

CDM and FDI Inflows in Sub-Saharan Africa : Comparative Study of South Africa and Rwanda

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Abstract

The Clean Development Mechanism (CDM) is the only Kyoto Protocol instrument that enables both developed and developing countries cooperate to response to climate change. The CDM is criticized due to its disproportionate regional market distribution. Sub-Saharan Africa (SSA) lags behind compared to other developing countries in CDM activities. However, even though South Africa is one of the countries in SSA region, its CDM activities and performance are more active than other African countries. This study aims to explore factors influencing the direction of CDM investment flows with compare analysis of two countries in Sub-Saharan Africa: South Africa and Rwanda. In general, South Africa, the continent's "Front Runner" as far as CDM is concerned in SSA, has 1) favorable business environment that attract potential CDM investors; 2) large-scale projects based on coal-based economy, which generate large quantities of CERs than small-scale projects; and 3) officially established and well-staffed local institution as well as CDM communication channels. On the contrary, Rwanda is 1) less attractive to FDI investors; 2) heavily dependent on agriculture sector which leads to have small-scale projects; and 3) lack of well-functioning institution.

Keywords:

Clean Development Mechanism, Foreign Direct Investment, Host Country Attractiveness, Sub-Saharan Africa

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Introduction

A core principle in the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC)¹⁾ is to protect the climate system “for the benefit of present and future generation of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities” (Article 3.1). The protocol obligates industrialized countries to reduce GHG emissions specific targets by 2012. In order to encourage parties to meet their emission targets in a cost-effective way, the Kyoto Protocol offers three market-oriented mechanisms²⁾. Unlike the other two mechanisms, the CDM enables developing countries, exempt from the Kyoto Protocol’s binding limits, to participate in the global emissions markets by selling tradable carbon credits, called certified emissions reduction (CERs)³⁾ through hosting projects. Under the CDM of the Kyoto Protocol, the so-called Annex-1⁴⁾ countries are able to achieve part of their binding GHG emission targets by financing and helping project activities that reduce emissions in developing countries, in return for CERs. As a project-based mechanism, new credits are continuously created if new projects are verified. CDM activities are broadly divided into energy (renewable energy, energy efficiency, agriculture, fuel switching, transport, waste) and afforestation/ reforestation (sinks) (de Lopez et al. 2009, 437). Annex 1 country entities (e.g. governments, private companies, market intermediaries) take certain forms in CDM transactions: 1) Investments in CDM projects (i.e. direct via

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- 1) In order to control anthropogenic GHG concentrations in the atmosphere and stop temperature increases, the UNFCCC, international environmental treaty, was produced at the Rio Summit in 1992. In 1997, the Kyoto Protocol was added to the treaty with the main intension of stabilizing GHG emissions at 1990 levels by setting more powerful and legally binding measures and entered into force on 16 February 2005.
 - 2) The Kyoto Protocol to the UNFCCC offers for three market-oriented mechanism: Joint Implementation (JI), Emissions Trading (ET), and the Clean Development Mechanism (CDM).
 - 3) The CERs are measured in tons of CO₂ equivalent. These are subject to a processes of verification and certification by a UN accrediting body before issuance and sale. cf. ERU (emission reduction unit) refers to the reduction of GHGs under JI, where it represents one ton of CO₂ equivalent reduced.
 - 4) Parties to UNFCCC are classified as: 1) Annex 1 including industrialized countries and economies in transition; 2) Annex 2 including developed countries which pay for costs of developing countries; and 3) Developing countries.

joint venture companies/wholly owned subsidiaries, or indirect (portfolio) that provide co-financing to projects that generate CER credits (investors receive the profit/return on investment and CERs; 2) Purchase of securities or purchase of yet-to-be generated CERs; or 3) CER trades on secondary markets (UNFCCC 2010).

Marrakech Accords emphasizes the importance of “equitable geographic distribution of clean development mechanism project activities at regional and sub regional levels” (UNFCCC 2010). However, the size and distribution of the CDM market are disproportionate among the non Annex 1 countries in relation to their market condition. Although CDM activities are undertaken in 69 host countries, these were unevenly distributed across region. China dominates the CDM market both in number of CDM (hosting 1,077 projects) and volume of CERs, followed by India, Brazil, and Mexico. Indeed, most of the projects are concentrated in Asia and Latin America. Due to the relatively low cost of emissions abatement in China (World Bank, 2008), many scholars forecast that China will still become the number one CDM implementing country. On the other hand, Africa countries have gained little from technology transfer from the CDM and generate few CERs (UNFCCC 2010). Especially Sub-Saharan Africa lags behind comparing to other developing countries. However, even though South Africa is one of the countries in Sub-Saharan region, its CDM activities and performance are more active than other African countries. The research starts from here. What are the reasons of Sub-Saharan Africa’s low participation in CDM? Is this because of a lack of potential CDM projects in the region? Then, why the performance of South Africa and other African countries are different even though they are located in the same region? What are the barriers that have prevented implementation of CDM projects in the region and how can African countries and other developing countries overcome these barriers?

Since the CDM is market oriented, it should attract FDI for implementing projects and this FDI flows are related the CDM portion. In this regard, this study aims to analyze factors influencing the direction of CDM investment flows with compare analysis of two countries in Sub-Saharan Africa: South Africa and Rwanda. The reason for choosing these two countries is South Africa has been actively implementing the CDM projects among Sub-Saharan African countries but Rwanda poorly performs in

CDM activities.

