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THE RESOURCE - SECURITY MATRIX

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1. Introduction

The last decades have brought an increasing environmental damage around the globe, together with a shift of the scientific community's perception towards global environmental problems. Therefore the broad issue of environmental protection has been part of the international political agenda. Starting with the *United Nations Conference on Human Environment* (Stockholm, 1972), and continuing with the *Earth Summit* in Rio de Janeiro in 1992 and the *World Sustainable Development Summit* in Johannesburg in 2002, the activity in the field of environmental protection has delivered an impressive number of legal instruments on the international level (conventions, treaties, protocols etc.), numerous bodies and programmes within the international and regional organizations, as well as international conferences and summits with impressive participation from all the states.

The proliferation of *green issues* on the international arena proves that the degradation of the environment creates risks to the security of humankind; natural resources scarcity, natural disasters – tsunamis, hurricanes, earthquakes, volcanic eruptions, desertification of large areas, soil erosion and salinity, and accidents caused by human activity are only few of the threats that humankind faces every day.

Even if the international community has committed itself to improving the living conditions of humankind and to promote sustainable development, the condition of the global environment has not improved and, even worse, continues to deteriorate[1]. The material losses and human casualties that nature demands through its various manifestations are rising year-by-year, and month-by-month.

2. Natural resources

The population of the planet is rising day by day, the economic development has a continuous positive trend, we use more and more natural resources since our consumption pattern ask for more and more comfort every day. The pressure the humankind puts every day on the environment is higher and higher.

[1] ***, *State of the World 2006. Special Focus: China and India*, A Worldwatch Institute Report on progress Toward a Sustainable Society, Worldwatch Institute, 2006: "…developing countries in particular face grave challenges in pursuing sustainable development: poverty in some countries has worsened with the widening disparities between North and South, industrial countries have slowed the transfer of technology and aid to developing countries, some countries still suffer from unsustainable production practices and from over consumption, and unconventional threats such as terrorism undermine world peace and development. A host of tough tasks lies ahead, and the world still has a long way to go to achieve the Millennium Development Goals."

We experience today sharp increase of natural resources scarcities, degradation of aquifers, rivers, and other water resources, decline of fisheries, drop in total area of agricultural land, together with forest areas and with the plant and animal species they sustain. Furthermore the climate change could accentuate resource shortages, especially of water and agricultural land.

Regarding the natural resources, humankind has to face now **two simultaneous phenomena**:

- first the overall **scarcity of natural resources**, which involves the reduction in the total quantity or available natural resources;

- second, at the same time, the environmental **resource degradation** has implication on the quality of the natural resources, diminishing their social and economic value.

Environmental degradation of resources and scarcities are closely connected, as degradation can increase scarcity and tensions over distribution and access, while scarcity of natural resources can degrade the resource through overexploitation. Due to this problem, many studies use the term **environmental stress** to cover both issues regarding the quantity and quality of the natural resources. Environmental stress includes anthropogenic degradation, natural system variability and natural disasters[2].

Literature describes the relationship between environmental stress (scarcity of natural resources and degradation of their quality) as being not a direct and mono-causal, but the environment is rather seen as one of several factors that can lead to conflict[3]. More than 5 million people were killed in resource-related conflict during the '90s. Close to 6 million people fled to neighbouring countries, and 11-15 million people were displaced inside the border of their home countries[4].

Environmental stress can lead to conflict under unfavorable contextual factors (patterns of perception; economic vulnerability and resource dependency; institutional, socio-economic and technological capacity; cultural and ethno-political factors; violence potential and internal security structures; political stability; participation; mechanism of conflict resolution) and conflict, can, in turn, generate more environmental stress[5].

Dependence on natural resources is one of the most important contextual factor, influencing the potential incidence of conflict. Developing countries are at higher risks because they are more directly dependent on their natural resources. Dependence differs enormously among countries, but also among regions and social groups. The vulnerability caused by heavily dependence on a resource (scarce) may create the conditions for conflict.

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[2] Lietzmann, Kurt M, Gary D. Vest (Editors), *Environment and Security in an International Context*, Committee on the Challenges of Modern society, NATO, Final Report, March 1999, Report no. 232, p. 96.

[3] Lietzmann, Kurt M, Gary D. Vest (Editors), *Environment and Security in an International Context*, Committee on the Challenges of Modern society, NATO, Final Report, March 1999, Report no. 232, p. 99; Homer-Dixon, Thomas F., Environmental Scarcities and Violent Conflict: Evidence from Cases, Peace and Conflict Studies Program, University of Toronto, International Security, Vol. 19, No I (summer 1994), pp. 5-40.

[4] Renner, Michael, "Resource Wars Plague Developing World" in *Vital Signs 2003*, p. 120, Worldwatch Institute 2003.

