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# **Environment and Climate Change Management: Perspectives for Post-Conflict Colombia**

## **Policy Brief**

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## **Executive Summary**

Environment and natural resources are linked to violent conflict and human rights in Colombia in several ways. While conflict over land rights is a well-known cause of involuntary displacement, revenues from illicit drugs fuel conflict through providing financing for armed groups. Conflict and unequal development also lead to environmental degradation and loss of ecosystem services which particularly affect poor men and women. They have least capacity to cope with health problems related to poor water and air quality, food insecurity or economic shocks following natural disasters.

This Policy Brief outlines key environmental and climate change issues in Colombia and discusses how these are linked to conflicts, human rights and a post-conflict scenario. The analysis provides input to the ongoing process to draft a new Swedish cooperation strategy for Colombia and responds to the Swedish Governments thematic priority of Environment and Climate Change in Development Cooperation.

### **Environment, Land and Conflict**

With one of the largest displaced populations in the world, forced displacement has intensified the process of urbanization, making urban environmental problems and the associated health consequences particularly costly to Colombian society. These include air pollution, inadequate water supply and sanitation in poverty belts surrounding most urban centres. Slums are typically more prone to natural disasters such as landslides.

Although not always recognized, the violent conflict has had both negative and positive effects on local environments in rural Colombia and in the country's tropical forests, which are amongst the most diverse in the world. Armed groups have displaced people in order to use the abandoned lands for growing illegal crops, mining, and in extensive agriculture. Important waterways and extensive areas of land have been affected by oil spills caused by guerrilla attacks. In some territories however, the armed conflict has led to environmental preservation. Extensive land areas that would have otherwise been used in legal and illegal production have remained abandoned and unused.

The Victims and Land Restitution Law of 2011 constitutes a significant land restitution effort by the Colombian Government. Important steps have been taken in the peace talks between the Colombian Government and the guerrilla group FARC, including a preliminary agreement in May 2013 on rural development. Central to the so-called Integral Rural Reform (Reforma Rural Integral RRI) accord is a fairer distribution of land and of opportunities to exploit it. However, environmentalists have expressed concerns as a large proportion of the municipalities to be prioritized under RRI in post-conflict Colombia are highly sensitive from an environmental perspective. Coupling RRI together with land use planning that takes into account the agro-ecological characteristics of the different regions is viewed as a pivotal element in building lasting peace. At the same time, local environmental governance in Colombia is rather weak and the process of development and implementation of land use plans do not meet basic environmental and socio-economic standards.

### **Environmentally Harmful Resource Extraction**

Extraction of mineral resources is taking place at an environmental cost. In some cases this activity is linked to the financing of armed groups. Strengthening local institutions and improving the transparency surrounding mining would be an important step towards rule of law and democratic governance.

### **Climate Change and Disaster Risk Management**

Climate change puts additional strains on fragile social and political systems. This is particular true in Colombia, a country with significant governance challenges and one of the most vulnerable countries in the world to climate change. All glaciers of the country are predicted to disappear within the next 40 years and large changes in precipitation patterns are expected. With the expected rise in sea level, millions of inhabitants are at risk of exposure to flooding in coastal zones. While the national government has initiated a number of climate change adaptation initiatives, including the formulation of the National Climate Adaptation Plan, a number of challenges remain, including improving cross-

sectoral coordination. Despite its relatively small contribution to climate change and high vulnerability to its impacts, Colombia has played a constructive role in international climate change negotiations.

### **Strengthened Environmental institutions: A Prerequisite for Green Growth**

The Colombian Government formulated an ambitious Green Growth Policy in 2015. This is in line with OECD recommendations provided in the context of the country's accession process to this organization. This opens a window of opportunity to create high level political attention to environmental issues. However, strengthening the country's environmental institutions is a necessary condition for green growth and its potential contribution to peace building.

### **Recommendations**

In the development of a new cooperation strategy with Colombia, we recommend that the following issues be considered:

*Integrate environmental considerations in support to land titling and rural development:* Sweden should highlight the need for proper environmental and social assessments of rural development initiatives. Particular attention in a possible capacity development support could be payed to the linkages between natural resource tenure and gender equality.

*Highlight the need for environment and social assessments of rural development initiatives:* Sweden should highlight the need for proper environmental and social assessments of rural development initiatives. Links should be made to the Swedish funded environmental impact assessment of the land restitution process from 2013.

*Support to improve environmental governance linked to the post-conflict agenda:* Pro-active and pro-poor natural resources management plays a key role in a post-conflict scenario. Sida could investigate possibilities to support Colombia's Green Growth policy as a peace building initiative.

*Support to climate adaptation strategies and disaster risk reduction:* Colombia is a highly unequal country and disadvantaged communities, including displaced and poor populations, are disproportionately affected by the impacts of climate change. Sida could actively promote that disaster risk reduction is included in environmental and social assessments of plans for land titling and rural development.

*Improve the knowledge base on environment-gender and climate-gender interactions:* Gender and environment are thematic priorities in Swedish development cooperation but the knowledge on the linkages between these priority themes in Colombia is, at best, weak. Including the environment-climate-gender relations in the policy dialogue would help raise awareness about gender issues in the country.

*Support to the Government of Colombia in necessary reforms related to the mining sector.* The formalization of the mining sector constitutes a major challenge for Colombia and Sida could become an important strategic partner in this area.

*Collaboration with new actors:* As part of a possible post-conflict scenario, Swedish actors with rich experiences from land titling, forest management and mining may contribute to socio-economic development, trust and peace building in ways that have not been conceivable during earlier strategy periods. This merits further analysis.

*Inclusion of climate change and environmental issues in analyses and programming:* Environment and climate change related issues have not explicitly been part of Swedish development cooperation with Colombia. However, as this review has shown, there are many important linkages between environment/natural resources and Swedish areas of key concern, such as conflict prevention, gender, human rights and involuntary displacement. We encourage Sida to analyze and discuss these issues further in the development and implementation of the new cooperation strategy.

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## 1 Introduction

Environment and natural resources are linked to violent conflict and human rights in Colombia in several ways. While conflicts over land rights is a well-known cause of involuntary displacement, illicit drugs fuel conflict through providing financing for armed groups. Conflict and unequal development also lead to environmental degradation and loss of ecosystem services which particularly affect poor men and women. They have least capacity to cope with health problems related to poor water and air quality, food insecurity or economic shocks following natural disasters. The links between climate change and conflict need to be further explored, but climate change can be viewed as adding to existing stresses and is likely to have profound effects on development in Colombia.

This Policy Brief outlines key environmental and climate change issues in Colombia and discusses how these are linked to current conflicts, human rights and a post-conflict scenario. The analysis provides input to the ongoing process to draft a new Swedish cooperation strategy for Colombia and responds to the Swedish Governments thematic priority of Environment and Climate Change in Development Cooperation.

The report is based on a desk study.<sup>1</sup> It used, whenever possible, up-to-date information from government policies and reports, national and international studies, press reports and communications from the peace negotiation table. Its aim is to assist the Swedish International Development Cooperation Agency, Sida, in prioritizing cooperation areas by considering the environment as an integral factor of social and economic development processes. The reader should note the limitations involved in doing a short analysis of this broad and highly complex theme, including access to data and the need to make general statements about locally specific environmental and social problems.

The document is structured as follows. In section 2, the environmental problems considered to be most important from a poverty reduction perspective are identified, their main impacts on poor people, productivity, migration etc., and the expected effects of climate change. Section 3 focuses on linkages between environment, climate change and conflicts. Section 4 examines the institutional setting and policy framework for environmental management as well as current climate adaptation and mitigation measures and policies. Section 5 concludes and brings forward issues for Sida to consider.

### 1.1 Swedish Development Cooperation with Colombia

The current strategy for Swedish Development Cooperation in Colombia (2009-2013), extended until December 2015, focuses on two thematic areas, (i) Peace and Security and (ii) Human Rights and Democratic Governance. Humanitarian assistance also plays an important role. In 2014, the development cooperation amounted to 35.3 million USD and involved governmental as well as non-governmental actors.

According to the current cooperation strategy, environment and climate change should be considered when relevant, but is not given priority, “because of the need for concentrating efforts”. A review of Sida’s country reports and home page about development cooperation with Colombia shows that environmental and climate change issues are absent in the analysis. There is no mentioning of environment and natural resources in the mid-term review of the strategy.

However, in more specific cooperation programmes or projects environmental issues have been addressed. A point in case is the Swedish support to the land restitution process where Sweden supported an environmental impact assessment of the proposed programme.<sup>2</sup> This assessment

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<sup>1</sup> The Policy Brief was commissioned by the Swedish Embassy in Bogotá (att: Catalina Hoyos) to Sida’s Helpdesk on Environment and Climate Change. The views expressed in this document are those of the authors and do not necessarily represent the views of Sida. The contribution by Karin Billing, ORGUT Consulting AB, in the elaboration of an earlier draft developed in 2013 is gratefully acknowledged.

<sup>2</sup> “Supporting the implementation of the victims’ land restitution policy, as part of the comprehensive land policy of the ministry agriculture and rural development 2011-2012”

indicated that the programme may have significant environmental impacts which must be addressed during implementation.

## 2 Key Environmental and Climate Change Problems

Colombia is an equatorial country that is endowed with considerable environmental assets. It hosts about 10 per cent of the (known) species of the planet while only covering 0.22 per cent of its land area. Colombia has the largest number of bird and amphibious species in the world, and the third and fourth largest number of reptile and mammal species. It occupies the third place in plant species (with 12 per cent of total species), after Brasil and China. This richness is partly explained by the country's location and varying geography. Colombia has coastlines on the Pacific and Atlantic oceans and snowed peaks in the Andes Mountain. More than 50 per cent of the land area of Colombia is covered by forest, including the highly biodiverse forests of the Amazon and Choco regions. The country has about 50 000 m<sup>3</sup>/inhabitant of (fresh) water available each year -that is about six times the world's average.<sup>3</sup> This has enabled a wide pipe water supply and electricity supply that heavily relies on hydropower.

Although not always recognized, a country's natural capital, along with manufactured and human capital as well as social institutions, is a key component of its productive base.<sup>4</sup> As explained in greater detail below, pollution and degradation of natural resources as well as climate change are undermining Colombia's natural capital and thus the country's capacity to generate wellbeing for its current and future populations.

### 2.1 Most Costly Environmental Problems - a Poverty Perspective

While there are a number of studies that analyze environmental problems and policies in Colombia, only a few consider the societal costs of environmental stressors and their relation with poverty. The World Bank study of 2007, which was partially updated in 2012,<sup>5</sup> is one such study, although it exclusively focuses on local environmental problems. This section, as well as Appendix A, is based upon these two studies and other relevant reports by the Colombian Government.

The two environmental assessments by the World Bank showed that the most costly problems associated with environmental degradation in Colombia are:

*Inadequate water supply, sanitation, and hygiene:* Even though the number of households living under poor sanitation conditions decreased during the period 2000-2010, this still constitutes an important health problem. It has been estimated that each year poor sanitation conditions in Colombia cause about 1600 premature deaths.

*Urban air pollution:* Although air pollution levels are moderate in most cities, the fact that close to 60 percent of the population lives in cities with more than 100 000 inhabitants creates substantial aggregate health effects, associated mainly with particulate matter. Approximately 5000 premature deaths per year are due to outdoor air pollution.