CDM-related Determinants of FDI Flows

FDI Inflows and CDM

According to the world-perceived definition announced by the Organization for Economic Cooperation and Development (OECD), foreign direct investment (FDI)⁵ is an “investment involving a long-term relationship and reflecting a lasting interest⁶ and control by a resident entity in one economy (foreign direct investor) in an enterprise resident in an economy other than that of the foreign direct investor (foreign direct investment enterprise)” (UNCTAD, 1998; OECD, 1999). It usually involves participation in management, joint venture, transfer of technology and expertise. CDM transaction involves private equity and some scholars view CDM projects as a form of FDI and regard it as a business opportunity. Also it has been thought that the CDM would follow an investment model, where actors from developed countries would invest in projects and then receive the emission reductions achieved in exchange. Therefore, FDI flows might serve as a useful indicator of potential CDM flows (Fankhauser and Lavric, 2003). Although some studies suggest FDI flows as one of the factors of the distribution of world CDM market, there are a few literatures on CDM-related determinants of FDI flows.

Determinants of FDI flows

Factors underlying the directional flow of FDI have been one of the most popular research topics and there have been a lot of studies undertaken to define what would

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- 5) There are two types of FDI: inward foreign direct investment and outward foreign direct investment. This study deals with only ‘inward’ FDI, investment coming from foreign countries.
 - 6) The lasting implies that the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise.

be the key determinants to FDI. The UNCTAD report (1998) conducted an analysis concentrated further on the location-specific (host country) determinants of FDI. It addresses foreign investors concern not only with economic characteristics of host countries but also with a policy framework and business environment when they decide their investment destinations (UNCTAD 1998, 91). Various economic, political and legal environments of host nations have been identified as factors influencing multinational corporations (MNCs)' decision to invest. In addition, in the CDM market, other factors, particularly CDM project types and whether host countries have well-established local capacity and institution, are affecting Annex-1 countries to invest in non-Annex 1 countries.

a. General Business Environment (Kaufmann-Kraay-Mastruzzi Worldwide Governance Indicators)

In recent years, the concept of governance has been receiving attention as key determinants influencing the direction of FDI flows (Lee 2010, 2; Dunning 2006; Globerman 2002). Globerman and Daniel found fairly strong evidence in their research suggesting that improvements in governance infrastructure will also affect capital outflows as well as net FDI flows. Globerman and Shapiro (2003) and Lee introduced governance as a determinant of FDI levels and analyzed the relationship between governance and FDI with the estimations of Kaufmann et al.'s governance indicators. They concluded that the developing and emerging economy's quality of governance and regulatory system have particularly strong effect on the respective countries FDI inflows (Globerman and Shapiro 2004; Lee 2010). Based on their work, this study expands its sphere to the CDM field and link FDI inflows to the factors influencing attractiveness of CDM host countries.

Table 1. KKM Indicators

Governance Indicator	Meaning
VA (Voice & Accountability)	Human rights, Democracy, Protection of civil liberties, Freedom of the press
PS (Political Stability)	Political terrorism, International tensions, Ethnic tensions, Risk of political instability
GE (Government Effectiveness)	Quality of bureaucracy, Independence of the civil service, Management and efficiency of public expenditures
RP (Regulatory Quality)	Anti monopoly, Easy to start company, Favorable banking/finance, Trade policy, Foreign exchange system, Tax system, Labor market policies
RL (Rule of Law)	Fairness of judicial process, Intellectual property protection, Property right
CC (Control of Corruption)	Corruption, Cronyism, Xenophobia, Nepotism

Source: Kaufmann et al. 2009.

Governance has become a guiding principle with regard to social, political, and environmental change during a decade. However the concept of ‘governance’ is somewhat multi-faceted and a lot of different definitions of governance exist in literatures. World Bank’s “Kaufmann-Kraay-Mastruzzi Worldwide Governance Indicators” (KKM Indicators) were designed to construct aggregate governance indicators more reflective of the six critical dimensions of governance. There are six governance indicators originally devised by Kaufmann et al., which put together various aspects of the governance structures able to cover a broad cross-section of countries. These are: Voice & Accountability, Political Stability and Lack of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption.

b. Project Types

Projects that produce large quantities of CERs at lower costs are financially more attractive. The current CDM market is dominated by the cost-effective and large-scale projects (such as the capture and destruction of HFC-23, a very powerful GHG). Yet, smaller projects⁷⁾, which are generally supposed to contribute more to sustainable

7) Small-scale projects refer to projects with a capacity of less than 15 MW, annual energy production of less than 15 GWh, or annual emissions and emission reductions of less than 15000 tCO_{2e}

development, are too expensive to carry out (Ellis et al. 2007; Muller 2007).

In order to find places to carry out CDM projects, Annex-1 countries would consider how much they could get CERs. If there are large quantities of GHG emission reduction, it would be easy to get CERs. Thus, it would be important for Annex 1 countries how much the potential CDM market gives opportunities to reduce GHGs emissions. Therefore Annex-1 countries would like to implement projects in a country where the volume of GHGs emissions are quite large so that they could get large CERs. This volume of GHGs emissions are largely related to a country's major economic sector whether it depends on energy sector based on fossil fuels or on primary sector.

In addition, how much a country is vulnerable to climate change or contributes to GHG emissions is an important determinant to decide its climate change policy. Both adaptation and mitigation efforts are critical in climate change policy implementation. However, countries which are vulnerable to climate change tend to focus on adaptation and increasing their capacities because it is directly related to their survival, whereas large quantities of GHGs emitting countries are more likely to focus on mitigation. What kinds climate change polices a country (especially for Non-Annex 1 countries) has may affect the participants of CDM markets.

c. Local Capacity and Institution

Institutional arrangements for the CDM in host countries and capacity development are frequently mentioned as crucial for the success of CDM projects (Figueres 2002). The quality of the designated national authority (DNA) (e.g. structure, funding, staffing, definition of sustainability criteria, national approval procedures, CDM communication channels) is considered particularly important because this institution is the host country's body that evaluates potential CDM projects and provides written approval before the project can be registered.

