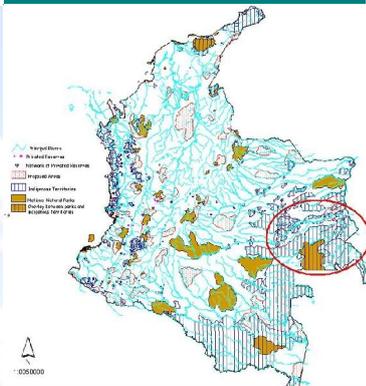


Promoting Environmental Security and Poverty Alleviation in the Matavén area of Colombia



Prototype EnviroSecurity Assessments

Matavén, Colombia Part 1: Case Study

Jeanna Hyde Hecker

Prototype EnviroSecurity Assessments

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Anna Paulownastraat 103, 2518 BC The Hague, The Netherlands

Tel +31 70 365 2299 • Fax +31 70 365 1948 • info@envirosecurity.org • www.envirosecurity.org

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Project Team

Project Manager: **Wouter J. Veening**, IES • Senior Consultant: **Leendert Jonker**, IES • Administrator / Editor: **Ronald A. Kingham**, IES • Researcher: **Jeanna Hyde Hecker**, EnviroSense • Legal Advisor: **Serge Bronkhorst**, BILS • Scientific Advisor: **Niels Wielaard**, SarVision • Cartographer: **Philippe Rekacewicz**, UNEP GRID-Arendal • Research Assistants: **Sjoerd de Gijzel**, **Eric van de Giessen**, **Frederik J.W. van Oudenhoven**

Project Partners

This project is coordinated by the **Institute for Environmental Security** with the following partners:
Borneo Orangutan Survival Foundation (BOS), Indonesia
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Jeanna Hyde Hecker, EnviroSense

Commissioned by the Institute for Environmental Security

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1 Introduction

Environmental security is the current and future availability of goods and services from a healthy environment for humankind and nature. The availability is reduced when there is environmental destruction. Environmental destruction leads to scarcity and scarcity triggers conflict which can develop into violence. Thus, environmental security is vital to human security and well being. Conflict or violence can also be caused by the availability of abundant rather than scarce environmental goods or natural resources. The situation could also be reversed in that, for reasons other than scarcity or abundance of environmental services and goods there is conflict or violence. This conflict or violence can then lead to environmental destruction - as wars often do - and as a result there is scarcity which results in conflict and the cycle continues.

Colombia has one of the world's most diverse and species rich landscape. Colombia also qualifies in the top three of the 17 mega diverse countries, according to the book *Megadiversity: Earth's Biologically Richest Nations* (1997, cited in Mittermeier, Mittermeier, & Kormos, 2001). All together the seventeen nations possess more than two-thirds of all life forms, the vast majority of tropical rainforests, coral reefs and other important ecosystems (Mittermeier, Mittermeier, & Kormos, 2001). The target area of this study lies in the northernmost region of the Colombian Amazon. It is the Matavén Forest which is partly inhabited by indigenous communities while the larger portion is left in its pristine state. The ecosystem in this area is in such a natural state as it has little to no infrastructure and absence of the state.

Such conditions in Colombia, however, are sought out by coca farmers and armed forces for their illegal activities. Colombia is world renowned for the conflicts generated from the armed forces- guerrilla and paramilitary. They are involved in illegal drug production and trafficking to other countries as well as the import of weapons and ammunition to fuel their internal conflicts and power struggles. The threat in the study area of the Matavén is now the advancing coca frontier, now existing up until the western border of this area but without mitigations will penetrate the indigenous territory. If the coca growers are successful in their attempt to enter the region the result will be the same as has been observed in other regions. There will be accompanying deforestation, possible soil erosion and water sedimentation, conflicts over resources, people displacement, loss of traditional knowledge, poverty, chemical pollution of the environment from fertilizers and pesticides used in coca cultivation; chemicals used in processing the coca into cocaine; and, from herbicides used in aerial fumigation once plantations are located.

This case study attempts to describe the problems in the area and identify causal relationships among them in order to generate a comprehensive understanding of the situation. Before recommendations are made stakeholders are identified and an analysis of areas for mitigation is carried out.

2 Background

2.1 The period of Violence

The current dependence on coca and armed conflict in Colombia could be linked back to the *Violence* of the 1940 – 1960's. This was one of the longest and most devastating civil wars of the 20th century in the western hemisphere and took place mainly in the most economically active municipalities of Colombia (Henderson, 1984 as cited in Bolivar, 2003). The Violence was between areas of coffee production and those left out of the development of the agricultural export – based economy. It was from these forgotten regions that the guerrillas emerged and consolidated (late 1960s and early 1970s). Those who fought in the Violence period also joined the guerrillas and along with the less fortunate population moved to the south east (Amazon area). The settlers then started planting coca or working as labourers on coca fields in the region.