*Indoor air pollution:* Indoor air pollution is an important health problem, particularly among rural poor women and children, related to the use of fuel wood, charcoal, and other solid fuels used for

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<sup>3</sup> IDEAM (2015). El IDEAM y la gestión integral del recurso hídrico. Presentation, Retrieved on November 20 2015: [http://ambientebogota.gov.co/documents/10157/237324/Nelson+Vargas\\_IDEAM.pdf](http://ambientebogota.gov.co/documents/10157/237324/Nelson+Vargas_IDEAM.pdf)

<sup>4</sup> Dasgupta P. (2007). Nature and the Economy. Journal of Applied Ecology 44, pp. 475-487

<sup>5</sup> World Bank (2007). Environmental Priorities and Poverty Reduction - Country Environmental Analysis for Colombia

World Bank (2012). Colombia: Strengthening Environmental and Natural Resources Institutions. Study 2: Environmental health in Colombia: An economic assessment of health effects. Report No.71443-CO

cooking, inefficient stoves and bad ventilation. Notably, about 50 per cent of the Colombia rural population use solid fuels. Indoor air pollution causes approximately 1000 premature deaths per year.

*Natural disasters:* Colombia is highly vulnerable to natural disasters and has the highest natural disaster occurrence rate in Latin America. The largest number of natural disasters is related to landslides, frequently attributed to hydrological phenomena, but also to inappropriate land use. In recent years, extreme seasonal rains partially attributed to climate change have caused severe damage.

*Land degradation:* The two most prominent components of land degradation in Colombia are erosion/salinization and deforestation. Between 4 and 23 per cent of the country's soil is estimated to be seriously eroded and 48 per cent susceptible to erosion. Deforestation is the major cause of biodiversity loss in Colombia and also contributes to destabilization of aquifer sources and erosion. Deforestation is mainly due to expansion of the agricultural frontier, mostly for livestock production and illicit crop production (coca and poppy).

The burden of the costs associated to these impacts falls most heavily on vulnerable segments of the population, especially poor children under age five. The value of the effects of the five most costly types of environmental degradation is estimated to total more than 3.7 per cent of gross domestic product (GDP), primarily related to increased mortality and morbidity and decreased productivity. Urban air pollution, indoor air pollution, drinking water supply and other sanitation issues imply total health costs of environmental degradation of about 2 per cent of GDP -the health costs related to urban air pollution had the largest share of total health costs. The World Bank concludes that from a poverty reduction perspective it is of particular importance to address the severe environmental health related problems affecting the growing number of poor people living in and around urban areas. The severity of these problems has increased as a consequence of the comparatively fast rate of urbanization experienced during the last decades.<sup>6</sup> It is important to note that over the last few years a number of Government sanitation actions and programs, in particular those focusing on the quality of water supplies, have had a positive impact on local health indicators, although the prevalence of waterborne disease is still relatively high. Air quality is also an issue of concern, despite the implementation of number of public transport systems in larger cities, the adoption of cleaner fuels and the improvement of environmental surveillance systems.

Although the costs associated with the deterioration of water resources has not been monetized, it has been found that 40 per cent of the main water sources of the country are vulnerable to deterioration. The World Bank states that "By 2025 some of the country's basins could become vulnerable and, if left unattended, could generate potential water deficits."

Appendix A presents more detailed descriptions of the environmental problems addressed in this section and their consequences for socio-economic factors such as health, productivity, water supply, etc. A brief description of existing and planned government policies designed to tackle these problems are also briefly discussed in the Appendix.

## **2.2 Expected Impacts of Climate Change**

Colombia is one of the most vulnerable countries in the world to climate change. A growing body of scientific work indicates that continued climate change is likely to have profound effects on development in Colombia. Climate change is predicted to lead to rising temperatures, changing rainfall patterns and a rising sea level. Recent years' emergency-level floodings due to extreme seasonal rains are just examples of how climate, together with other factors, influence daily lives of a large part of the population. Rather than creating totally new problems, climate change will add to existing stresses, including:<sup>7</sup>

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<sup>6</sup> National Development Plan 2014-2018, Bogotá 2015

<sup>7</sup> The description of expected impacts of climate change is based on Colombia's Second National Communication to the United Nations Framework Convention on Climate Change, IDEAM (2010),

*Health:* Increase in the impact of vector-transmitted diseases (malaria and dengue fever). With increased temperatures and changing rainfall regimes, Andean regions are more prone to see the emergence of new epidemics. These are among the most populated areas and have deteriorated water resources and housing conditions.

*Agricultural and Livestock Sector:* A good portion of the agro-ecosystems of the country is vulnerable to increased aridity, soil erosion, desertification, and changes in the hydrological system. In addition, there is a greater risk of crop flooding as well as other natural events that affect agricultural production (windstorms, hailstorms, etc.). For example, rice production will be affected because increased average temperatures stress the crop and induce pollen sterility<sup>8</sup> According to a recent report by ECLAC, the agriculture and livestock sectors will have an average loss of yield of 24 per cent and 17 per cent respectively during the analyzed period (2007-2050).<sup>9</sup>

*Temperature:* The average temperature would increase by 1.0 degrees centigrade in the period 2011 - 2040, 1.0-2.5 degrees in the period 2041 - 2070 and 1.5-4.0 degrees in 2071 - 2100.<sup>10</sup>

*Precipitation:* During the period 2011-2100 the Caribbean region and the Amazon region will face a decrease in total precipitation that is in the range 10-40 per cent, while the central and northern Andean regions will face an increase that is in the range 10 - 30 per cent. In the Orinoco region and the rest of the country no significant precipitation changes are expected.<sup>11</sup>

*Water resources:* Runoff levels will increase in coastal regions, in eastern flatlands, and in regions that had prevalent floods and landslides in the last decade. In contrast, the Andean region and the North of the country will see a decrease of runoff levels, which may cause water distribution problems and a deficit of water in associated dams, which in turn would decrease hydro-energy generation.

*Glaciers:* All glaciers of the country would disappear within the next 40 years. Each year the area of glacier diminishes by 3 per cent. This natural source of water storage will be lost and will result in increased water scarcity in certain regions.<sup>12</sup>

*Coastal systems:* With the expected rise in sea level (approximately 3.5 mm per year at the Caribbean coast and similar at the Pacific coast), millions of inhabitants are at risk of exposure to flooding in coastal zones, not to mention industrial settlements, tourism-related infrastructure and facilities, and crops. Water sources would also be vulnerable to seawater intrusion. The ECLAC study indicates that a sea level rise of 1.0 m would permanently flood 4,900 km<sup>2</sup> of low lying coast. About 1.4-1.7 million people would be affected; 7 million ha of crops and pasture would be lost.

*Ecosystems:* Of concern is the reduction of snow-capped areas and moorlands, and the associated environmental services. An increase in the median temperature of the sea may affect corals, which would also influence biodiversity and fishing resources. There could be a considerable impact on forests, although there is still uncertainty with respect to their resilience. ECLAC estimates that in the pessimistic scenario of the IPCC, the ecosystems of the savannah and moorland would be the most affected, losing as much as 70 per cent and 60 per cent of their cover, respectively. Andean forests and

Mainstreaming Climate Change in Colombia UNDP (2010), fourth Assessment Report (AR4) of the IPCC and the document Panorama del cambio climático en Colombia (ECLAC 2013).

<sup>8</sup> Fernandez, M. (2013). Efectos del cambio climático en el rendimiento de tres cultivos mediante el uso del Modelo AguaCrop. FONADE, BID, IDEAM. Informe final. Contrato de Cooperación CO-T1150.

<sup>9</sup> Panorama del cambio climático en Colombia of the Environment and Human Settlements Division of the Economic Commission for Latin America and the Caribbean (ECLAC) of the UN, 2013.

<sup>10</sup> IDEAM, PNUD, MADS, DNP, CANCELLERIA (2015). Escenarios de cambio climático para precipitación y temperatura para Colombia 2011-2100 Herramientas científicas para toma de decisiones – Estudio técnico completo: Tercera Comunicación Nacional de Cambio Climático.

<sup>11</sup> Idem

<sup>12</sup> Instituto de Hidrología, Meteorología y Estudios Ambientales IDEAM (2015). Estudio Nacional del Agua 2014. Bogotá.



dry forests could lose 40 per cent and 20 per cent respectively. In the future, sea level rise, weather and climatic variability and extremes modified by global warming are also very likely to have large impacts on mangroves<sup>13</sup>.

*Housing and settlement:* The infrastructure of the country, along with its precarious settlements, may be affected by more frequent extreme events (especially floods, strong rainfall, tropical storms, windstorms, and landslides), which would further deteriorate the living conditions and quality of life of displaced and poor populations.

*Others:* It has been estimated that household consumption in the country will be reduced by 3 per cent due to climate change. Because poorer households spend a higher proportion of their income on food they will be most affected by expected increased food prices. This constitutes a major obstacle to poverty reduction policies and strategies.

The study of the Banco Inter-Americano de Desarrollo and the Departamento Nacional de Planeación of 2014 characterize and quantifies the impact of climate change in Colombia.<sup>14</sup> Assuming that no adaptation measures are taken, the economic impacts of climate change have been estimated to amount to 0.49 per cent of GDP -it should be noted that this calculation only considers a limited number of climate change impacts.

### **2.3 Environment, Climate and Gender: A Knowledge Gap**

The Global Gender Gap Report of 2012, which uses economic, political, education and health criteria, shows that Colombia has the 12th widest gender gap among 26 Latin-American countries and the 63rd widest gap among 135 countries worldwide.<sup>15</sup> Two World Bank assessment reports (referenced in section 2.1) document a clear link between indoor pollution and gender –rural women experience long indoor-pollution exposure and have a higher risk of developing airborne diseases. However, the links between gender and other environmental problems are not addressed in these two reports and, to the best of our knowledge, there is no detailed study that maps the relations between gender and environmental variables in Colombia. This contrasts with a wealth of studies that assess issues such as gender-based violence (while prevalent in both urban and rural areas it is typically under-reported),<sup>16</sup> gender and internal conflict (about 90 per cent of reported female victims of conflict have also reported gender-based violence and fear of sexual violence is a common reason for internal migration and displacement among women)<sup>17</sup> and differences in the labor market such as labor force participation (female unemployment is twice as high as male unemployment) and gender gap earnings (in average women earn 20 per cent less than men).<sup>18</sup>

There also appear to exist an important knowledge gap regarding climate-gender interactions in Colombia. Although, the issue has been discussed in local fora, no mapping of these interactions seems to exist. To the extent that the gender gap is particularly broad in rural Colombia,<sup>19</sup> the role of women in climate mitigation and climate adaptation in the countryside deserves closer attention from authorities and the research community.

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<sup>13</sup> IPCC Fourth Assessment Report: Climate Change 2007 (AR4)

<sup>14</sup> DNP-BID (2014). Impactos económicos del cambio climático en Colombia – Síntesis. Bogotá.

<sup>15</sup> World Economic Forum (2012). The Global Gender Gap Report

<sup>16</sup> Defensoría del Pueblo (2014) El conflicto armado y el riesgo para la mujer rural: Estudios de caso en los departamentos de Chocó, Córdoba, Santander y Caquetá

<sup>17</sup> Restrepo J.A. and Aponte D. (2009) Guerras y violencias en Colombia. Editorial Pontificia Universidad Javeriana, Bogotá

<sup>18</sup> Abadia, L.K. (2013) ¿Por qué en Colombia las mujeres ganan menos que los hombres?, Revista Javeriana, Junio, Número 795, Tomo 149.