In addition to having well-functioning institution, whether a country has local-based capacity building program for hosting and implementing CDM projects more cost effectively is influencing future CDM investors. Also, how policy makers and private sectors are well aware of CDM projects is important, to some extent, for planning CDM projects and hosting developed countries.

Case Study

General Investment Flows and Level of CDM

According to the United Nations Conference on Trade and Development (UNCTAD)'s analysis of the overall FDI inflows, FDI inflows in millions of US dollars as well as FDI inflows per capita are extremely low for Rwanda but much higher for South Africa (see Table 2). Although South Africa's FDI Inflows account for still small portion of world FDI Inflows comparing to that of China, there is obviously a big gap between South Africa and other Sub-Saharan Africa (SSA) countries.

Meanwhile, the number of registered CDM projects is analogous to the FDI inflows. As of November 2010, 17 projects were registered at UNFCCC DNA by South Africa, but only one project has been implemented in Rwanda. Many analysts have pointed out the correlation between the level of CDM and FDI flows (Fankhauser and Lavric, 2003; Niederberger and Saner, 2005; Ellis et al., 2007), meaning that the same factors that contribute to low inflows of FDI to sub-Saharan Africa are likely to make Annex I countries reluctant to invest in CDM projects in the region.

In addition, the CDM investment climate index shows that South Africa is favorable condition for CDM activities. The CDM ICI measures the investment climate for CDM projects. It can range between 100 points (highest) and 0 points (lowest) classified as good, satisfactory, adequate and unsatisfactory climate. Altogether, the climate is rated as 'good' in South Africa. Among 52 African countries, South Africa ranks at the first place (79.4) whereas Rwanda has adequate climate ranked at 22nd (34.8). Then, what makes these two countries have different CDM host country attractiveness? Below section compares these two countries regarding their general business environment, project types and local capacity institution.

Table 2. Total FDI Inflows (US\$ million)

		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
FID Inflows (US\$ million)	Rwanda	2	8	19	2	3	11	14	31	82	103	119
	South Africa	1,502	887	6,784	1,569	734	798	6,647	-527	5,695	9,006	5,696
	China	38,753	38,399	44,241	49,307	57,076	54,936	79,126	78,094	138,413	147,791	78,192
	SSA (excluding SA)	79	73	96	124	149	150	168	218	372	356	355
	SSA (including SA)	187	136	308	269	344	343	576	715	831	1,056	902

Source: UNCTAD Statistics (Data as of December 2010)

<http://unctadstat.unctad.org/TableViewer/tableView.aspx>

*SA: South Africa

SSA: Sub-Saharan Africa

Comparison: South Africa and Rwanda

a. General Business Environment

Table 3 indicates the overall governance score of Rwanda and South Africa which largely affect investment climate. In fact, since both two countries are African countries, they still account for small portion of FDI flows and general governance scores are low at the world level. However, when comparing only two countries, the government of South Africa is open to foreign investment, which it views as a means to drive growth, improve international competitiveness, and obtain access to foreign markets. Virtually all business sectors are open to foreign investors. No government approval is required to invest, and there are almost no restrictions on the form or extent of foreign investment.

Table 3. World Governance Indicators

	VA		PS		GE		RQ		RL		CC		Average	
	PR	GS	PR	GS	PR	GS	PR	GS	PR	GS	PR	GS	PR	GS
R	10.9	-1.29	33.5	-0.33	48.6	-0.18	41.4	-0.34	36.3	-0.51	61.9	+0.13	38.77	-0.42
SA	66.4	+0.56	44.3	+0.02	67.6	+0.51	64.3	+0.42	56.1	+0.06	60.5	+0.10	59.87	0.28

Source: WGI Indicators Report (World Bank), 2010

* GS: Governance Score (-2.5 to +2.5)

PR: Percentile Rank (0 to 100)