The guerrillas did not start off cultivating and selling coca themselves (Bolivar, 2003). Rather they were mainly improving the reliability of the illegal market, making sure that the settlers were not taken advantage of by landholders and coca dealers. The settlers in turn depended on the guerrillas for these and other social services. With time, however, the guerrillas became increasingly more involved in the cultivation of coca itself. According to Bolivar (2003) the guerrillas saw the need to expand their territorial boundaries.

3 Study Area Description

3.1 Location

The Matavén Forest is the furthest north eastern section of the Colombian Amazon. It lies in the Orinoco watershed and is bounded east by the Orinoco River, north by the Vichada River, south by the Guaviare River and west by Chupave River. It is in the Vichada Department, and belongs to the Cumaribo municipality.

The Matavén Forest is 2,150,000 ha, of which 970,000 ha (45%) are used by 16 indigenous communities, *resguardos*. These communities form a protective belt surrounding a central area of the remaining 1,180,000 ha which is well conserved and largely uninhabited (Etnollano, 2000).

3.2 Population

The *resguardos* total 10, 449 inhabitants from 6 different ethno-linguistic groups: Sikuani, Piapoco, Piaroa, Puinave, Curripaco and Cubeo (Etnollano, 2000). These indigenous people have generations of knowledge and experience on the natural resources, the seasonal cycles, and on how to live sustainably off the environment

(Etnollano, 2000). They support the conservation of the ecosystems and as a result the environment is intact (Etnollano, 2000).

3.3 Environmental Importance

Being part of the Colombian Amazon, the Matavén Forest characteristically consists of species richness and a complex mosaic of ecosystems with high endemic levels. It has five ecosystems, for instance, it contains enclaves of savannahs in the north reflecting the transition to the Orinoquia ecoregion. It also has *caatingas* of the upper Orinoco and Negro rivers. A *Caatinga* is a semi arid ecoregion in South America.

(Rodrigues)

The typical "caatinga" landscape consists of extensive inter-plateau and inter-mountain plains, which involve and interpenetrate higher residual massifs. The vegetation is xerophytic, deciduous and open, well adapted to withstand the lack of water. The "caatinga's" most common landscape is the one it presents during the drought. Despite the dry aspect of the plants, they are all alive; they have only lost their leaves, in order to endure the lack of water. Even during the drought, the animal life is also rich and diversified. However, it is after the rains that the animal and vegetable diversity of the "caatingas" becomes evident. The plants flower and the animals reproduce, leaving descendants which already have adaptations to endure the next long drought period.

The caatingas found in the Matavén region are unique ecosystems of the entire Amazon.

A third ecosystem type contains the most extensive “flooding forest” or “Varzeas” of the Colombian Amazon (Etnollano, 2000). If the flooding forest disappears it will impoverish the rivers, streams and several aquatic resources to the point of extinction. The riparian zones also need careful management in order not to overexploit the palms that grow along banks or the fish within the water (Etnollano, 2000).

Of the five ecosystems in the Matavén Forest, the biotic makeup of three of them are relatively unknown by scientists.

According to the IUCN red lists there are several threatened species of terrestrial vertebrates which inhabit or may inhabit the Matavén Forest (Etnollano, 2000). Alterations of the ecosystems here can lead to species extinction or species becoming critically threatened.

4 Analysis of Situation

4.1 Problem Overview

4.1.1 Environmental Destruction

Most of the environmental destruction that occurs in the study area is related to the coca economy in some way. In the Departments of Amazonas, Vaupés, Guiana, and Vichada, there is relatively less coca plantation than in the surrounding areas (Fundacion GAIA Amazonas). The threat, however, lies in the possibility for the movement of coca growers into this region when they want to expand the area under cultivation or when

their current crops are eradicated. The presence of coca fields will result in deforestation, possible soil erosion and water sedimentation, conflicts over resources, people displacement, loss of traditional knowledge, poverty, chemical pollution of the environment from fertilizers and pesticides used in coca cultivation; chemicals used in processing the coca into cocaine; and, from herbicides used in aerial fumigation once plantations are located.

1. Deforestation

Approximately 70% of coca cultivation occurs in the south and east of Colombia at elevations ranging from 100 and 1500m above sea level, mostly in ecosystems classified as tropical rainforests (Rosero, Alvarado, Contreras, & Rocha, 2003). Coca farmers move into these areas and clear the forests to create fields. In addition, coca is a space and nutrient demanding crop, one ha of coca requires about two and half ha of cleared forest land. In a 15 year period starting in the 1970's 700,000 ha of Amazon rain forest was cleared for planting coca.

While coca expansion causes the highest loss of deforestation in the region some forests are also logged for commercial purposes. In the varzea of the Guaviare River there was extensive wood extraction for trading purposes (Etnollano, 2000). While deforestation is a direct loss of vegetation there are other repercussions such as loss of wildlife habitat, fragmentation of forests leading to limitation of movement for animals as well as displacement of wildlife from cleared areas into forested areas.