<sup>19</sup> Documento CONPES 161 (2013) Equidad de género para las mujeres. Departamento Nacional de Planeación

### 3 Linkages between Environment, Climate Change and Conflict

In this section we pay particular attention to the environment-conflict linkages regarding land use and land restitution; illicit cultivations; biofuel production and extractive resources (oil and mining). We also discuss linkages between climate change and conflict.

#### 3.1 Land Use, Environmental Problems and Conflict

##### 3.1.1 Land Concentration Reduces Livelihood Possibilities

Colombia is a highly unequal country regarding land holdings. Colombia's GINI coefficient for land (a measure of land concentration that ranges between 0 and 1, where 0 represents total equality) is 0.85, one of the highest in the world.<sup>20 21</sup> The third and most recent National Agrarian Census (Tercer Censo Nacional Agropecuario) shows that land holdings (Unidad de Producción Agropecuaria UPA) of less than 5 hectares represent 70.9 of total land holdings while only covering 2.4 per cent of total surveyed land area. On the other hand, land holdings of more than 500 hectares represent 65 per cent of total land area but only amount to 0.4 per cent of the total number of land holdings.<sup>22</sup>

Concentration of land ownership has increased over recent years, accentuated by the armed conflict and the acquisition and/or appropriation of land by drug traffickers and illegal armed groups. Unequal landownership deprives rural farmers of a livelihood and so perpetuates income inequality. By reducing the land available for small-scale farmers to produce food for subsistence, unequal landownership contributes to food insecurity, with resulting health problems including malnutrition, anemia, calcium deficiencies, and deficiencies in calorie intake.<sup>23</sup> According to the National Agrarian Census about 45 per cent of the country's rural population is poor.<sup>24</sup>

Inappropriate land use – in particular livestock farming - is the most important reason for land degradation like erosion, flooding and landslides in Colombia, while climate change-induced precipitation-changes are also likely to have a considerable effect. Land concentration is also linked to environmental degradation, since inability to gain access to land drives the poor into marginal areas leading to deforestation and other forms of land degradation, including in national parks areas. Land holdings of less than 5 hectares allocate, in average, about 80 per cent of their area to agriculture and farming while those of more than 1000 hectares have about 60 per cent of area covered by forest.<sup>25</sup> A large part of the involuntary displaced also end up in urban slums with poor sanitary conditions, stress on scarce natural resources and higher vulnerability to natural disasters.

As shown in several studies,<sup>26</sup> there exists relationship between land inequality and civil conflict. There is an increasing consensus that violence in the Colombian countryside has thrived upon land inequality and a failed model of rural development.<sup>27</sup>

As pointed out above, there is also a reversed connection - the historical trend towards the concentration of land ownership has been accentuated by the armed conflict and the acquisition and/or appropriation of land by drug traffickers and illegal armed groups, and consequential displacement of population. Forced displacement poses a formidable challenge to national and local governance in Colombia. As of 2014 the total internally displaced population has been estimated to be from 5 to 6

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<sup>20</sup> UNDP National Human Development Report Colombia 2011

<sup>21</sup> World Bank (2004), Colombia – Land Policy in Transition, Report No. 27942

<sup>22</sup> DANE (2015). Tercer Censo Nacional Agropecuario.

<sup>23</sup> ABColombia, (2013). Retrieved on August 15 2015 <http://www.abcolombia.org.uk/mainpage.asp?mainid=76> (2013)

<sup>24</sup> DANE (2015). Tercer Censo Nacional Agropecuario.

<sup>25</sup> Idem

<sup>26</sup> E.g. Peter Sandholt Jensen and Tony Vittrup “Land inequality and conflict in Latin America in the twentieth century”. *Defence and Peace Economics*, 2012, vol. 23, issue 1, pages 77-94

<sup>27</sup> Voelkel C., “Three Reasons why Colombia’s Land Reform Deal is Significant”, 28 May 2013 <http://www.crisisgroupblogs.org/crimeandpolitics/>

million. Indigenous groups, African-Colombians and farmers are among those hit the hardest by this phenomenon.<sup>28</sup> In the face of threats and violence women and children tend to flee their dwellings and lands before men.

### 3.1.2 Land Restitution and Rural Development

Law 1448 of 2011, or the Victims and Land Restitution Law, acknowledged the gravity of the forced displacement phenomenon in Colombia and it initiated what might become the most significant land restitution effort in the history of the country (see Appendix B for Map of Abandoned and Expropriated Lands by Region).<sup>29</sup> One of its most salient features is the acceleration of land titling processes that might otherwise take several years or decades. Among the institutions created by Law 1448 of 2011 are the Special Administrative Unit for Victims and the Special Unit for Land Restitution (Unidad de Restitución de Tierras). Special Restitution Judges and Magistrates process and rule land claims. It should be noted that the establishment or restoration of property rights over land is particularly challenging in a context where small proportion of the displaced population held formal land titles at the time they fled their lands. Also, large areas of the country remain unsafe and security of land claimants cannot always be ensured. In cases where security is not a pressing issue, psychological stress becomes an important barrier for return –e.g. widows might find it particularly difficult to return to the place where they lost their partners. As discussed in section 2.3 gender base violence has been an important driver of displacement.

The Government has so far identified 2 million hectares that could be returned to claimants. As of March 2015 a total of 1.866 cases (each associated with a land plot) had been ruled under the Victims and Land Restitution Law.<sup>30</sup> 20.977 hectares were restituted in the period 2011 -2014. However, as of November 2015, Restitution Judges had issued restitution orders that cover a total of 176.908 hectares of land.<sup>31</sup> The restitution process gives female heads of household preferential treatment at different stages but a recent study reports that gender outcomes are difficult to identify in current statistics. About 40 per cent of total restitution requests are from women, although over half of the displaced population is female.<sup>32 33</sup>

It is no coincidence that the Victims and Land Restitution Law was enacted around the same time that the Colombian Government was holding preliminary negotiations with FARC about a potential peace process. The peace process was officially launched in October 2012 with the first point of the negotiation agenda, out of a total of five points, being rural development. In May 2013 the two sides announced an agreement on land and rural development that would, in the signatories' words, represent a radical transformation of rural Colombia. The so called Integral Rural Reform (Reforma Rural Integral RRI) accord is a 21 page document that is wide-ranging in scope. It includes the creation of a Land Fund that would be formed by lands owned or recovered by the central government –the size of the Land Fund (in hectares) is to be determined in later stages. The RRI prioritizes the most vulnerable populations and includes agricultural subsidies, the provision of local public goods and the construction of infrastructure projects. Environmental considerations are an integral part of the RRI agreement. It considers land zoning using environmental criteria, delimitation of the agricultural frontier as well as the sustainable management of natural resources and local biodiversity.

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<sup>28</sup> Norwegian Refugee Council and Internal Displacement Monitoring Center. “Global Overview in 2015: People Internally Displaced by Conflict and Violence”

<sup>29</sup> Restrepo JC and Bernal A (2014) “La cuestión agraria: Tierra y posconflicto en Colombia”. Bogotá

<sup>30</sup> Unidad Administrativa Especial de Gestión de Restitución de Tierras Despojadas. “Informe de gestión – Plan de acción a 31 de Marzo de 2015”

<sup>31</sup> Unidad Administrativa Especial de Gestión de Restitución de Tierras Despojadas. Estadísticas de restitución de tierras - Noviembre 30 de 2015. Retrieved on November 30 2015:

<https://www.restituciondetierras.gov.co/web/guest/estadisticas-de-restitucion-de-tierras>

<sup>32</sup> García-Godos J. and Wiig H. (2014) “The Colombian Land Restitution Programme: Process, Results and Challenges, with Special Emphasis on Women.” NIBR-rapport 2014:14

<sup>33</sup> Defensoría del Pueblo (2014) El conflicto armado y el riesgo para la mujer rural: Estudios de caso en los departamentos de Chocó, Córdoba, Santander y Caquetá

At the time this report was written a final peace agreement had not been reached as a number of critical points are still under negotiation and the final agreement has to be approved by Colombians in a referendum. In any event, the principles laid out in the RRI accord is likely to shape the rural development of the country in the years to come. It should be noted that the implementation of Victims and Land Restitution Law is not conditional on a successful peace agreement.

### **3.1.3 Post-conflict scenarios, Rural Development and Environment**

The Colombian conflict has had direct impacts on local environments that have critical implications for land planning and current and future land restitution and titling efforts. While not always recognized, the environmental impacts of the conflict have been both negative and positive. On the negative side important water-ways and extensive areas of land have been affected by oil spills caused by guerrilla attacks. Coca production and illegal mining, activities often used by illegal armed groups to finance their activities, have resulted in deforestation and the impairment of waterways. A recent study showed that paramilitary activity displaced people in order to use the abandoned lands for growing illegal crops, mining, and in extensive agriculture.<sup>34</sup> This may also apply to other armed groups.

On the other hand, violence, which is most prevalent in areas over which no illegal group has complete control, causes a natural slowdown in economic activity. Extensive land areas that would have otherwise been used in legal and illegal production have remained abandoned and unused. While no detailed study on the subject exists, it is not far-fetched to state that environmental preservation has been, in some territories and with regards with some natural resources, a byproduct of violence.<sup>35</sup>

A recent report entitled “Environmental consideration for the establishment of a stable, lasting and sustainable peace in the regions of Colombia”<sup>36</sup> expresses a high degree of concern about land restitution in the context of RRI and its environmental and economic consequences. It shows that a large proportion (about 90 per cent) of the municipalities to be prioritized under RRI in post-conflict Colombia are highly relevant and sensitive from an environmental perspective – these municipalities correspond to about 25 per cent of total municipalities of the country. Some of the planned intervention areas are highly diverse, rich in water resources and host a wide range of ecosystems. On the other hand, environmental degradation processes such as deforestation and erosion have either started, or settled in, in some of these regions. The authors of the report worry that many of these processes will intensify in post-conflict Colombia. Coupling RRI with land use planning that takes into account the agro-ecological characteristics of the different regions is a pivotal element in building peace. To the extent that environmental assets constitute the most important form of capital in several regions of Colombia, especially among the rural poor, environmental management is central for economic and social development.<sup>37</sup>

### **3.1.4 Sustainable Forest Management in a post-conflict scenario**

The Colombian Government has identified forest resources and the forest sector as whole as a key sector in a post-conflict scenario. As mentioned earlier, Colombia has more than 50 per cent of its land covered by forest. Yet, the forest sector is underdeveloped and it only constitutes 0.2 per cent of the country’s GDP. It has been estimated that about 15 million hectares of land are suitable for commercial reforestation and forest exploitation, but only 400 000 thousand hectares have been placed

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<sup>34</sup> Fergusson L, Romero D, Vargas JF (2014) The Environmental Impact of Civil Conflict: The Deforestation Effect of Paramilitary Expansion In Colombia. Departamento de Economía, Universidad del Rosario. Documento de Trabajo No. 165.

<sup>35</sup> Foro “Bosques y construcción de paz, una oportunidad para el posconflicto” – Organized by the national newspaper El Espectador, August 20 2015 – Bogotá.