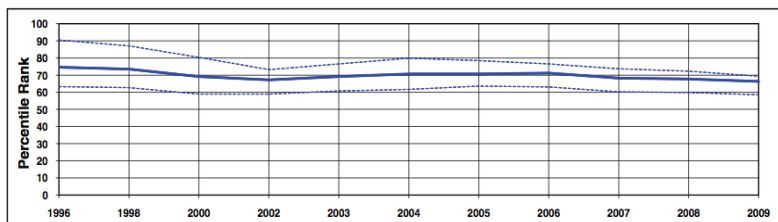
SA: South Africa

R : Rwanda

1) Voice & Accountability

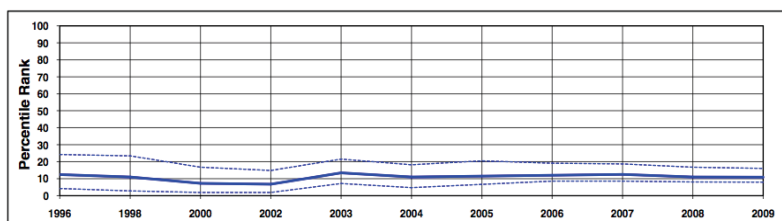
SOUTH AFRICA, 1996-2009

Aggregate Indicator: Voice & Accountability



RWANDA, 1996-2009

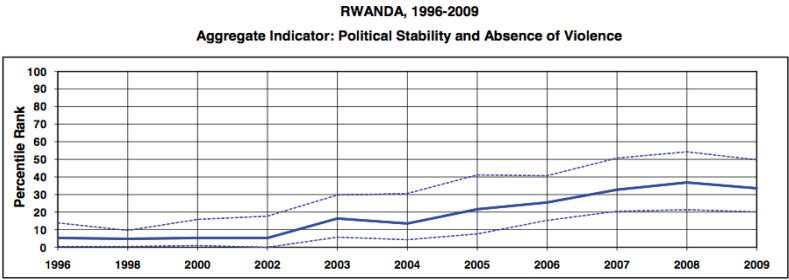
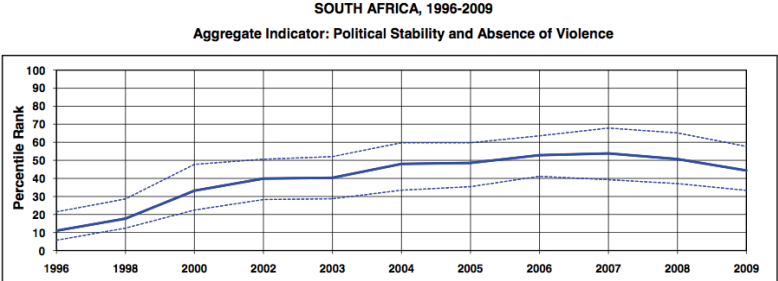
Aggregate Indicator: Voice & Accountability



There are large gaps in VA between Rwanda and South Africa. Since VA coincides with the concept of the general level of democracy, this can be understood democracy in South Africa is better established than in Rwanda. Indeed, the degrees of human rights, democracy index and civil liberties are much higher in South Africa. A free and

open press is one of the pillars of democracy. South Africa has better situation on the freedom of the press and there are now no African countries with a media considered to be free. Rwanda has seen many improvements in the transition to democracy since the end of the 1994 genocide, but freedom of speech is not one of them. Rwanda’s status of the press has been not free for years (Freedom House 2010). Since the genocide, in order to increase the transparency and accountability of Rwandan police, the Government of Rwanda has made some progress strengthening monitoring and investigation of police performance.

2) Political Stability and Absence of Violence/Terrorism

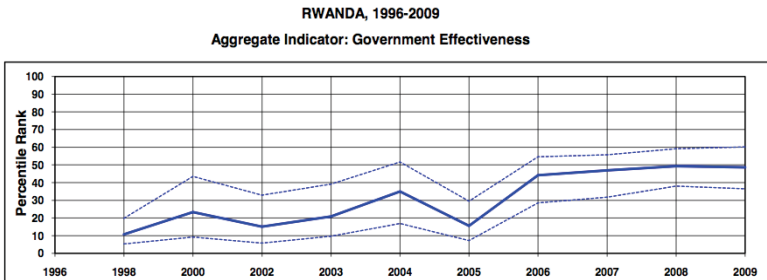
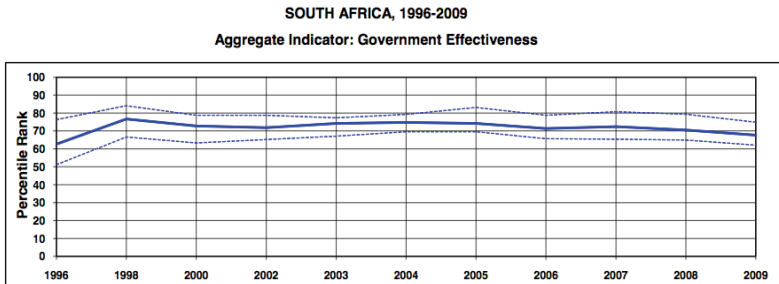


Rwanda experienced significant political and economic instability. After the outbreak of the genocide, the government has focused on the 4Rs, namely; reconciliation, reform, reconstruction, and regional stability. Since 2002, Rwanda’s political condition has become stabilized but still lower than South Africa. As business entities prefer to invest in politically stable countries to keep their tangible and

intangible assets and to preserve all of business activities, political stability do affect its FDI flows.

3) Government Effectiveness

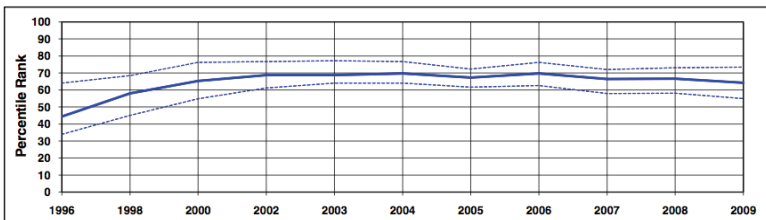
Bureaucratic performance plays a crucial role in determining financial market development. The quality of bureaucratic performance affects the overall level of transaction costs evident in case of calculability of risks in profit-making opportunities for economic actors. Since 2006, Rwanda’s overall quality of bureaucracy, competence of its civil servants, independence of the civil service function from political pressures, and the general credibility of the government’s ability have been improved. Generally, it is appraised that the administration is functioning quite effectively throughout the entire country. The quality of the policy regime is an important determinant of allocation of FDI flows. “The better the bureaucracy the quicker decisions are made and the more easily foreign investors can go about their business” (Global Insight 2003).