2. Soil erosion

The soils upon which coca is planted in the south of the country are not as fertile as many tend to believe, rather they are fragile soils (Rosero et al., 2003). When the original vegetation is cut and/or burned away, the soil becomes exposed to the factors necessary for erosion to occur. In addition, as a means of deterring anti-drug forces from accessing coca plantations, coca is planted on slopes. As coca farmers are often not expecting to stay in one location for long periods of time they do not incorporate soil conservation practices. Consequently, soil from slopes erodes away. In mountainous areas, such as the Andean Mountains, there are often land slides and overflowing rivers (Rosero et al., 2003) caused by the removal of forests and lack of soil management.

3. Effects of chemicals used on coca

As a result of relatively unproductive soils, soil erosion, the non utilization of soil conservation practices and the desire to have improved coca yields, large quantities of fertilizers and pesticides are used on coca crops. In addition, for the processing of coca leaves to make cocaine several chemical compounds are utilized. After these compounds are used in the field labs they are dumped into the rivers or unto the ground.

Colombia supplies 70-80% (estimate until 1997) of the coca market worldwide with cocaine. According to the US Office of National Drug Control Policy (2001), 90% of the cocaine that enters the US originates or passes through Colombia. The increase in the availability of cocaine in the US has been recognized as a threat to US security as well as to the well being of the citizens (International ONDCP, 2001). To mitigate this problem, the US has implemented Plan Colombia. A part of this program entails the destruction of coca fields by aerial fumigation with glyphosate herbicidal mixtures.

In 2004, there were 80,000 ha of coca being cultivated in Colombia, that is a 51% decrease from the 2000 estimate of 163,000 ha (UNODC Colombia, 2005). While the UNODC report (2005) claims that the major reduction in coca fields can be attributed to aerial spraying as well as alternative development projects, over the period of 2002 to 2004 each year more than 133, 000 ha of coca fields were fumigated (UNODC Colombia, 2005).

- **Human health effects**

While some believe that health problems developed by cultivators in rural areas are linked to the aerial spraying of the coca with glyphosate mixtures others believe that the problems are caused by other chemicals which the cultivators themselves use for improving coca crop yields. According to research carried out by US agencies, the herbicide - a mixture of glyphosate and other compounds, used in aerial spraying of coca is not hazardous to human health (Rosero et al., 2003). In California, however, glyphosate was found to be the third most commonly reported cause of pesticide illness among agricultural workers (Pease, 1993 cited in Cox, 1995). In addition, cultivators do indeed use chemicals such as paraquat and parathion on the coca crops (Rosero et al., 2003). The pesticide paraquat, for instance, if handled without protection can cause skin irritation while prolonged exposure can lead to systemic absorption and consequently, fatal poisonings (Reigart & Roberts, 1999).

- **Destruction of legal crops**

Farmers have had their legal subsistence crops destroyed during fumigation, with no compensation (Cryan, 2004; Tenenbaum, 2002). Glyphosate is an herbicide, so it does not kill indiscriminately only coca, but any other vegetation that comes in contact with the substance can be affected. Responsible authorities stated that legal crops are not directly targeted but may be sprayed if they are adjacent to or within fields of illegal crops (Tenenbaum, 2002). Although there is a compensation system set up by the Colombian government and assisted by the US, it seems to be a time consuming process in which poor farmers often do not get compensated (Cryan, 2004).

4. Water pollution

River systems in the region are polluted by eroded soils, and point and nonpoint sources of chemicals used in production, processing and eradication of coca. These rivers are

also essential for the security of the ecosystems and for the local communities who rely on them as their source of, for instance, drinking water and fish.

4.1.2 Governance

There are three main areas in which the government falls short of fulfilling its responsibilities. Firstly, the government lacks capacity. This exists in different aspects, for instance, to provide security and enforce laws, as is the case with protected areas management and protection; also in providing infrastructure in rural areas especially to facilitate marketing of legal products; and, establishing or ensuring that each community has or is a part of a legitimate organized means by which it can manage its own affairs. These three conditions are precursors for the presence of armed forces.

Secondly, there are claims against members of government stating that they demonstrate corrupt behaviour. Such behaviours are, for instance, accepting bribery from drug traffickers or using state funds for personal rather than public interests, or being obstructive towards indigenous self governance (Fundacion GAIA Amazonas).

Thirdly, while it is not only the government's responsibility to investigate and provide opportunities for rural communities as alternatives to coca cultivation, they should play an important role in this matter. As is mentioned throughout the literature on coca in Colombia, from various sources, despite the fact that it is illegal coca is a "good" means of livelihood for the coca growers. There are several reasons for this, mainly that the climate is suitable, growers do not have to market coca as they need to with other crops, growers are paid in cash, infrastructure is provided and secured by the guerrillas, and profits are good. Therefore, if alternatives are not provided to substitute for coca, growers will not be stopped by fumigation only displaced.