<sup>36</sup> Sistema de las Naciones Unidas en Colombia y Ministerio de Ambiente y Desarrollo Sostenible (2014). Consideraciones ambientales para la construcción de una paz territorial estable, duradera y sostenible en Colombia – Insumos para la discusión. Bogotá.

<sup>37</sup> García, J.H., (2012). La depreciación del capital natural en Colombia ¿Desarrollo económico en riesgo? Mimeo: Universidad Javeriana

under this regime over the last 20 years. On the other hand, natural forests may constitute an important source of income for local communities through a wide implementation of Sustainable Forest Management (SFM)<sup>38</sup> where local livelihoods are an integral component in this approach. Despite the fact that Colombian forest laws uses SFM principles (Decree 1791 of 1996, now a chapter of Decree 1076 of 2015), only a few successful implementation cases have been reported. These cases, however, may be viewed as pilot projects that could eventually inform a broader SFM implementation in Colombia. SFM was successfully used in post-conflict Guatemala in high diversity areas where armed violence took place. Through a careful policy design that involved strengthening local governance and the provision of forest exploitation rights to local communities, both environmental and socio-economic indicators showed significant improvements. Since legal and illegal logging often compete under the same conditions in local wood markets, strategies such as green certification and economic incentives need to be in place for an overarching SFM in Colombia. The Colombian government is currently in the process of strengthening its payment for environmental services strategies as an environmental and social policy tool to be use in post-conflict Colombia.

### **3.2 Illicit Cultivations**

Colombia is the world's second largest producer of coca leaf after Peru, and together with Mexico, is the largest producer of opium poppies in the Americas. These plants are the basic raw materials used to produce cocaine and heroin. There are also substantial cultivations of marihuana. Estimates vary, but although massive resources are spent yearly on the war on drugs in Colombia, coca and cocaine production seem to remain robust: It has recently been estimated that a 1 per cent increase in eradication has resulted in about a 1 per cent increase in coca cultivation.<sup>39</sup> While in recent years coca plantations and coca production fell, in 2014 the area of land used to grow coca leaves and in coca production increased by 44 and 53 per cent in relation to 2013, that is 69 000 ha involving 64 500 households.<sup>40</sup> As mentioned earlier, illicit drugs are fueling the violent conflict in Colombia and are closely linked to the finances of illegal armed groups<sup>41</sup>.

Illicit drugs are also linked to serious environmental problems, primarily deforestation and chemical pollution, as described below:

The environmental effects linked to the illicit cultivations arise during different moments of the processing cycle. The first step is the *choice of where to grow* coca and poppy. Illicit cultivations are often situated in remote and biodiversity rich areas, such as the Andean and Alto- Andean forests for poppy cropping, and the plains and rainforest of the Orinoquía and Amazonian regions for coca crops. Distance to coca plantations increase the probability of deforestation. Recently it was estimated that this illegal crop caused the deforestation of 290 000 ha in the period 2001-2013.<sup>42</sup>

Since the year 2000 a growth in illicit cultivations have also been observed in many of Colombia's national parks. In 2014 coca plantations were found in 14, out of a total 59, national parks. This represents 8 per cent of the total area cultivate in coca. During this year there was also an increase of coca cultivation in areas populated by Afro-Colombian and indigenous communities. Coca cultivations have also spread to a larger number of Colombia's 32 departments, from 12 in 1999 to 21 in 2014.<sup>43</sup>

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<sup>38</sup> SFM is the "sustainable use and conservation of forests with the aim of maintaining and enhancing multiple forest values through human interventions" (FAO).

<sup>39</sup> Reyes, J.C., (2014). "Estimating the causal effect of forced eradication on coca cultivation in Colombian municipalities", *World Development* 61: 70-84.

<sup>40</sup> Oficina de las Naciones Unidas contra la Droga y el Delito – Gobierno de Colombia (2015). *Colombia Monitoreo de cultivos de coca 2014*.

<sup>41</sup> COWI, 2008. *Study of the relationship between conflict and poverty and its relevance for the Swedish cooperation strategy with Colombia*, 31st of March 2008.

<sup>42</sup> United Nations Office on Drugs and Crime (2015). *World Drug Report 2015*.

<sup>43</sup> WOLA, 2008.

The *preparation of land* for illicit cultivations leads to deforestation of large areas, normally through burning and carbonization of biomass, which in turn causes erosion.

Some studies indicate that in order to create one hectare of coca cultivations it is necessary to degrade four hectares of tropical forest and for one hectare of poppy 2.5 hectares of Andean forests. This deforestation drastically affects local ecosystems, including effects such as change in local climate, loss of habitats, soil erosion, river sedimentation and emission of greenhouse gases.<sup>44</sup> In 2014 15.405 ha of land were reforested in lands where that were previously covered in primary (54 per cent per cent) and secondary (46 per cent) forests. Coca cultivations, however, tend to return such areas.<sup>45</sup>

The *cultivation process* requires the extensive use of pesticides and fertilizers, although detailed information on the amounts used is scarce. It has been estimated that in 2005 81 thousand tons of fertilizers and herbicides were used,<sup>46</sup> ending in water and soil.

The *processing* of coca to cocaine normally takes place in processing plants close to the cultivations and close to a water body. A large quantity of different chemicals is used, including acetone, hydrochloric acid, ethylic ether and potassium permanganate (or other chemicals with similar characteristics). It has been calculated that some 750 000 tons of these chemicals have been used in processing plants within the Colombian tropical forest over the last 14 years<sup>47</sup>. The resulting chemical poisoning of soils and water bodies is likely to be very serious.

The effects of *aerial fumigation*<sup>48</sup> on human health and the environment has been a debated subject over several years. The fumigation program has also been heavily criticized for destroying the licit crops and livelihoods of many small producers. Fumigation can hit both licit crops of non-coca producers and coca producers. Most of the coca is produced by small producers (< 3ha) and often farmers grow a mixture of different crops. In 2015 the International Agency for Research on Cancer stated that glyphosate, which is used in aerial fumigation, was “probably” carcinogenic and it was associated with skin diseases. This announcement was followed by the Government of Colombia’s decision to bring areal fumigation to an end.

### 3.3 Biofuels

Colombia produces bio-ethanol from sugar cane and biodiesel from palm oil. The latter has raised major environmental concerns as well as concerns regarding its relation with the country’s armed groups. The number of hectares under palm oil cultivation have rapidly increased and amounted to about 450 000 hectares in 2014.<sup>49</sup> While palm oil is an ingredient in many different products, it is the growing biofuel market that can drastically increase the demand for palm oil. In Colombia the government has expressed interest in a large expansion of palm oil cultivations to cover as much as 3 million hectares by 2020, although evidence suggests that this goal is unlikely to be reached.<sup>50</sup>

Oficina de las Naciones Unidas contra la Droga y el Delito – Gobierno de Colombia (2015). Colombia Monitoreo de cultivos de coca 2014

<sup>44</sup> DNE, 2006. Impacto ambiental ocasionado por las sustancias químicas, los cultivos ilícitos y las actividades conexas

<sup>45</sup> Oficina de las Naciones Unidas contra la Droga y el Delito – Gobierno de Colombia (2015). Colombia Monitoreo de cultivos de coca 2014.

<sup>46</sup> United Nations Office on Drugs and Crime (2015). World Drug Report 2015.

<sup>47</sup> European Commission, 2005. Regional Environmental Profile Andean Countries

<sup>48</sup> The following chemicals are used: Roundup Ultra Herbicide, the surfactant Cosmo-Flux 411 – a blend of two additives that enhance the mixture’s adherence to and penetration of the leaves of the coca plants.

<sup>49</sup> Sistema de información estadística del sector palmero SISPA (2015). Evolución histórica del área sembrada con palma de aceite en Colombia – 2014. Consultado en: <http://sispaweb.fedepalma.org/SitePages/areas.aspx>

<sup>50</sup> Castiblanco, C., Etter, A. and Aide, M. (2013). Oil palm plantations in Colombia: a model of future expansion. In: Environmental Science & Policy 27, 172-183.

Although the number of small producers is growing, oil palm production in Colombia is characterized by large scale plantations and the level of investments needed are considerable. The Colombian government has provided political and financial support to the development of African palm plantations, as part of its effort to eradicate illicit crops and promote regional development.

Palm oil production in Colombia has been heavily criticized for causing deforestation (including of unique areas of dry tropical forest), destruction of wetlands and loss of biodiversity as well as being linked to human rights violations and forced displacement in some regions.<sup>51</sup> A recent study showed that palm oil has been grown and produced in municipalities with particularly unequal income and land ownership distributions.<sup>52</sup>

The Colombian African palm oil producer association portrays palm oil production as both socially and environmentally benign and is member of the international working group developing criteria for sustainable palm oil production.<sup>53</sup>

### **3.4 Extractive Resources**

#### **3.4.1 Oil**

Although being a minor player on the international oil market, Colombia has a substantial production and exports of oil. In 2014 oil production was 5 per cent of the country's GDP and its total share in overall exports was 52.8 per cent -that is a 2 per cent decrease in export participation in relation to 2013 but over 25 per cent increase in relation to 2007-. The oil sector attracted 30 per cent of foreign direct investment in Colombia and it represented 18.9 per cent of the central governments revenues in 2014. In the face of the recent crashed in the price of oil in international markets, exploratory activities were reduced in about 89 per cent from January through April in 2015, although production has been maintained. Oil producing companies have recently stated that in order to keep a relatively robust production, environmental licensing process should be accelerated.<sup>54</sup>

The linkages between oil and conflict have a long history in Colombia.<sup>55</sup> Since 1986 the guerrilla groups, mainly ELN, have bombed oil pipelines more than 1000 times and have kidnapped hundreds of oil-company executives and employees. The oil industry and the attacks against oil installations have caused massive oil-spills with large environmental effects.<sup>56</sup> Using these operations as leverage, the guerrillas have generated large sums in ransoms and extortion payments and "taxed" local oil contractors. The paramilitary has been able to indirectly benefit from oil through taxing local contractors and extortion from local businesses, as well as accessing revenues from municipalities.

In a few cases oil exploration has resulted in clashes with local groups. The most well-known is the success of the U'wa indigenous community in northeastern Colombia in preventing drilling in its ancestral land.<sup>57</sup>

#### **3.4.2 Mining**

The Colombian mining industry has grown at a fast pace during the past decade, mostly as a result of government policies that favor foreign investment in this economic sector. Mining represented 2.10 per cent of Colombian GDP in 2014, with Coal as the largest contributor to mining GDP. Coal

<sup>51</sup> Rodríguez Becerra, M. ¿Cuáles son los factores de sostenibilidad o insostenibilidad ambiental de la producción de biocombustibles en Colombia? Presentation in National Congress of Colombia, May 2008

<sup>52</sup> Castiblanco, C., Etter, A. and Ramirez, A. (2015), Impact of oil palm expansión in Colombia: What do socioeconomic indicators show? In: Land Use Policy 44, 31-43,

<sup>53</sup> <http://www.fedepalma.org/>. Roundtable on Sustainable Palm Oil, <http://www.rspo.org/>

<sup>54</sup> Fedesarrollo (2015). Informe de Coyuntura Petrolera. Julio 2015. Bogotá.

<sup>55</sup> Pearce, J. (2004). Beyond the Perimeter Fence: Oil and Armed Conflict in Casanare, Colombia, London School of Economics, Center for studies of global governance

<sup>56</sup> El Espectador. June 25 2015. Derrame de petróleo en Tumaco es el peor desastre ambiental en 10 años: Gobierno.