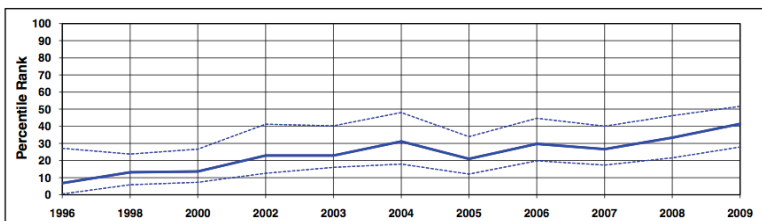
4) Regulatory Quality

Regulatory quality refers to the regulation about economic and business activities such as tax, trade policy, and exchange system. MNCs may not invest in a country which has many regulations to restrict to use resources, employ labor, sell products, and contract with domestic or other foreign company. FDI flows are greater in a particular country which labor regulation is more flexible (Javorcik and Spatareanu 2004). Also favorable taxation (or lower tax level) to foreign investors has a positive impact on FDI flows (Lee 2009, 14). South Africa has a relatively well-developed and regulated taxation regime comparing to other African countries. No government approval is required to invest, and there are almost no restrictions on the form or extent of foreign investment. The Department of Trade and Industry's (DTI) Trade and Investment South Africa (TISA) division provides assistance to foreign investors (Investment Climate Statements 2008). Rwanda has steadily reformed its commercial laws and institutions since 2001. Rwanda is still developing its legal investment infrastructure but the commercial judicial system continues to lack capacity.

SOUTH AFRICA, 1996-2009
Aggregate Indicator: Regulatory Quality

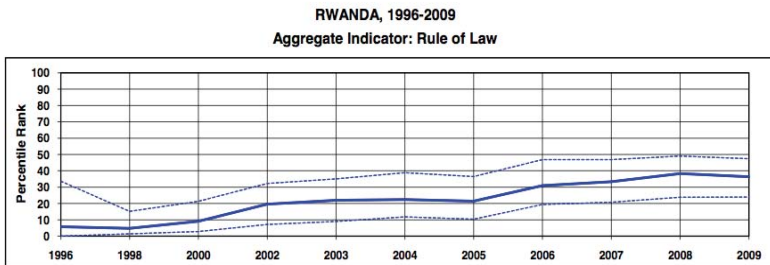
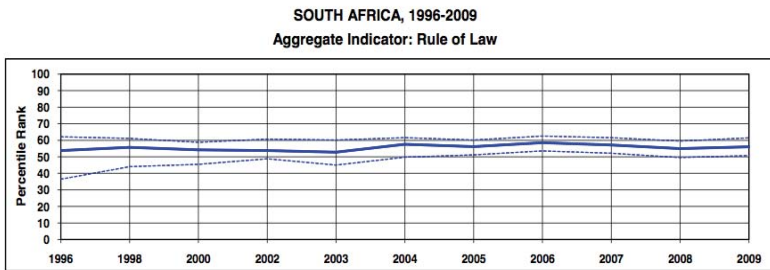


RWANDA, 1996-2009
Aggregate Indicator: Regulatory Quality



5) Rule of Law

RL describes the effective function of both the judicial system and law enforcement. Countries with better functioning legal systems attract more FDI (Globerman and Shapiro 2003). The South African legal system protects and facilitates the acquisition and disposition of all property rights, e.g., land, buildings, and mortgages Banks usually provide finance for the purchase of property by registering the mortgage as security (Investment Climate Statements 2010).



Project Types

a. Major Economic Sector

1) South Africa

South Africa is Africa's largest power producer and consumer. Coal makes up the backbone of energy supply, accounting for about 76% of primary energy consumption

(International Energy Agency 2010). South Africa occupied sixth place worldwide for coal-based electric power generation in 2003 (CIA World Fact Book 2010). Owing to the pollutant emissions from the energy industry, the scope for CO₂ savings in the country is generally very large. The energy needs of the South African economy continue to grow rapidly. South Africa's large coal-based economy offers large possibilities for CDM projects and these are shown through their early experiences under JI.

2) Rwanda

Rwanda's economy is still small and the country heavily depends on agriculture. About 85 percent of the population of this poor rural country engages in (mainly subsistence) agriculture and some mineral and agro-processing which are less profitable for creating CERs (CIA World Fact Book 2010). Agriculture is an "unmovable cornerstone" of Rwandan society⁸⁾. 80 percent of the people depend on the land for their livelihoods.

b. Type of Efforts to Respond to Climate Change

Table 4. CO₂ Emissions by Country in 2007

Rank	Country	Annual Co ₂ Emissions (in thousands of metric tons)	Percentage of Global Total
	World	29,321,302.00	100%
1	China	6,538,367.00	22.30%
2	United States	5,838,381.00	19.91%
-	European Union	4,177,817.86	14.04%
3	India	1,612,362.00	5.50%
4	Russia	1,537,357.00	5.24%
5	Japan	1,254,543.00	4.28%
6	Germany	787,936.00	2.69%
7	Canada	557,340.00	1.90%
8	United Kingdom	539,617.00	1.84%

8) <http://allafrica.com/stories/20101230060.html>

...
13	South Africa	433,527.00	1.48%
....
165	Rwanda	715.00	< 0.01%
215

Source: CDIAC for the United Nations 2008

1) South Africa

In fact South Africa is still a developing economy. However, in that they are largely dependent on coal-driven energy sources together with its energy-intensive economy their carbon emission level per unit of GNP is extremely high compared to the other countries. The emission levels are equivalent to that of developed nations such as the United Kingdom (Table 4). Meanwhile, South Africa is located in one of the regions most susceptible and vulnerable to climate change. In this sense, South Africa is a contributor to global climate change, but in the other sense, they are potential victims and vulnerable to its impacts. Together with other countries, South Africa has made efforts to stabilize GHG concentrations in the atmosphere. Also thanks to their GHG emissions, there are possibilities to generate CERs in implementing the CDM projects.