4.1.3 Loss of traditions

The younger generations of indigenous people are turning away from the traditional sustainable livelihoods of their ancestors to lifestyles that are influenced by western development. The vision of western development is related to extractivist economies and in the region there have been booms in namely, rubber, cedar, animal skins and coca leaf exploitation (Etnollano, 2000). This way of life is different from the traditional way of life of the indigenous people. As the name suggests extractivist industries rely on exploitation of the natural resources, such as, clear cutting/deforestation for coca cultivation, for cedar extraction and non sustainable animal hunting/poaching. As more people exploit the natural resources, the more destruction of the life supporting ecosystems will increase. These life supporting ecosystems, for instance, "Corazon de la salud", are the same ones the indigenous ancestors have depended on for generations. There is also an increase in the desire for money and basic consumer items (Etnollano, 2000). Young indigenous men try to fulfil this need by working for wages as labourers on settlers' farms or on coca plantations leaving the arduous subsistence farming to the

mothers (Etnollano, 2000). According to Etnollano (2000), one of the outcomes of the change in roles is an increase in child malnutrition and related diseases.

Not everyone from the younger generations, however, is turning away from their ancestral life styles. Those that still appreciate the traditional knowledge and values are working with agencies to ensure cultural longevity (Etnollano, 2000).

4.2 Problem Linkages

The problems in the region are manifold and complex. The problem linkage described here and demonstrated in Figure 1., is a simplified version of the situation and it aims at giving a clear understanding through cause and effect relationships. There might be other factors not included here that may lead to some of the problems listed or depending on the reader's interest a different core problem could be identified which could also lead to a rearrangement of the problems. The linkages are based on literature research of related documents and input from the local counterparts. They are used in further analysis of what the region needs.

As the IES' objective is to promote environmental security it recognizes the core problem in the study area as environmental destruction. That includes, for instance, soil erosion, water pollution, deforestation and loss of biodiversity.

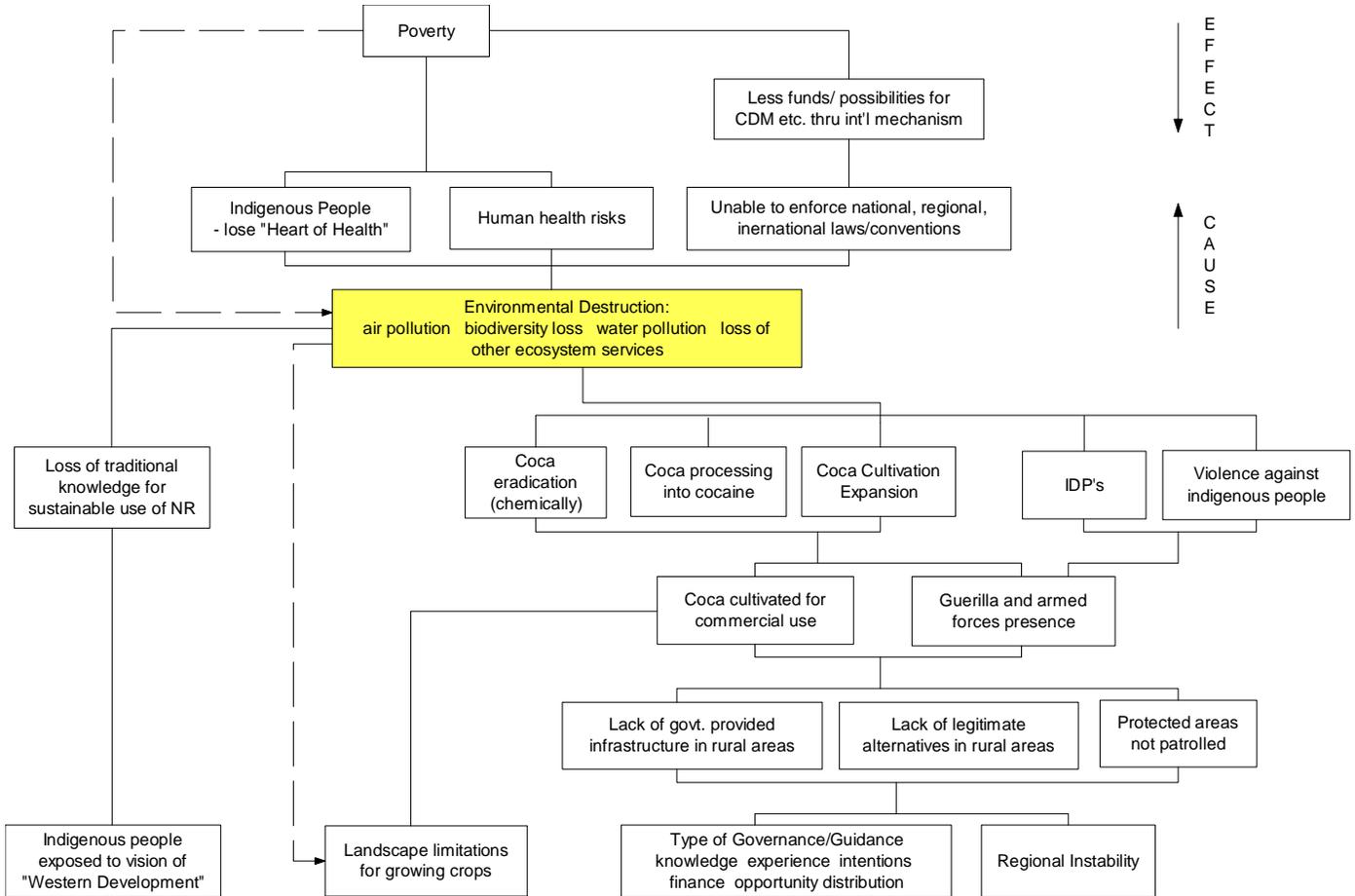


Figure 1. Problem tree (cycle) showing cause and effect relationships among the problems identified in the region