<sup>57</sup> Pearce, 2004. Beyond the Perimeter Fence: Oil and Armed Conflict in Casanare, Colombia, London School of Economics, Center for studies of global governance

royalties grew 7-fold between 2004 and 2012.<sup>58</sup> In 2013 Colombia was the 11th largest coal producer in the world.

In 2011, the Government of Colombia undertook a reform of the state bodies regulating and controlling mining activities in Colombia, after which the National Mining Agency has the task of overseeing the activities to be performed under the titles that have been granted to date, administering the mining and conducting the granting of new titles as of 2012.<sup>59</sup>

The current government has promoted normative changes that have cleared the way for intensifying mining activities. The government has declared mining an “activity for public utility and social interest,” and it has conceded mining licenses in protected areas such as moorlands, indigenous reserves, and collective territories belonging to Afro-descendent communities.<sup>60</sup> In practice licensing processes take little considerations of environmental factors or existing land use plans and this has generated confusion and a degree of infighting among different national and local institutions.

Land currently used for mining activities represents 8 per cent of the national territory. Highly biodiverse regions such as Guainía and Vaupés have 30 and 15 per cent of their area under consideration for gold exploitation. Notably, about 86 per cent of all production from mining is illegal and among those who have a mining license only a small proportion has an environmental license for exploitation.<sup>61</sup> The Mining Code identifies areas, like national and regional natural parks, which should be protected from exploration and mining operations, but these safeguards are often not respected in practice.

Armed groups such as FARC and ELN as well as other illegal actors have found in mining an important source of income through the development of own exploitations or through extortions to third miners. Illegal mining has recently been linked to money-laundering. The formalization of the mining sector thus constitutes a major challenge for the Government of Colombia.

The environmental degradation caused by mining in Colombia is considered as very serious. Highly toxic products, like cyanide and mercury, are used to mine minerals such as gold. These chemicals contaminate the land and water sources in the region, to the detriment of resident communities.<sup>62</sup> In addition, large-scale mining projects often require changing the course of rivers, and often the dynamite explosions create such heavy noise pollution that animals as well as humans are pushed out of their habitat.<sup>63</sup> As mentioned earlier, coal production is an important economic activity in Colombia. While coal consumption is the world’s biggest source of man-made CO<sub>2</sub> emissions, coal production has pervasive impacts on local landscapes and generates water and air pollution. A recent report states that 15 per cent of environmental conflicts in Colombia are related to coal production (while 32 per cent are associated with gold extraction).<sup>64</sup> The country has one of the world’s largest open-pit coal mines in the world, namely El Cerrejon, located in the country’s northernmost region Guajira. Currently, there are heated discussions between local communities and the mine operators about a possible change in the course of an important water stream.<sup>65</sup> Impairment of water quality due

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<sup>58</sup> Martínez, A. (2014). *Minería y Medio Ambiente en Colombia*. FEDESARROLLO – Sector de la Minería a Gran Escala

<sup>59</sup> PBI Colombia: *Mining in Colombia: At what cost?* 2011

<sup>60</sup> PBI Colombia: *Mining in Colombia: At what cost?* 2011

<sup>61</sup> Garay, J.L. *et al.* (2013). *Minería en Colombia. Derechos, políticas públicas y gobernanza*. Contraloría General de la República.

<sup>62</sup> Instituto de Hidrología, Meteorología y Estudios Ambientales IDEAM (2015). *Estudio Nacional del Agua 2014*. Bogotá.

<sup>63</sup> PBI Colombia: *Mining in Colombia: At What Cost?* 2011

<sup>64</sup> Pérez, M.A. (2014). *Conflictos ambientales en Colombia: Inventario, caracterización y análisis*. Instituto CINARA – Universidad del Valle. Cali.

<sup>65</sup> El Tiempo, 7 de febrero de 2015, “Polémica en La Guajira por desvío de un arroyo”  
<http://www.eltiempo.com/colombia/otras-ciudades/el-desvio-de-un-arroyo-tiene-a-los-guajiros-molestos/15207895>



to dissolved solids and acids in mine drainage is a major concern in coal mining.<sup>66</sup> Inhalation of particulate matter generated in coal extraction and transportation has negative health effects such as pneumoconiosis, although little is known about these health impacts in Colombia. A study found that a coal loading port located nearby the city of Santa Marta has impacted local beaches and has had a negative effect on tourism.<sup>67</sup>

Many believe that responsible mining is the solution to the conflict between environmental sustainability and economic development in Colombia. However, and as documented in section 4.2, the current environmental regulatory regime is still relatively weak.<sup>68</sup>

### **3.5 Links between Climate Change and Conflict**

The linkages between climate change and conflict are receiving growing attention. In light of the existing evidence, climate change and other environmental stress factors should be viewed as putting additional strains on already fragile social and political systems rather than being a direct trigger of conflict. IPCC explains that ‘many of the factors that increase the risk of civil war and other armed conflicts are sensitive to climate change’, including poverty, slow economic growth, economic shocks, and inconsistent political institutions. According to IPCC, the climate-related factors that are expected to have the largest effect on human settlements are flooding, landslides, cyclones becoming more destructive, and diminishing water supplies (factors that can also have other reasons than climate change, for example land degradation due to inappropriate land use).<sup>69</sup> In the paper *Implications of Climate Change for Armed Conflict*<sup>70</sup>, three processes through which climate change could cause social instability and conflict are identified:

*Natural disasters:* an increase in the frequency and magnitude of natural disasters, such as tropical storms, flash floods, landslides and wild fires, would have obvious negative implications for human security and may also lead to increased migration. As described above, Colombia is prone to natural disasters.

*Sea level rise:* risks causing massive population displacement. In Colombia 1,4 million people live in areas which are projected to be affected by a rising sea level (Colombia’s insular areas as well as the Caribbean and Pacific coastal areas).

*Resource scarcity:* climate change risks affecting the availability of resources necessary for sustained livelihoods. In Colombia climate change may lead to changing agricultural conditions and lead to the disappearance of the Andean glaciers affecting water availability and seasonal river flows. This could trigger migration and local conflicts.

In Colombia the possible increase in migration due to climate change and other environmental stress factors, including land degradation and pollution of land and water should be seriously considered. In combination with the already large internally displaced population and unclear land tenure systems this could be a potential source of conflict.

In most parts of the world, the impacts of climate change will be experienced both through changes in mean conditions (such as temperature, sea-level, and annual precipitation) over long time, but also through increases in the intensity and in some cases frequency of floods, droughts, storms and cyclones, fires, heat waves, and epidemics. Gradual changes, for example of the sea-level, are unlikely

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<sup>66</sup> Garay *et al.* (2013). *Minería en Colombia: Institucionalidad y territorio, paradojas y conflictos*. Vol 2. Contraloría General de la República.

<sup>67</sup> Contraloría General de la República (2010). *Valoración de Costos Ambientales Asociados al Transporte y Embarque del Carbón en Santa Marta*

<sup>68</sup> Martínez, A. (2014). *Minería y Medio Ambiente en Colombia*. FEDESARROLLO – Sector de la Minería a Gran Escala

<sup>69</sup> IPCC 2014

<sup>70</sup> By Buhaug *et al* 2008, presented at the World Bank conference on Social Dimensions of Climate Change in April 2008

to create a sudden wave of migration and hence less likely to create conflict than a sudden displacement of a large number of evacuated people due to for example a flooding situation.

The conflict implications of policies aimed at mitigating climate change through large scale biofuel production or forest plantations need also to be considered.

## **4 Policy Framework and Institutional Capacity for Managing Environmental Challenges**

### **4.1 Green Growth Policy**

The current National Development Plan 2014-2018 reinforces the need to integrate environmental considerations in all sectors through the formulation of a Green Growth Policy that seeks to improve the welfare of the population in general and the living conditions of the poor in particular. In 2013 Colombia formally initiated the accession process to the OECD. Colombia's Green Growth policy, as well as a number of new policy reforms and measures, are to a large extent aimed at meeting OECD's requirements. The document "OECD Environmental Performance Reviews: Colombia 2014" presented 45 recommendations to the Government of Colombia and it underscores the following five:

- Making green growth a central element of the 2014-18 National Development Plan, and making sectoral ministries accountable for the environmental impacts of their policies.
- Promoting greater use of environmentally related taxes, and phasing out environmentally harmful subsidies and tax exemptions, while mitigating any adverse impacts on poor and vulnerable groups.
- Strengthening the system of environmental management involving different levels of government, particularly by better defining their roles and responsibilities.
- Better managing the environmental impacts of mining, particularly from the use of mercury, and the impacts of mining operations on biodiversity.
- Strengthening the environmental information system, and building support for environmental measures by better communicating environmental information to policy makers and the public.

Due to their relation with the Colombian conflict and rural reform that is currently taking place (see section 5) two additional OECD recommendations are of particular relevance for this report, namely:

- Fully integrate environmental criteria into policies for land redistribution and agrarian reform; strengthen the means of enforcing environment-related land use in land use plans, particularly in rural areas and coastal zones; ensure the implementation of river basin management plans and their integration into land use plans.
- Require environmental licensing for mining exploration.

Land use plans (Planes de Ordenamiento Territorial POT) in Colombia ought to be approved by the corresponding local environmental authorities, CARs and AAUs, with regards to environmental considerations. POTs are an important planning instrument as they ensure that land is allocated to the use that generates the most social welfare. As pointed out by OECD and earlier observers the process of POT development and implementation do not meet basic environmental and socio-economic standards in Colombia.

Institutional capacity is central for the successful implementation of green growth but as next section shows Colombia's environmental regime suffers from a number of weaknesses.

### **4.2 Institutional Framework and Challenges in Environmental Management**

The Colombian National Environmental System (SINA) is considered as one of the most advanced institutional arrangements for environmental management in Latin America. It was created by Law 99 of 1993, Colombia's most important environmental Law to date. Law 99 of 1993 not only implemented the environmental principles set in Colombia's Constitution of 1991, including the right to a clean environment, but also its decentralization spirit. SINA's most important institutions today include the Ministry of Environment and Sustainable Development (MADS), 33 regional environmental authorities (Corporaciones Ambientales Regionales, CAR), and 8 urban environmental authorities (Autoridades Ambientales Urbanas AAU). The MADS's main mission is to formulate policies and regulations on the environment and to support their implementation by the CARs and AAUs. Five government research institutes, which are part of SINA, provide scientific support to MADS. MADS coordinates Colombia's international cooperation regarding environmental issues and has over the years developed significant collaborations with different international agencies.

In certain areas, including the financial and operational decentralization structure of SINA, the use of environmental charges and the creation of a National Park System (Sistema de Parques Nacionales Naturales SPNN), Colombia has been a world leader in environmental management. SINA, however, suffers from important institutional problems. As it will be discussed in greater detail below, environmental protection in Colombia is underfunded and the governance of certain institutions within SINA has been called into question. Notably, what might become one of the most important milestones in environmental management in Colombia, has recently come from outside SINA, namely Colombia's Supreme Court decision to clean up the Bogota River, one of the most polluted rivers in the world. In recent years a number of important environmental management decisions and actions have come from the judiciary as a result of Compliance Actions (Acciones de Cumplimiento) and Popular Actions (Acciones Populares). These two mechanisms were introduced in Colombia's Constitution 1991 and are meant to protect citizen's rights.