2) Rwanda

Rwanda is greatly affected by climate change while its greenhouse gas emissions are negligible (See table 3). Their climate change policy has much focused on adaptation rather than mitigation although emissions are likely to increase with a growing economy. Rwanda is politically committed to a sustainable development with a strong focus on renewable energies. The Rwandan Government has already invested substantially in reforestation, efficient biomass use, energy sources including hydropower, methane gas and solar photo voltaic. However, initial investments for clean technologies are very capital intensive which can be problematic. Rwanda is preparing a number of carbon trade initiatives for efficient lighting, hydro-power projects, Lake Kivu methane gas to power, solar and biomass related energy projects as well as carbon capture benefits through forestry programs (Ministry of Environment

and Lands of Rwanda).

Local Capacity and Institution

South Africa has an officially established and well-staffed DNA (seven permanent staff) thus they can be stably provided funds from both domestic and external budgets. Also, based on the institution, they actively promote successful CDM projects through showcase (targeted workshops, occasional TV programs, brochures/newsletters). Moreover, South Africa has investment promotion agencies (IPAs) such as the Development Bank of Southern Africa, which work with municipalities and which was early engaged with the World Bank's carbon funds, acting as an intermediary in the identification of projects, and providing some capital, though not being responsible for technical assessment (Pfeifer, 2008). Indeed, the presence of such agencies has contributed to the South Africa's CDM activities. While, a few CDM capacity development activities have been taken place in Rwanda and these are initiated and carried out by outside agencies, not by the DNAs (Byigero 2010, 185).

Implication for Sub-Saharan Africa

CDM in Sub-Saharan Africa

Like other developing countries, countries in Sub-Saharan Africa region are expected to get opportunities for cleaner and low carbon economic development through the CDM as well as other climate change mitigation funding mechanisms such as World Bank's Climate Investment Funds (CIFs), Forest Carbon Partnership Facility (FCPF) and the Reducing Emissions through Deforestation and Degradation (REDD). Until now, however, Sub-Saharan Africa's participation under the CDM has been extremely low. Out of the 1,596 projects already registered under the CDM only 20 are in the SSA (and 15 out of the 20 in South Africa). In terms of CERs to be

delivered by 2012, these projects account for 2.25 percent of the total. Even if all 4,733 CDM projects already registered, requesting registration and submitted for validation are considered, SSA's share merely accounts for 1.6 percent in terms of the number of projects and 2.5 percent in terms of emission reduction by 2012 (UNFCCC). Except for South Africa, most SSA countries have similar characteristics of the CDM project types and environment, like Rwanda.

In general Sub-Saharan Africa countries perform poorly in corruption perception surveys, trailing at the bottom of international rankings (Transparency International, 2009). Civil unrest, expropriation, breach of contract, and other nonpayment contribute to increasing the political and economic risks confronting CDM project developers in SSA.

An analysis of GHG emission profiles based on national communications submitted by SSAs to the UNFCCC shows that these countries have limited energy industries and industrial processes, and thus limited emissions from these sectors. Even though limited aggregate GHG emissions may lead to little opportunities for GHG emission reduction, this does not mean that there are no potential for CDM activities (de Lopez et al. 2009, 439-441). In fact the energy, industrial, and agricultural production in SSA is fragmented among a range of small-medium enterprises, cottage industries, and household businesses, rather than concentrated in large commercial entities. GHG mitigation could be realized not only in large industrial conglomerates but also in cottage industries and household activities (de Lopez et al, 2009, 449).

African leaders and delegates at UNFCCC meetings have repeatedly called for increased capacity building to enable their countries to participate more strongly in CDM. One result of this was the creation of the Nairobi Framework (NF), which was launched during the Conference of the Parties serving as the Meeting of the Parties, or COP-12/MOP-2, in Nairobi in November 2006. The NF Initiative is geared towards building CDM capacity with a view to fostering better CDM penetration, particularly in Africa (UNFCCC 2007 and 2008). Five international agencies are involved in this framework: the World Bank, the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the African Development Bank (AfDB) and the United Nations Framework Convention on Climate Change (UNFCCC)

(Skutsch et al. 2010). The NF has five objectives: 1) to build and enhance the capacity of DNAs to become fully operational; 2) to build capacity in developing CDM project activities; 3) to promote project investment opportunities; 4) to improve information-sharing/outreach/exchange of views on activities/education and training; and 5) inter-agency coordination⁹⁾. In practice, however, the NF does not propose a consolidated joint programme for all the NF sponsors. Although the UNDP has provided a series of training courses in six African countries under the NF, there is little evidence of consensus between the donors and the prospective African beneficiaries. It seems that the main multilateral and bilateral agencies supporting the NF at the UNFCCC level have not all endorsed it internally, and has not had time to plan their activities around it (ICF International, 2007). Olsen summarizes the problem as follows: ‘the goals and motivations of donors and beneficiaries are mistakenly assumed to be shared in partnerships and non-existing consensus’ (Olsen, 2006). Based on the case study, this study draws implications for other Sub-Saharan countries including Rwanda.