4.3 Stakeholders

In order to address the problems appropriately it is important to have an understanding of each group’s concerns. As there are many different stakeholders in the region, in some instances categories were developed to make consideration of as many stakeholder groups feasible for this study. The following stakeholders are in some way related to the problems above.

Stakeholders	Objectives, Goals, Needs	Environmental & Natural Resources Interests
1. Indigenous Communities and Organizations	To maintain balance between themselves and nature for long term livelihood, spirituality, education	Corazon de la salud and all aspects of this ecosystem (rivers, biodiversity, etc.) intact;
2. Coca farmers	To make a living and be able to fulfil needs. As coca allows them to meet goals, they want to obtain as high and as many yields as possible	Forested, rural areas; rivers;
3. Other farmers or cattle ranchers	To make a living and be able to fulfil needs.	forest or land for agriculture or cattle; rivers/water bodies
4. Guerrillas	To fulfil needs of the group, to obtain power over territories and to regulate coca markets and secure entire coca processing phases.	Forested, rural areas; rivers;
5. Paramilitary	To fulfil needs of the group, to obtain power over territories.	Forested, rural areas; rivers; minerals-gold, emeralds, diamonds, oil
6. Local government	To protect people and the environment and maintain a stable economy	Forests and all aspects of ecosystem (rivers, biodiversity, etc.)
7. National government	To protect people and the environment and maintain a stable economy	Forests and all aspects of ecosystem (rivers, biodiversity, etc.)
8. Local NGOs Socio-Economic	To help protect people and contribute to establishment of stable economy	Corazon de la salud and all aspects of this ecosystem (rivers, biodiversity, etc.) intact;
9. Local NGOs Conservation	To protect people and the environment and maintain a stable economy	Forests and all aspects of ecosystem (rivers, biodiversity, etc.)
10. Foreign Donors	To protect people and the environment; contribute to a stable economy; and, fulfil environmental quotas	Forests and all aspects of ecosystem (rivers, biodiversity, etc.)
11. Research Institutes	To protect people and the environment and maintain a stable economy	Forests and all aspects of ecosystem (rivers, biodiversity, etc.)
12. International Community	To protect people and the environment; contribute to a stable economy; and, fulfil environmental quotas	Forests and all aspects of ecosystem (rivers, biodiversity, etc.)

Table 1. Overview of stakeholders needs and interests

4.4 Conflicts

After assessing the stakeholders' needs and interests and developing a conflict assessment between pairs of stakeholders, it can be generalized that there are two conflict areas, environmental security and human security. There are two sides to both conflict areas and each side is made up of more than one of the stakeholder groups utilized in the stakeholder Table 1. Regarding environmental security, while indigenous groups, the state, conservation groups and foreign donors want to preserve ecosystems, coca growers, guerrillas and paramilitary agendas lead to deforestation, soil erosion and water pollution.

For an overview of the conflicts between stakeholders please refer to the *Conflicts and Alternatives Matrix*, in Annex 1.

5 Attention Areas for Mitigation

As a result of completing the identification of the stakeholders, their needs and interests assessment followed by a current or potential conflict assessment a few areas of attention have emerged.

1. Communication between different groups needs to be improved and systemized in order to improve transparency; portray trustworthiness and reliability to the communities; and solve the real issues at hand. Some goals to achieve during communication are as follows:
 - Share objectives
 - Progress updates
 - Facilitate but do not duplicate each other
 - Identify comparative advantage amongst each other and utilize each other's respective strengths
2. Coca farmers need alternatives to planting coca. As is mentioned throughout the literature on coca in Colombia, from various sources, despite the fact that it is illegal coca is a “good” means of livelihood for the coca growers. There are several reasons for this, mainly that the climate is suitable, marketing is not necessary as with other crops, growers are paid in cash, infrastructure is provided and secured by the guerrillas, and profits are good. Before large scale commercial production of coca and cocaine can be stopped, there must be alternatives provided.
3. The Matavén Forest is threatened by an encroaching coca frontier in the west at the Chupave Canal. To prevent the continuation of this movement into *Corazon de la Salud*, the indigenous communities' capacity to govern themselves must be strengthened.
4. The non indigenous communities whose main source of livelihood is based on the forests and rural lands need to be taught best management practices. This is to ensure that soil conservation methods are applied during farming and cattle grazing.
5. Indigenous knowledge need to be collected, organized and re-introduced back into communities. These communities referred to are both indigenous and non indigenous, as there seems to be a loss of interest in culture by the younger generation of the indigenous people. While this change is often seen in cultures that are exposed to others it does not have to entail the loss of information forever. As it is a way of life for the indigenous people to live in balance with nature, and they have done this successfully for so long, such knowledge is invaluable.