Urban Environmental Authorities are under the administration of Colombia's main cities and their Directors are appointed by the corresponding mayor, who is in turn democratically elected. The CAR's, on the other hand, are rather autonomous entities. To ensure broad representation, Law 99 of 1993 mandated the creation of a Board of Directors for each CAR. The Board of Directors is formed by municipal mayors, local NGOs, organizations of the private sector, ethnic groups and delegates of the MADS and of the President. Despite the democratic spirit of Law 99 of 1993, this institutional design has not performed as initially envisioned. There have been frequent allegations of regulatory capture and corruption in the CARs and this has been a matter of concern among the general public and central Government authorities for many years.<sup>71</sup> Technical and operational capacity of the CARs varies greatly from region to region, with poorer parts of the country having rather weak institutions. In more developed areas of the country the CARs receive considerable resources from local taxation. This has been instrumental in making them more independent and technical capable but has also exposed them to predatory behaviour. The current President is attempting to modify the structure of the CARs but has so far not succeeded.

As pointed out in a number of official documents, sustainable development requires the integration and harmonization of policies and environmental and sectorial objectives. However, in Colombia this integration and harmonization is scarce and weak. Further, while plans are regularly elaborated on a sectorial basis, there is no systematic periodic planning to establish priorities across environmental programs and subsectors such as forestry, biodiversity, air pollution, waste management, water resources, and water sanitation. As a result of this, as well as of lack of technical capacity and vision in

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<sup>71</sup> Uribe, E. (2005). *The Evolution of Colombian Environmental Institutions: 1971 – 2004*, Documento CEDE 2005-4, Universidad de los Andes.

Revista Semana (2015). "Corrupción y politiquería contaminan corporaciones autónomas regionales. Retrieved on August 12 2015: <http://www.semana.com/politica/articulo/corruccion-politiqueria-contaminan-corporaciones-autonomas-regionales/99548-3>

Forero, L.E. (2015). In: *Las2orillas. ¿Las CARs entidades intocables?* Retrieved on August 12 2015: <http://www.las2orillas.co/las-cars-entidades-intocables/>

the sectors, land use interventions are often not coordinated and environmental concerns not incorporated. For example, mining can be given concession in strategic environmental conservation areas, agricultural expansion is allowed in areas of importance for the protection of watersheds. Opportunities to minimize the environmental impact are lost, with negative effects for other sectors, like tourism, which are critically dependent on the natural environment. As in many countries, suboptimal regulatory instruments and compliance mechanisms are important obstacles to a sustainable management of resources: low legal and fiscal oversight and auditing capacity, excessive influence by the private sector in authority decision making, and an excessive dependency on voluntary regulation.<sup>72 73</sup> In its assessment of the state of the environment covering the period 2009-2010, the General Auditor (Contraloría General de la República, CGR) listed a number of additional weaknesses: 1) the collection of water contamination fees amounts to only 52 per cent, and only 9 per cent of prioritized watersheds are regulated; 2) implementation of land use plans is low; 3) of 2000 endangered species, protection measures have only been established for 118 species 4) only 34 per cent of sewage management plans are controlled by the CAR; and 5) solid waste plans are not always followed.<sup>74</sup> Other weaknesses are the adequacy of data and the lack of indicators on environmental quality and institutional performance; the efficiency (rather than the volume) of public sector spending on the environment; technical and management capacity in key agencies and coordination between national and regional agencies and between research institutes and program agencies.

Public expenditures in environmental protection in Colombia in 2010 corresponded to 0,55 per cent of GDP (0,28 per cent by SINA and 0,27 by other public institutions) while private expenditures were 0,10 per cent of GDP. These figures are relatively low when compared to those of other Latin American countries as well as to OECD countries where total environmental expenditures are higher than 1 per cent of GDP<sup>75</sup>. This is supported in the report of the Comptroller General (Contraloría General de la República, CGR) covering 2011-12, where the CGR highlights that there is still no balance between the resources assigned for the protection of natural resources compared with those allocated to the productive sectors, implying that the country's development model can still not be considered sustainable.<sup>76</sup> As a result of the current and expected slowdown of the Colombian economy, total environmental expenditures may be further reduced in the near future.

### **4.3 Climate Adaptation and Disaster Risk Management**

In the face of the big challenges outlined above, it is important to build a national capacity to adapt to climate change. Initial steps towards this purpose already taken in Colombia include:

- The First National Communication to the UNFCCC (March 2002), Second Communication (June 2010). The Third National Communication is currently work in progress.
- The Integrated National Adaptation Plan, a million pilot adaptation project partly funded by the Global Environment Facility (GEF) with the objective to improve Colombia's understanding and assessment of impacts, vulnerability, and adaptation to climate change.
- The Joint Programme "Integration of Ecosystems and Adaptation to Climate Change in the Colombian Massif", likewise supported by GEF, aiming at strengthening the integration of environmental issues into the national agenda, with emphasis on reducing the vulnerability of the poor populations to environmental degradation, particularly climate change.

Currently, the Government of Colombia, under the coordination of DNP, is formulating a National Climate Adaptation Plan (Plan Nacional de Adaptación al Cambio Climático, PNACC), with the ultimate objective to reduce the risk and socio-economic impacts of climate variability and change in

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<sup>72</sup> Idem

<sup>73</sup> Environmental Priorities and Poverty Reduction - Country Environmental Analysis for Colombia, World Bank 2007

<sup>74</sup> Estado de los Recursos Naturales y del Ambiente 2009-2010, Contraloría General de la República, 2009-2010

<sup>75</sup> OECD/ECLAC (2014). OECD Environmental Performance Reviews: Colombia 2014. OECD Publishing.

<sup>76</sup> Estado de los Recursos Naturales y del Ambiente 2009-2010, Contraloría General de la República, 2011-2012

Colombia. The coordination between DNP and other actors, including the Ministry for Environment and Sustainable Development, IDEAM<sup>77</sup> and UNGRD<sup>78</sup> and representation of productive sectors, regions and the population at large, will be carried out within the National System on Climate Change (Sistema Nacional de Cambio Climático, SNACC).

In the document “ABC: Adaptación bases conceptuales. Marco Conceptual y Lineamientos del Plan Nacional de Adaptación al Cambio Climático (PNACC)”, the Government outlines the framework, process and purpose of the Plan, through which the Government aims at providing methodological inputs to support sectors and regions in order to a) generate a better understanding of the potential risks and actual impacts, including the economic costs; (b) take advantage of opportunities associated with climate change and variability; (c) mainstream climate risk management in the sectorial planning and territorial development; and (d) identify, prioritize, implement, evaluate and monitor adaptation measures to reduce vulnerability and exposure of socio-economic systems to climate change.

Central in the above-mentioned document is that a planned adaptation is more cost-efficient, i.e. that it is better to act today than meeting the economic costs of future climate change. The Government has identified five strategic lines for planned adaptation. These should serve as general guidelines for different sectors and regions in developing adaptation plans. These are: 1. Raising awareness about climate change; 2. Generating information and knowledge to measure climate risk; 3. Land use planning. 4. Implementing adaptation actions; 5. Strengthening the reaction capacity.

The Government formulated a roadmap for the development of adaptation plans within the national plan for adaptation to climate change. This plan seeks to guide the different sectors of the economy and the regions territories in their formulation of adaptation actions according to their needs.<sup>79</sup> There are more than fifteen programs and plans for adaptation to climate change, including a Comprehensive Regional Plan for Climate Change in the Capital Region of Bogotá-Cundinamarca (PRICC), the Huila Plan 2050 "Preparing for Climate Change" and the 4C Plan "Cartagena Competitive and climate compatible". From a sectoral perspective, the Strategy for the Agricultural Sector Adaptation to Climate Change was formulated. A roadmap for adaptation of the energy sector to climate change has also been drafted.<sup>80</sup>

After the current conceptual and methodological phase of PNACC, where the guidelines for sectors and regions are developed, there will be a phase when the government will support the elaboration of sectorial and geographic adaptation plans. This is followed by of the planned adaptation measures, and finally, a phase of monitoring, reporting and verification.

There remain several challenges such as a lack of integration of adaptation strategies across productive sectors, a lack of definition of responsibilities of the different government entities in the proposed national system for climate change, and a lack of knowledge about the impacts of climate change on ecosystem services.<sup>81</sup>

Climate change adaptation and disaster risk management are closely intertwined as climate change adds to existing environmental stressors such as the occurrence of natural disasters. The extreme rain seasons since 2010, and the consequences in terms of especially floodings has put increased attention on the necessity to recognize risk management in land planning and sectorial policy making. However, there is still an “emergency” focus in policy making and land use plans are lacking in considering risks of natural disasters. The Government of Colombia pointed out the weak technical capacity of the National System for Prevention and Attention of Disasters (Sistema Nacional de Prevención y

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<sup>77</sup> Instituto de Hidrología, Meteorología y Estudios Ambientales

<sup>78</sup> Unidad Nacional para la Gestión del Riesgo de Desastres

<sup>79</sup> DNP, MADS, SNGRD, UNGRD, IDEAM (2013). Hoja de ruta para la elaboración de los planes de adaptación dentro del Plan Nacional de adaptación al cambio climático.

<sup>80</sup> DNP. Plan Nacional de Adaptación. Consulted in Aug 7th 2015: [www.dnp.gov.co/programas/ambiente/Paginas/plan-nacional-de-adaptacion.aspx](http://www.dnp.gov.co/programas/ambiente/Paginas/plan-nacional-de-adaptacion.aspx)

<sup>81</sup> OECD/ECLAC (2014). OECD Environmental Performance Reviews: Colombia 2014. OECD Publishing.

Atención de Desastres, SNPAD), the limited coordination between institutions and the lack of an integrated risk management strategy covering the national, regional and municipal levels. In response to this, the National Unit for the Management of Risk of Disasters was established through Government decree in November 2011, to coordinate the SNPAD.

The Government of Colombia enacted Law 1523 of 2012 on disaster risk management and has strengthened the technical capacity of the Colombian Geological Service (SGC) and the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM). The country faces important challenges in terms of knowledge and vulnerability analysis and risk assessment. Risk analysis in land use planning at the municipal level is very weak. The new National Development Plan 2014-2018 has recently signaled the Government's commitment to address some of these pressing issues. It, for instance, states that public spending in disaster risk management will increase to 1 per cent of total public spending –this is expected to reduce disaster incidence by 60 per cent.<sup>82</sup>

#### **4.4 Mitigation of Climate Gases**

While being a country that is highly vulnerable to global warming, Colombia has relatively low greenhouse gas emissions, much due to a large proportion (78 per cent the latest decade) of hydroelectric energy. Currently, hydropower generates about 64 per cent of the total electricity supply in Colombia, while fossil fuels generate about 30 per cent.<sup>83</sup> In the early 1990s, however, 80 per cent of the electricity produced in the country was hydro and only 15 per cent corresponded to fossil fuels. The transition to a heavier reliance on fossil fuels can be explained by the need to meet an increasing demand for electricity with a more reliable energy mix. In particular, El Niño has largely impacted water storage volumes and hydropower production capacity in certain periods over the last 20 years, and this has underlined the need to expand and diversify generation capacity.<sup>84</sup>

Colombia accounts for about 0.4 per cent of global emissions of greenhouse gases, excluding land use change and forestry. On average, the country produces 4.15 tons GHG per capita<sup>85</sup>, much below the average for Latin America which is 8 tons per inhabitant. These figures do not include emissions caused by deforestation, which internationally is a major contributor to climate change (accounting for 18-25 per cent of global greenhouse gas emissions).