Devising Project Types

It is generally considered that large-scale projects produce large quantities of CERs at lower costs and these are thus financially attractive. However, not all CDM projects are built on industrial processes. Landfill gas flaring is a case in point, and South Africa has several at the municipal level. Afforestation and reforestation activities are also eligible for CDM, and might be more suited to African countries. In fact, global experience has shown that these kinds of projects have been very difficult to fund under the mechanism (with one in Guangxi Province in western China registered with the UNFCCC by March 2008, and a second in India in early 2009), despite the fact that a large number of methodologies have been approved and are available for use. Therefore it needs to simplify procedures for forest conservation in Africa region (De Lopez et al 2009). In addition to this, some scholars suggest development of sub-regional projects and bundling projects as a form of programme of activities (PoA), or called ‘programmatic CDM’. PoA are designed to solve the problems of current

9) http://cdm.unfccc.int/Nairobi_Framework/index.html

CDM market by reducing transaction costs and policy-based PoA. PoA contributes to reduction in transaction costs to make used-to-be unfeasible projects types but. Policy-based PoA also can attract unilateral participation of unpopular nations to host projects which consequently helps to relive geographical disparity (Dave 2009). Also, through bundling small-scale projects, transaction costs are somewhat reduced. However, the PoA has only three-year-history and considered as very immature. Meanwhile de Lopez suggested developing new “micro” category taking a form of “micro - small - full sale project” (De Lopez et al. 2009). In addition to this, to create simplified rules and expedited procedures applicable to African countries that currently host few CDM projects is another option (Cosbey et al 2005).

Business Environment

Governance has an effect on the decision making process of foreign entities in deciding where to invest. Regarding business environment, it is important for each government’s effort to attract more FDI through improvements in overall various governance factors. Plus, building the capacity and support local/national and regional banking institutions to finance viable CDM projects, such as establishment of African CDM Investment Fund, might be another way of boosting CDM-host attractiveness (Byigero et al. 2010).

Establishment and Development of DNA Supporting Institution

In order to expand local capacity, establishment and development of DNA supporting institution is significant. Through the role of regional and internal DOEs, direct registration and certification of CDM activities in SSA by the UNFCCC secretariat would be possible (de Lopez et al 2009). This institution will support other public institutions (e.g. national investment centers) or sub-regional and/or regional center to serve as anchors for CDM activities. It might also support the public/private sector entities for CDM project development (especially the development of baselines,

methodologies and monitoring programs in the energy, transport and forestry sectors). In addition, regarding initiatives by Africa, Nairobi Framework and South South North Project, their role should be clarified (Byigero et al 2010). These initiatives take some roles in increasing CDM awareness for 1) policy makers, 2) private sector (Private sector to stimulate their interest and to see the opportunities in carbon market; and 3) regional, sub-regional and national financial and business institutions through organize regional and sub-regional forums to share experiences and best practices (de Lopez et al 2009).

Conclusion

The Clean Development Mechanism was developed as a new and innovative channel that links developing and developed countries' efforts to response climate change together. As a market based mechanism, the CDM is using and affected by market forces and developing countries try to attract foreign direct investment (FDI) for implementing projects. However, since investments tend to flow toward the large markets that offer higher profits with little political and economic risks, the size and distribution of the CDM market are disproportionate. Sub-Saharan Africa (SSA) lags behind compared to other developing countries in CDM activities.

This paper explores CDM activities are correlated with FDI flows. The case study of South Africa and Rwanda demonstrates the factors influencing the direction of CDM investment flows and CDM-host country attractiveness. These are general business environment, type of the projects, and local capacity.

Compared with South Africa, Rwanda is in a less favorable position both in investment opportunities and implementing CDM projects. South Africa's coal-based economy is able to introduce projects that produce large quantities of CERs, while Rwanda is heavily dependent on agriculture and thus limits the types of projects to the small-scale ones projects which are less profitable for making CERs. In addition, the officially established and well-staffed DNA in South Africa stably provides funds and CDM communication channels. However, Rwanda is lack of well-functioning

institution and a few CDM capacity development activities have been taken place.

Indeed, the characteristics of CDM activities in most Sub-Saharan African countries are similar to that of Rwanda. Therefore remaining SSA countries' future CDM activities depend on how they attract CDM investment flows from the Annex 1 countries. Even though limited aggregate GHG emissions may lead to little opportunities for GHG emission reduction, this does not mean that there are no potential for CDM activities. Besides overall improvement of investment climate and strengthen local capacity through building DNA supporting institution, it is needed to devise projects types which can utilize their limited energy industries, industrial circumstances or environment such as projects related to climate-friendly technologies or afforestation/reforestation or projects can be done in cottage industries and household businesses.

References

- Baumert, K., Kete, N., & Figueres, C. 2000. Designing the Clean Development Mechanism to meet the needs of a broad range of interests. Washington, DC: WRI.
- Boseley, Sarah. 2010. Rwanda at pains with democracy. [available at <http://www.mg.co.za/article/2010-06-04-rwanda-at-pains-with-democracy>]
- Boyd, E et al. 2009. Reforming the CDM for sustainable development: lessons learned and policy futures. *Environmental Science & Policy* 12:820-831
- CDM Rulebook. 2010. Designated Operational Entities. Sydney: Baker & McKenzie. [available at <http://cdmrulebook.org/62>]
- CIA, 2010, World Fact Book [available at www.cia.gov/library/publications/the-world-factbook/index.html]
- de Lopez, Thanakvaro, Ponlok Tin, Keisuke Lyadomi, Sergio Santos, and Bridget McIntosh. 2009. Clean development mechanism and least developed countries: changing the rules for greater participation. *The Journal of Environment & Development* 18: 436-452.
- Dave, Rutu. 2009. *Programmatic CDM – An new tool under carbon finance*. Paper presented at Carbon Finance Assist, September 28, in Quezon City, Philippines.
- Dunning, J. H. 2006. Towards a new paradigm of development: implications for the determinants of international business activity. *Transnational Corporations* 15(1): 173-228.
- Dutschke, M., Michaelowa, A., 1998. Creation and Sharing of Credits through the Clean Development Mechanism Under the Kyoto Protocol. HWWA Discussion Paper 62. Institut für Wirtschaftsforschung, Hamburg.
- Ehlers, C., 2006, CDM-Market Brief. CDM Investment Climate Index: Regional Comparison – South Africa [available at www.gtai.de/DE/Content/___SharedDocs/Anlagen/PDF/CDM/cdm-marktsuedafrikaenglish,templateId=raw,property=publicationFile.pdf/cdm-markt-suedafrika-english?show=true].
- Ellis, J., H. Winkler, J. Corfee-Morlot, & F. Gagnon-Lebrun, (2007). CDM: Taking