6. Government at all levels need improved capacity to execute their responsibilities. An example of this is the protected areas authority inability to manage and secure the parks in the region. While the intentions and objectives of this department are commendable, they do not have the resources to execute.
7. Monitoring is also a crucial attention area for this region. Monitoring of both land use/ land cover and projects/initiatives objectives and outcomes need to be carried out. Monitoring can be used to, for instance, detect deforestation and the reasons for it - spread of coca plantations; to observe trends; make forecast; and, assist in planning to improve unfavourable conditions.

6 Recommendations

Attention Area	How to Address
<p>1. Governance/Guidance</p> <ol style="list-style-type: none"> a. Obtaining finances b. Obtaining education & training c. Law enforcement <ul style="list-style-type: none"> - environmental protection d. Checks and balances for intra government transparency 	<ol style="list-style-type: none"> a. Environmental services valuation & financial mechanisms adaptation^I b. Establish relationships with international training institutes^{II} c. With funds obtained in a.;with assistance of remote sensing for monitoring^{III}; and, assistance from regional /international organizations^{IV} d. Research, select and adopt most appropriate from those in practice else where
<p>2. Local rural communities (indigenous, non indigenous and IDP's) empowerment</p> <ol style="list-style-type: none"> a. Free Education/Training: <ul style="list-style-type: none"> - on importance of environmental protection and respecting laws - what rights they are entitled to - what alternatives are possible in lieu of illegal or environmentally destructive activities b. Facilities <ul style="list-style-type: none"> - assistance with intensification/diversification of agriculture - assistance with adopting alternatives 	<ol style="list-style-type: none"> a. With funds and training from 1a. & b. above <p>- Funds from 1a. above</p> <p>- Funds from 1a. above & joint technical capacities^V.</p>
<p>3. Communication</p> <ol style="list-style-type: none"> a. Encouraging and developing transparency and good rapport among stakeholders. Need system preferably set up by stakeholders themselves. (Stakeholders also refers to government at all levels) 	<ol style="list-style-type: none"> a. With funds and training from 1a. & b. above

<p>4. Monitor</p> <p>a. Geospatial info. compilation of environment and baseline and legal data and existing local organizations cooperation</p> <p>b. Land use & land cover of target areas</p> <p>c. All other recommendation programs established in order to ensure that not only direct goals are achieved but also environmental preservation</p>	<p>a. Remote sensing and GIS required: With funds and training from 1a. & b. above</p> <p>b. assistance of remote sensing for monitoring</p> <p>c. Funds from 1a. above, assistance of remote sensing for monitoring & good communication between local executing agencies and program evaluation group</p>
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Table 2. Attention area outlined and options on how to address

I. Environmental services valuation & financial mechanisms adaptation

1. The Matavén area is extremely rich in biodiversity, it is an important part of the Orinoco basin and its forests store and sequester large amounts of carbon and thus play a key role in climate stabilisation. It is recommended to start the process of valuation of these ecosystem services and to develop systems of actual payments for them. This should be done in close cooperation with the Guiana Shield Initiative which has applied to the European Union for setting up pilot projects of payment mechanisms in the Guiana Shield ecoregion. One of the pilots will be in the Matavén region in association with the Nature Valuation and Financing-Network based at the Wageningen University. Such services should remain in the public domain and not be privatized!
2. The proposed trust fund construction for the “Mosaique of protected areas in Colombia” could be a model or even the actual vehicle for the long-term financing of the management of the Matavén region. It is recommended to carefully study this construction (attached) from this perspective.
3. Standing natural forests were left out the CDM in 2001. It is strongly recommended to the international climate diplomacy to “re-include” these forests in the CDM and to allow countries that agree to reduce their levels of deforestation below an agreed baseline level to sell carbon certificates. Countries like Colombia and areas like the Matavén would then benefit fro these sales.
4. Colombia has one of the most advanced legal systems in the world. This holds especially for the constitutional provisions and legislation regarding indigenous communities. Also, Colombia has ratified the ILO 169 Convention, the most important international legal instrument for indigenous rights. Furthermore, Colombia is Party to the Convention on Biological Diversity (CBD) and it was under Colombian political leadership that the Cartagena Protocol on Biosafety was negotiated. As international agreements have pre-eminence in the hierarchy of Colombian law, it is important that the compatibility of proposed national legislation with these international arrangements is on the agenda of the consultations of the international donor community and diplomacy with the national government.