As a non-Annex I Party to the Kyoto Protocol, Colombia is not bound by specific targets for greenhouse gas emissions. Still, the country has taken steps to reduce national emission. On a policy level, the following national policies and plans are associated with mitigation: Policy Guidelines on Climate Change (2002); Conpes 3242: Sale of environmental services for mitigation (2003); Mitigation Climate Change Group at the MAVDT<sup>86</sup>; Resolutions by MAVDT on CDM projects and on Technical Committee on Climate Change (2009); National Development Plans (NDP) 2002-2006, 2006-2010, 2010-2014, 2014-2018; Colombia's Vision II Centenary 2019; and Multilateral cooperation agreements. Sector strategies and plans have been developed for the agriculture, energy, waste, and forestry sectors, respectively. The national climate change policy is operationalized through four programs, the National Plan for Adaptation to Climate Change, the National Strategy for Reducing Emissions from Deforestation and Forest Degradation REDD, the Financial Strategy for Disaster Management, and the Colombian Strategy for a low Carbon Development ECDBC.

The ECDBC seeks to decouple economic growth from greenhouse emissions through sectoral mitigation measures that contribute to economic development and competitiveness of the sectors. The components of the strategy are: 1) To identify low carbon strategies at the sectoral level taking into

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<sup>82</sup> DNP-BID (2014). Impactos económicos del cambio climático en Colombia – Síntesis. Bogotá.

<sup>83</sup> UPME (2013) Proyección de Demanda de Energía Eléctrica en Colombia. Bogotá.

<sup>84</sup> Idem

<sup>85</sup> IDEAM (2010). Segunda Comunicación Nacional IDE ante la Convención Marco de las Naciones Unidas sobre Cambio Climático. Bogotá.

<sup>86</sup> Ministerio de Ambiente, Vivienda y Desarrollo Territorial (currently Ministry of Environment and Sustainable Development)

account carbon abatement costs; 2) To introduce the variable low-carbon development in sectorial planning. These two strategies include eight sectoral mitigation plans (PAS) for the sectors transport, electricity, hydrocarbons, mining, industry, agriculture, solid waste, water sewage and housing as well as a portfolio of nationally appropriate mitigation actions (NAMAs) for cattle farming, steel production among other sectors. 3) To promote the implementation of PAS and NAMA as established in the National Development Plan 2014-2018. 4) To build capacity among national and local actors and 5) to socialize advances made within ECDBC and to consolidate a network of international cooperating<sup>87</sup>.

In the report *Panorama del cambio climático en Colombia*<sup>88</sup>, ECLAC summarizes various studies on projections of climate gas emissions, according to which emissions from the energy sector are projected to increase by 40 per cent from 2000 to 2040 and those from the agricultural sector are estimated to increase by 34 per cent from 2000 to 2019. In the same period, total national greenhouse gases are projected to increase by 50 per cent. The mitigation potentials in various sectors vary from 10 to 50 per cent of cumulative emissions over the period 2010-2040 -50 per cent of this potential has negative mitigation costs<sup>89</sup>.

ECLAC estimates the mitigation potential to be of about 5-10 per cent, based on the 2020 base line scenario (business as usual) of the IPCC. In June 2015 the Colombian Government announced that it will reduce its Green House Gas Emissions by 20 per cent by year 2030 (base year 2010) and that its Intended Nationally Determined Contributions (INDC) for the of Conference of the Parties COP 21 - Paris may increase to 25 or 30 conditional on international assistance and cooperation.

## 5 Concluding Remarks and Recommendations

### *Momentum for change*

As in many other developing countries, environmental assets in Colombia constitute an important form of capital, in particular among the country's poor. Environmental management is central for economic and social development, not least in a context where climate change adds to existing vulnerabilities.

Colombia has severe social problems, but is also a fast evolving country. Important steps have been taken in the peace talks, including the preliminary agreement on rural development. These are opportunities for a fairer society and a more equal land ownership, but also for an improved land use planning based on the sustainable use of natural resources.

The environmental sector in Colombia suffers from ills that are common to other institutions in the country. Allegations of regulatory capture in the regions are not rare, suggesting that the interests of local communities are not always reflected in government decisions. Furthermore, total public and private expenditures in environmental protection in Colombia are relatively low when compared to those of other Latin American countries as well as to OECD countries.

The Colombian Government formulated an ambitious Green Growth Policy in 2015. This creates an important window of opportunity to formulate policies and initiate measures to give increased priority to a sustainable use of resources. However, strengthening the country's environmental institutions is a necessary condition for green growth and its potential contribution to peace building initiatives.

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<sup>87</sup> MADS (2015). *Estrategia Colombiana de Desarrollo Bajo en Carbono*. Brochure.

<sup>88</sup> ECLAC (2013). *Panorama del cambio climático en Colombia* of the Environment and Human Settlements Division of the Economic Commission for Latin America and the Caribbean (ECLAC) of the UN, 2013

<sup>89</sup> Universidad de Los Andes (2014). *Productos analíticos para apoyar la toma de decisiones sobre acciones de mitigación a nivel sectorial: Curvas de abatimiento para Colombia*. Preparado para PNUD y MADS. Bogotá.

### *Recommendations for Sida*

Environment or natural resource related issues have not explicitly been part of Swedish development cooperation with Colombia. However, as this review has shown, there are many important linkages between environment/natural resources and Swedish areas of key concern, such as conflict prevention, gender, human rights and involuntary displacement. In the development of a new cooperation strategy with Colombia, Sida should consider the following issues:

Integrate environmental considerations in support to land titling and rural development: A large proportion of the municipalities prioritized in land restitution and titling initiatives in post-conflict Colombia are highly sensitive from an environmental standpoint. Coupling these and other poverty reduction initiatives with sustainable management of ecosystems that takes into account the agro-ecological characteristics of the different regions is a pivotal element in building socio-economic development and lasting peace. Regional and local authorities will need considerable support in order to be able to integrate environmental considerations in their spatial plans. A more detailed study on how such support can be implemented is recommended (it goes beyond the reach of this policy brief).

Highlight the need for environment and social assessments of rural development initiatives: Sweden should highlight the need for proper environmental and social assessments of rural development initiatives. Links should be made to the Swedish funded environmental impact assessment of the land restitution process from 2013.

The need for further studies and evaluations of the rural development process should also be considered. Methodological work on natural resources tenure, within Sida, as well as internationally, should be taken into account. Particular attention could be paid to the linkages between natural resource tenure and gender equality.<sup>90</sup>

Consider support to improve environmental governance linked to the post-conflict agenda: Pro-active and pro-poor natural resources management plays a key role in a post-conflict scenario. The Green Growth policy recently announced by the Colombian government has a special emphasis on improving the living conditions of the country's poor. Sida could investigate possibilities to support the implementation of this strategy as a peace building initiative.

Consider supporting climate adaptation strategies and disaster risk reduction. While Colombia's contribution to climate change is relatively low, it is one of the world's most vulnerable countries to climate change. Colombia is a highly unequal country and disadvantaged communities, including displaced and poor populations, will be disproportionately affected by the impacts of climate change. These include a change in precipitation regimes, intensifications of floodings and landslides and reduction of the productivity of crops. Increasing the resilience of local communities to disaster risks hence form an important part in a post conflict development scenario. Sida could actively promote that disaster risk reduction is included in environmental and social assessments of plans for land titling and rural development.

Improve the knowledge base on environment-gender and climate-gender interactions: Gender and environment are thematic priorities in Swedish development cooperation but the knowledge on the linkages between these priority themes in Colombia is, at best, weak. Sida could consider collaborating on this issue with some of the five government sponsored research institutes that focus on environmental research and with local universities. Environment and climate are receiving considerable attention in Colombia. Including the environment-climate-gender relations in the policy dialogue would help raise awareness about gender issues in the country.

Consider supporting the Government of Colombia in necessary reforms related to the mining sector. The mining sector is a complex and sensitive area, but Sida could possibly consider assisting the

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<sup>90</sup> For example Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests of the FAO (2012); "Gendering Land Tools" of UN Habitat (2008), World Bank Gender in Agriculture.



Government in the discussed reform of the mining law, carrying out an inventory and remediation planning of environmental liabilities from decades of irresponsible mining activities, and strengthening the public sector's capacity to control mining activities and reinforce environmental legislation and vigilance. A large proportion of total mining production is illegal and among those who have a mining license only a small proportion has an environmental license for exploitation. The formalization of the mining sector constitutes a major challenge for Colombia and Sida could become a strategic partner in this area.

Consider collaborations with new actors: As part of a possible post-conflict scenario, Swedish actors with rich experiences from land titling, forest management and mining may contribute to socio-economic development, trust and peace building in ways that have not been conceivable during earlier strategy periods. This merits further analysis.

Include climate change and environmental issues in analyses and programming: Based on our review, we find that Sida's country reports, planning documents and poverty analysis for Colombia has so far not given sufficient attention to environmental, natural resource and climate change related considerations. According to the current country strategy, these issues are "not in focus", and there is no mentioning at all of environment and natural resources in the mid-term review of the strategy. To be multidimensional the poverty and development analysis should incorporate also the constraints and opportunities that environmental and natural resource factors constitute for poor women and men, including land issues. In line with Sida's overall focus in Colombia, special attention should be put on analyzing climate change, environmental and natural resources issues from a conflict prevention perspective, including that of land use and land concentration. This should imply a relatively larger focus on predominantly rural environmental issues, despite the growing importance of urban environmental issues documented in this report. We encourage Sida to discuss these issues in the development and implementation of the new cooperation strategy. Seminars with selected experts or commissioned studies on specific issues linked to planned programmes and projects could be part of such an effort.

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## Appendix A: Description of Key Environmental Problems

### A.1 Inadequate Water Supply, Sanitation, and Hygiene

Inadequate water supply and poor sanitation conditions can transmit diseases such as diarrhea, cholera, dysentery, typhoid and polio. Although diarrheal illness is not the most serious waterborne illness, it affects more people than others. Globally, contaminated drinking-water has caused 502 000 diarrheal deaths yearly in recent years.<sup>91</sup>

In Colombia 22 per cent of rural households are connected to sewers and 73 per cent of the rural population has access to clean water supply. This contrasts with urban areas where more than 90 and 98 per cent of households have access to sewers and clean water supply. Even though the number of households living under poor sanitation conditions decreased during the period 2000-2010, poor sanitation still constitutes an important health problem. It has been estimated that each year poor sanitation conditions in Colombia cause about 1,600 premature deaths (1,000 children under age five with various types of malnutrition) and almost 20 million disability-adjusted life years.<sup>92</sup> Inadequate water supply and sanitation generated health impacts that cost about 0.68 per cent of GDP (2009). Diarrheal mortality and morbidity are about 89 per cent of this cost with 77 per cent of the cases concentrated in urban areas.<sup>93</sup>

During the period 2011-2014, the Colombian Government allocated the highest historical level of financial resources to the water sanitation sector, that is 552 000 million (Col) pesos. Some of the funded projects included a program to improve water supply and sanitation facilities in poorer rural areas, waste water treatment plants in five watersheds and three large cities, as well as improvements in local water development plans.<sup>94</sup> It has been estimated that hand-washing can reduce diarrheal illness by up to 45 per cent,<sup>95</sup> especially when combined with improved access to clean water and sanitation facilities. There remain important challenges due to deficient sectoral planning processes, unsustainable schemes for providing water and sanitation in some municipalities, and the vulnerability of natural water supplies.<sup>96</sup>

### A.2 Urban and Indoor Air Pollution

Air pollution is a serious problem in Colombia's cities and rural areas. Although air pollution levels are moderate in most cities, the fact that close to 60 per cent of the population lives in cities with more than 100 000 inhabitants creates substantial aggregate health effects, associated mainly with particulate matter. The impacts include cardiopulmonary diseases and lung cancers among adults and acute respiratory illness, particularly in children, as well as death from related diseases such as pneumonia. Approximately 5 000 premature deaths (75 per cent in Bogotá and the Valle de Aburrá Metropolitan Area) and almost 65 million disability-adjusted life years per year are due to outdoor air pollution.<sup>97</sup> Urban air pollution cause health impacts that costs annually 1.1 per cent of GDP (2009) - 79 per cent of this cost is related to mortality.