- stock and looking forward. *Energy Policy* 35: 15–28.
- Fankhauser, Samuel and Lucia Laviric. 2003. The investment climate for climate investment: Joint Implementation in transition countries. European Bank for Reconstruction and Development, Working Paper No. 77.
- Freedom House. 2010. *Freedom of the Press 2010 – Rwanda*. [available at: <http://www.unhcr.org/refworld/docid/4871f62a2.html>].
- Globerman, Steven and Daniel Shapiro. 2003. Governance infrastructure and US foreign direct investment. *Journal of International Business Studies* 34: 19-39.
- Globerman Steven, Hall, R.E., Jones C. I., 1999. Why do some countries produce so much more output per worker than others? *The quarterly Journal of Economics*. 114: 83-116.
- Globerman, Steven and Daniel Shapiro. 2002. Global foreign direct investment flows: the role of governance infrastructure. *World Development* 30(11): 1899-1919.
- Javorcik, B. and Spatareanu. 2004. Do foreign investors care about labor market regulations? Policy Research Working Paper 3275. World Bank. Washington DC.
- Jung, Marina. 2005. Host country attractiveness for CDM non-sink projects. HWWA *Discussion Paper* No. 312.
- Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi. 2010. The Worldwide Governance Indicators: Methodology and Analytical Issues. *World Bank Policy Research Working Paper* No. 5430. [Available at SSRN: <http://ssrn.com/abstract=1682130>]
- Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi. 2009. Governance Matters VIII: Aggregate and Individual Governance Indicators. *World Bank Policy Research Working Paper* No. 4978. [Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1424591]
- Kolk, A., & J Pinkse. 2007. Private actors and the governance of global climate change. Paper presented at the Amsterdam Conference on the Human Dimension of Global Environmental Change, Amsterdam.
- Lee, Si-Young. 2010. *Governance Attractiveness for Inward FDI*. Seoul: Korea University.

- Michaelowa, A. 2003. CDM host country institution building. *Mitigation and Adaptation Strategies for Global Change* 8(3): 201–220.
- Minister of Water and Environmental Affairs in South Africa. 2010. National Climate Change Response Green Paper 2010.
- Mwakasonda, S., 2006, ‘Africa is energizing itself’, presentation to the 4th Global Forum on Sustainable Energy, Vienna, 29 November–1 December.
- Niederberger, A., Saner, R., 2005, ‘Exploring the relationship between FDI flows and CDM potential’, *Transnational Corporations* 14(1), 1–40.
- Olsen, K.H. 2006. National ownership in the implementation of global climate change policy in Uganda. *Climate Policy* 5. 599-612.
- Pearson, B. 2007. Market failure: Why the clean development mechanism won’t promote clean development. *Journal of Cleaner Production*, 15, 247–252.
- Prefier, G. 2008. New instruments for attracting FDI: carbon finance in Africa. *Responsible Enterprise, Foreign Direct Investment and Investment Promotion*. IIED. London
- Reyntjens, Filip. 2010. Constructing the truth, dealing with dissent, domesticating the world: governance in post-genocide Rwanda. *African Affairs* 110(438): 1-34.
- Skutsch, Margaret, Alfred D Byigero, Joy Clancy. 2010. CDM in sub-Saharan Africa and the prospects of the Nairobi framework Initiative. *Climate Policy*. 10(2010): 181-189
- T. Sowell, 1980. *Knowledge and Decision Basic Books*.
- United Nations (UN). 1998. *Kyoto Protocol to the UN Framework Convention on Climate Change*.
- UNFCCC. 2001. *Report of the Conference of the Parties on its seventh session, held at Marrakech from 29 October to 10 November*
- UNCTAD. 2010. *FDI statistics*. [available at <http://unctadstat.unctad.org/TableView/tableView.aspx?ReportId=88>]
- UNCTAD. 2010. *World Investment Report 2010*. United Nations: New York and Geneva.
- U.S. Department of State. 2010. *2010 Investment Climate Statement: Rwanda*. Bureau of Economic, Energy and Business Affairs. [available at <http://www.state>.

- gov/e/eeb/rls/othr/ics/2010/138135.htm]
- Wara, M., 2007. Is the global carbon market working? *Nature* 445, 595–596.
- Wei, Y., Balasubramanyam, V.N., 2004, Foreign Direct Investment: Six Country Case
- Winkler, H., Davidson, O., Mwakasonda, S., 2005, ‘Developing institutions for CDM; an African perspective’, *Climate Policy* 5, 207–218.
- World Bank. 2010. World Wide Governance Indicator. [available at <http://info.worldbank.org/governance/wgi/index.asp>]
- Zhang, Z., & A. Maruyama. 2001. Towards a private–public synergy in financing climate change mitigation projects. *Energy Policy*, 29, 1363–1378.

(Footnotes)

- 1 In order to reduce errors, average FDI inflows in SSA are calculated excluding that of the highest two countries (Sudan and Nigeria) and the lowest two countries (Angola and Benin) because difference among these two countries and remaining SSA countries were quite big.