- a. For instance, there is obviously serious incompatibility between the proposed Forest Law (Ley Forestal) and the under 7. mentioned international agreements – for an extended analysis see the report *Informe de Investigación desarrollado por la Fundación Gaia Amazonas para el “IES Prototype EnviroSecurity Assessments Project”*, commissioned by IES to Gaia Amazonas, attached. It is recommended that the donor community investing in programmes to strengthen indigenous rights and conservation of biodiversity expresses its concern about this incompatibility to the national government of Colombia.

II. Establish relationships with international training institutes

III. With funds obtained in a. and with assistance of remote sensing for monitoring

As a component of ensuring environmental security, monitoring is essential. Monitoring of the biophysical aspects of the region as well as monitoring of the administration and effectiveness of projects is important. Regarding the former, we recommend the implementation of a permanent monitoring system aimed at detecting land use and land cover changes. Results from this can be used to prevent further deforestation and soil erosion or to monitor parameters that need to be regulated as part of contractual agreement with donors. A crucial part of monitoring is being able to compare new findings with the past or with other types of data, thus a compilation of baseline data is important. There are many capable organizations in the country that work in the field of remote sensing and geographical information technology, their expertise and data should be utilized.

1. A continuous, radar-based monitoring system has to be developed and installed so as to assist the local (indigenous) authorities in the management of their territories and to effectively relate to the outside forces which impact on these territories and the management there-of or which may do so in the future.
2. The development of the system has to be done in close consultation with the local authorities, using their own cartography and ecological calendar and the cartography developed by the GEF project 2001-2004, so as to program the monitoring also in conformity with the local needs in space and time.
3. The local communities and authorities have to be trained and empowered to make optimal use of the monitoring data and to carry out field verifications for the remote sensing data analyses. This training can best be done by NGOs with permanent field presence in the region and with full knowledge of the local cultures and with intimate sensitivity for the timing of the various activities (the “rhythm of the region”).
4. Consultations have to be set up about who, in the Colombian context, can best manage such a monitoring system, and with whom, in what form and at what time

the data have to be shared. While data concerning the Matavén area itself obviously have to be shared with the local authorities, data about relevant outside forces may also have to be shared with higher levels of policy and authority.

5. Since the Matavén area is part of the wider Guiana Shield ecoregion, stretching from Colombia into Venezuela, Brazil and the three Guianas, the monitoring should be part of the monitoring system proposed by the Guiana Shield Initiative (GSI), in which an important role is to be played by the Brazilian SIVAM programme (*Sistema da Vigilância da Amazônia*), which is also a radar-based system. In this respect the system should contribute to address problematic transboundary issues between that part of Colombia, Venezuela and Brazil.
6. Periodically the map as produced for this case-study (see for Indonesia and Africa <http://dev.grida.no/envsec-hague> , Colombia map not yet available) will have to be updated. It is proposed to do this as part of the updating of the interactive map recommended by IES to the Amazon Programme of the Dutch Embassy in Bogotá.

IV. Assistance from regional and/or international organizations

1. As has been extensively discussed in the report mentioned in this section at I4a., further ratification and implementation of ILO 169 is of the utmost importance for the future of the Matavén region in particular and of the indigenous (territorial) rights in general. It is recommended to the international human rights diplomacy to take note of the conclusions of this part of the report and to promote the further ratification and implementation of ILO 169 at the appropriate fora.
2. Idem for the recommendations and the conclusions of the visit of UN Special Rapporteur Rodolfo Stavenhagen in March 2004 to Colombia - see also the analysis of the Stavenhagen report for the Amazon Programme of the Dutch Embassy of October 2005.
3. On 16 August 2005 an agreement (*convenio*) has been concluded between ACATISEMA, the association of traditional indigenous authorities in Matavén and their Venezuelan counterparts at the other side of the Orinoco, the *Asociación Comunitaria Caño Grulla*, to regulate fishing in their section of the Orinoco. It is recommended to highlight this as a success of indigenous transboundary diplomacy and as further justification to strengthen indigenous authority and management in law and practice.

V. Funds from 1a. above & joint technical capacities.

A joint capacity is similar to 2. above except the local experts would be working alongside foreign experts of the same field to build infrastructure in rural areas. The benefits would be a transfer of modern expertise at the same time as infrastructure development.

7 Conclusion

The challenge now for Colombia is to protect its wealth of ecosystem services and the indigenous people's culture and way of life. To achieve this it must be able to enforce laws, provide its people with security and viable alternatives. Foundational to achieving the challenges are not only payments for ecosystem services from foreign donors but also monitoring of these ecosystems in order to prioritize problematic areas. While there are organizations currently addressing many of the problems identified here, there also needs to be an investigation into how much is planned and for what are there funds allocated.