Based on an evaluation of environmental health with emphasis on air pollution carried out by the Ministry of Environment, a new governmental policy on prevention and control of air pollution was

<sup>91</sup>Drinking Water-Fact Sheet N°391. June 2015. WHO. Retrieved on Aug 7 2015:

<http://www.who.int/mediacentre/factsheets/fs391/en/>

<sup>92</sup> World Bank (2012). Colombia: Strengthening Environmental and Natural Resources Institutions. Study 2: Environmental health in Colombia: An economic assessment of health effects. Report No.71443-CO.

<sup>93</sup> Idem

<sup>94</sup> MVCT (2014). La transformación del agua en Colombia. Viceministerio de Agua y Saneamiento Básico. Presentation.

<sup>95</sup> Larsen, B (2004) Cost of Environmental Damage: A Socio-Economic and Environmental Health Risk Assessment. Consultant Report prepared for the Ministry of Environment, Housing and Regional Development, Colombia

<sup>96</sup> National Development Plan 2014-2018, Bogotá 2015

<sup>97</sup> World Bank (2012). Colombia: Strengthening Environmental and Natural Resources Institutions. Study 2: Environmental health in Colombia: An economic assessment of health effects. Report No.71443-CO.

formulated in 2010. Considering that 86 per cent of air pollution originated from land transport, followed by industry (8 per cent) and energy (3 per cent), the policy puts emphasis on the renovation of the vehicle park. Despite improvements in information systems for air quality and the implementation of some effective measures (e.g. the adoption of cleaner fuels) air quality is still an issue of concern. The National Development Plan 2014-2018 seeks a deeper involvement of environmental authorities in air quality management and the improvement of surveillance systems and standards. It also calls for further improvements in the quality of fuels and better vehicle emission controls, as well as the design and implementation of an economic instrument targeting air emissions.

Indoor air pollution is also an important health problem in Colombia, particularly among the rural poor women and children, related to the use of fuel wood, charcoal, and other solid fuels used for cooking, inefficient stoves and bad ventilation. An estimated 1000 premature deaths per year and almost 12 million disability-adjusted life years are related to exposure to such indoor air pollution. Notably, about 50 per cent of the rural population use solid fuels. Indoor air pollution cause health impacts that costs annually 0.22 per cent of GDP (2009) -78 per cent of this cost corresponds to mortality among women over 30 years of age.

### **A.3 Natural Disasters**

Colombia is highly vulnerable to natural disasters such as floods, droughts, and earthquakes. The country has the highest natural disaster occurrence rate in Latin America, with over 600 events reported each year.<sup>98</sup> 24.4 per cent of the area of the country has a moderate or high natural hazard risk.<sup>99</sup> According to the Natural Disaster Hotspot study by the World Bank, the country has the 10<sup>th</sup> highest economic risk in the world to three or more natural hazards. 84.7 per cent of the Colombian population and 86.6 per cent of the country's assets are located in areas with two or more natural hazards. The largest number of natural disasters is related to landslides, frequently attributed to hydrological phenomena, but also to inappropriate land use, as described further below. Large parts of Colombia's territory are susceptible to flooding, especially in the lower basins and valleys of its main rivers. Most of the country lies in zones of high or very high seismic activity, including all major urban areas.<sup>100</sup> During recent years, extreme seasonal rains, in part considered a consequence of climate change, have caused severe damage. Floods and landslides, aggravated by inappropriate land use, have led to severe consequences for the population and the economy -3.2 million people have been affected (65 per cent living in rural areas) and the estimate cost is 0.4 per cent of GDP (2010).<sup>101</sup>

Natural disasters have adverse effects on local livelihoods, have a disproportionate impact upon the poor whose dwellings are in unsafe areas, and reduce the competitiveness of different economic sectors and the economy as a whole. There have been events of high intensity and low recurrence (such as the earthquake of 1999 in the coffee region that generated losses equivalent to 1.9 per cent of GDP), and events with low and medium intensity but high recurrence (the accumulated economic losses in the period 1970-2000 are about 1.4 times of that caused by a large earthquake the 1999 earthquake).<sup>102</sup>

### **A.4 Land Degradation and Deforestation**

The two most prominent components of land degradation in Colombia are erosion/salinization<sup>103</sup> and problems associated with deforestation. Erosion is primarily related to an inappropriate use of land, including the expansion of agricultural activities and cattle ranching, while salinization mainly is caused by irrigation. Between 4 and 23 per cent of the country's soil is estimated to be seriously

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<sup>98</sup> National Development Plan 2014-2018, Bogotá 2015

<sup>99</sup> Instituto Geográfico Agustín Codazzi – IGAC (2012). Proyecto Conflictos de uso del territorio colombiano. Escala 1:100.000.

<sup>100</sup> Disaster Risk Management in Latin America and the Caribbean Region: GFDRR Country Notes, Colombia. World Bank, 2012.

<sup>101</sup> National Development Plan 2014-2018, Bogotá 2015

<sup>102</sup> Idem

<sup>103</sup> Salinization occurs when salt content of soil accumulates over time to above normal levels.



eroded<sup>104</sup> and 48 per cent susceptible to erosion. 0.55 per cent of its total land area should be subject to recovery strategies from salinization (626 460 hectares).<sup>105</sup>

Soil erosion and salinity generate significant economic costs, not least stemming from lost agricultural productivity. Land degradation can also have other negative consequences, including siltation of low-lying dams and irrigation infrastructure, contamination of drinking water by agrochemicals, and loss of biodiversity and ecosystem services.

19.3 per cent of the country's land area has been deemed suitable for agriculture, 13.3 per cent for livestock farming, 3.5 per cent for agroforestry, 5.5 per cent for conservation and environmental recovery and 56.2 per cent for forestry and natural forests. Only 4.66 per cent of the land area of the country is being farmed, while livestock farming occupies 30.57 per cent of the total area, and forests 53.17 per cent. Currently only 67.6 per cent of the country's territory has an appropriate land use<sup>106</sup> - most of the over-exploited area is concentrated in the Andean and Caribbean regions. These figures highlight that land use planning is a central environmental and socio-economic issue for Colombia.

Deforestation is the major cause of biodiversity loss in Colombia. It contributes to other environmental problems such as erosion and aquifer depletion and increases the frequency and severity of flooding and landslides. Deforestation affected 120.993 hectares in 2013 - 57 per cent of the total affected area was in the Amazon, followed by 22 per cent in the Andean region<sup>107</sup>. Total forest cover is about 53.17 per cent of total land area, as compared with an estimated 90 per cent before human settlement.<sup>108</sup> Deforestation in Colombia is mainly due to expansion of the agricultural border, mostly for livestock production and illicit crop production (coca and poppy). Other causes include lumber production, firewood consumption and forest fires.

#### **A.5 Deteriorating Water Resources**

Although Colombia has abundant water resources, 40 per cent of the main water sources of the country are vulnerable to deterioration. Important water stressors include climatic changes, erosion, loss of vegetation, and not least, human pressure, including contamination and over-exploitation.

Agriculture represents 46.6 per cent of total water demand in the Colombia, electricity generation 21.5 per cent, livestock 8.5 per cent, households 8.2 per cent and industry 5.9 per cent<sup>109</sup>. Water demand is concentrated in the Magdalena and Cauca Basins, Colombia's most important waterways. The World Bank states that "By 2025 some of the country's basins could become vulnerable and, if left unattended, could generate potential water deficits."

Water quality impairment is worrisome in a number of regions. The Bogota River and the Chicamocha River are highly contaminated and are direct tributaries to the Magdalena River, Colombia's most important river.<sup>110</sup> Organic pollution in water bodies is mainly generated by households (69 per cent), followed by the industrial sector (28 per cent) and coffee plantations (3 per cent) -inorganic pollution generated by these sources is 61 per cent, 37 per cent and 2 per cent respectively. Most water

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<sup>104</sup> Environmental Priorities and Poverty Reduction – A Country Environmental Analysis for Colombia, by Sánchez et al, 2007

<sup>105</sup> Instituto Geográfico Agustín Codazzi – IGAC (2012). Proyecto Conflictos de uso del territorio colombiano. Escala 1:100.000.

<sup>106</sup> Idem

<sup>107</sup> Sistema de Información Ambiental de Colombia SIAC (2013) Informe de la tasa de deforestación 2013. Retrieved on July 23 2015: [https://www.siac.gov.co/contenido/contenido\\_preview.aspx?conID=1705](https://www.siac.gov.co/contenido/contenido_preview.aspx?conID=1705)

<sup>108</sup> WRI (World Resources Institute). 2003. "Earthtrends, Country Profile, Colombia." World Resources Institute, Washington, DC, quoted in Country Environmental Analysis, World Bank 2007

<sup>109</sup> Instituto de Hidrología, Meteorología y Estudios Ambientales IDEAM (2015). Estudio Nacional del Agua 2014. Bogotá.

<sup>110</sup> Instituto de Hidrología, Meteorología y Estudios Ambientales IDEAM (2015). Estudio Nacional del Agua 2014. Bogotá.

pollution originates in large urban centers such Bogotá, Medellín, Cali and Cartagena. Only 43 per cent of municipal wastewater in the country is treated.<sup>111</sup>

The Government of Colombia has recently created the National Policy for an Integral Management of Water Resources. Its aim is “to ensure the sustainability of water resources through management and an efficient and effective water use and [to ensure] the conservation of ecosystems that regulate water supply, considering water as a factor of economic development and social welfare, and implementing processes for equitable and inclusive participation”<sup>112</sup>. Under this policy strategic plans for five macro river basins are being formulated while other 130 basin management plans are being updated. The policy highlights the importance of increasing the knowledge base on the country’s groundwater resources, which is so far limited.<sup>113</sup>

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<sup>111</sup> OECD/ECLAC (2014). OECD Environmental Performance Reviews: Colombia 2014. OECD Publishing.

<sup>112</sup> Ministerio de Ambiente, Vivienda y Desarrollo Territorial (2010). Política Nacional para la Gestión Integral del Recurso Hídrico.

<sup>113</sup> OECD/ECLAC (2014). OECD Environmental Performance Reviews: Colombia 2014. OECD Publishing.

## Appendix B: Map of Abandoned and Expropriated Lands by Region