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9 Abbreviations

AATI	Associations of Traditional Indigenous Authorities
BMP	Best Management Practices
CDM	Clean Development Mechanism
Etnollano	Fundación para el Etnodesarrollo de los Llanos Orientales de Colombia
FARC	Revolutionary Armed Forces of Colombia
FGA	Fundación GAIA Amazonas
GEF	Global Environment Facility
GIS	Geographical Information System/Science
ICE	The Inventory of Conflict & Environment
IDP	Internally Displaced People
NGO	Non Governmental Organization
NR	Natural Resources
UNODC	United Nations Office on Drugs and Crime

10 Annex 1: Conflicts and Alternatives Matrix

Stakeholders	Indigenous Communities and Organizations	Coca farmers	Other farmers or cattle ranchers	Guerrillas	Paramilitary	Local government	National government	Local NGOs (Socio-Economic)	Local NGOs Conservation	Foreign Donors	Research Institutes	International Community
Indigenous Communities and Organizations		Alternatives to coca for coca farmers; use of best management practices for agri.	Programs to collect, organize indigi. knowledge + train indigi young	strengthen indigenous communities + organizations to govern themselves	strengthen indigenous communities + organizations to govern themselves	gov't needs capacity to provide security, education on BMPs	gov't needs capacity to provide security, education on BMPs	Communication, strengthen govern. capacity	Communication, strengthen govern. capacity	Communication, strengthen govern. capacity	Communication	-
Coca farmers	corazon de la salud; river pollution with chemicals and sedimentation;			-	-	Alternatives, monitor, law enforce.	Alternatives, monitor, law enforce.	Alternatives, monitor, law enforce.	Alternatives, monitor, law enforce.	Alternatives, monitor, law enforce.	Alternatives, monitor, law enforce.	Alternatives, monitor, law enforce.
Other farmers or cattle ranchers	Indigenous people exposed to different way of life (western) and value system			Need protection	Need protection	Monitor, BMPs + law enforce	Monitor, BMPs + law enforce	Monitor, BMPs + law enforce	Monitor, BMPs + law enforce	Monitor, BMPs + law enforce	Monitor, BMPs + law enforce	Monitor, BMPs + law enforce
Guerrillas	land, violence, life	in sync unless coca farmer resist guerrillas commands, then can be violence, life threats	? Same as for indig. people?		-							
Paramilitary	land, violence, life		Simi. as for indig. people	competition for power and territories; violence??								

Local government	gov't can not provide security when necessary	commercial level coca farming illegal	Do they abide by the laws?	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drug production + trafficking, controlling state or indigenous territories	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drug trafficking + mining , controlling state or indigenous territories		Communication	Communication	Communication	Communication	Communication	Communication
National government	gov't can not provide security when necessary	commercial level coca farming illegal	Do they abide by the laws?	"	"	should be in sync		Communication	Communication	Communication	Communication	Communication
Local NGOs Socio-Economic	Sometimes accusations of lack of transparency	Coca farming disrupts non coca farming communities way of life		human rights violations; regulation and security of coca market makes it challenging to find equally successful alternatives for coca farmers and rural communities	human rights violations; regulation and security of coca market makes it challenging to find equally successful alternatives for coca farmers and rural communities	should be in sync	should be in sync		Communication	Communication	Communication	Communication
Local NGOs Conservation	Sometimes accusations of lack of transparency	Coca farming destroys most of the components of ecosystems	non utilization of safe agricultural practices can lead to environmental destruction	Environmental destruction and human rights violations; regulation and security of coca market makes it challenging to find equally successful alternatives for coca farmers and rural communities	Environmental destruction and human rights violations; regulation and security of coca market makes it challenging to find equally successful alternatives for coca farmers and rural communities	should be in sync	should be in sync	should be in sync		Communication	Communication	Communication

Donors	-	Coca farming is illegal and destroys most of the components of ecosystems	non utilization of safe agricultural practices can lead to environmental destruction	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drugs production + trafficking, controlling state or indigenous territories	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drugs production + trafficking, controlling state or indigenous territories	should be in sync		Communication	Communication			
Research Institutes	Lack of communication	Coca farming is illegal and destroys most of the components of ecosystems	non utilization of safe agricultural practices can lead to environmental destruction	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drugs production + trafficking, controlling state or indigenous territories	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drugs production + trafficking, controlling state or indigenous territories	should be in sync		Communication				
International Community	-	Coca farming is illegal and destroys most of the components of ecosystems	non utilization of safe agricultural practices can lead to environmental destruction	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drugs production + trafficking, controlling state or indigenous territories	Ongoing organization of illegal activities: ecosystem destruction, human rights violations, illegal drugs production + trafficking, controlling state or indigenous territories	should be in sync						



Conflicts



Alternatives

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A major proportion of the world's ecosystems and the services they perform for society and nature is being degraded or used unsustainably. This process affects human wellbeing in several ways. The growing scarcity of natural resources creates a growing risk for human and political conflicts and hinders sustainable development and the poverty alleviation that depends on it. Situations involving resource abundance can also be related to serious environmental degradation, increased community health risks, crime and corruption, threats to human rights and violent conflicts – in short, to a decrease of security.

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Institute for Environmental Security
Anna Paulownastraat 103
2518 BC The Hague, The Netherlands
Tel +32 70 365 2299 • Fax +31 70 365 1948
info@envirosecurity.org • www.envirosecurity.org