[5] Lietzmann, Kurt M, Gary D. Vest (Editors), *op.cit.*, pp. 102-108;

Natural resources can be divided into **two categories: non-renewable**, such as fossil fuels, iron ore, and **renewable**, like fresh water, forestry, fertile soil. Always having in mind this classification, we will have to make distinctions in this analysis regarding the links between natural resources and conflict.

The **non-renewable** natural resources, such as oil, natural gases, and coal are more likely to lie at the heart of wars and civil strife. States have fought more over non-renewable resources for **two reasons**:

- Oil and minerals can be more easily and directly converted into state power that can agricultural land, fish, and forests. Oil and coal fuel the industry, and ores are vita for the army industry (production of weapons and tanks). Cropland, forests, water resources may eventually generate wealth, but this outcome is more remote in time and less certain.

- countries that are very dependent on renewable resources also tend to be poorer, which diminish their actual capability of aggression[6].

The **renewable resource** more likely to stimulate inter-state war is the water resource.

3. Types of natural resource-related conflicts

There is rich literature on the relationship between environment – conflict – security. I will concentrate in this paper only on the natural resources-related conflict, not on the broad issues of environmental conflicts, which tend to be more complex and harder to define and classify.

The classic model of the relationship between natural resources and conflict concentrate on the struggle for scarce natural resources. Recently, theories have come up, that treat abundance of natural resources – resource wealth – as an equally important factor, as it provides the economic means to conduct a conflict.

Therefore the specific literature makes a distinction between resource *wealth* and resource *scarcity* – overuse and depletion - induced conflicts[7]. Some researcher regard it as only a false dichotomy used for theoretical reasons (Michael Renner). Others try to integrate these two schools of thought in order to move forward and develop policies to overcome natural resources-related conflicts (Oslo PRIO Centre for the Study of Civil War).

Where resource *wealth*[8] is a factor of conflict, it is primarily non-renewable resources such as fuels and minerals. Where resource *scarcity* is a factor, it is the degradation of arable

[6] Homer-Dixon, Thomas F., *Environmental Scarcities and Violent Conflict: Evidence from cases*, Part 2: Evidence Bearing on Hypothesis.
[7] Based on information from Renner, Michael, *The Anatomy of Resource Wars*, Chapter: "The Relationship between Resources and Conflict", p. 9; Lietzmann, Kurt M, Gary D. Vest (Editors), *op.cit.*, pp 117-118.
[8] In any given 5 year period the chance of civil war in an African country ranges from 1% in countries without resource wealth, to almost 25% in those with such wealth (Collier, Paul, *The Economic Causes of Civil Conflict and their Implications for Policy* , The World Bank, 2000).

land, the depletion of water resources, and the decimation of forests that are the focal point[9].

Due to the unequal geographical distribution of resources, some regions enjoy a more generous endowment than the other and therefore we can speak of a resource *wealth* at a small regional scale, but humanity faces on the global scale a growing scarcity of natural resources. At the same time local scarcity can coexist with global abundance.

A. Simple scarcity conflicts - conflicts to gain control over non-renewable natural resources[10]

These conflicts are caused by the asymmetrical dependence on the quantity and quality of resource, but also depend heavily on the specific combination of contextual factors. Population pressure and a high level of resource consumption contribute to the overexploitation, degradation, and depletion of resources, leading to competition to control them and eventually to conflict. These are conflicts where the state actors rationally calculate their interests in a zero-sum or negative-sum situation.

Simple scarcity conflicts may arise over three types of resources in particular, as also pointed out above: river water, fish, and agriculturally productive land, because their scarcity Is increasingly rapid in some regions, they are often seen essential for human survival, and they can be physically controlled and seized.

Conflicts over water resources tend to be the more complicated ones from this type, since in the regions where there is seasonal drought or even permanent water crisis, distribution and discriminatory access to scarce water resources are highly sensitive issues that are treated as threats to national security, affecting national sovereignty and integrity. In international river basins there is asymmetric dependence of upper and lower riparian states.

Paradoxically river pollution and water distribution conflicts are distinct shared resources problems over an indivisible public good that are more likely to be solved through a win-win situation. The best-case scenario is avoiding water distribution and pollution conflicts are regimes. Water conflicts in and between developed countries tend to be settled by peaceful means, due to the parties experience and capabilities (Rhine Commission).

Water issues can become a potential trigger for conflict under a particular set of highly negative contextual factors (i.e. Middle East: Jordan River Basin, Gaza Strip – Israel, Syria, Jordan and Palestinians; Central Asia: Aral Sea Basin – Kazakhstan, Uzbekistan, Tajikistan, Turkmenistan, and Kyrgyzstan).

The specific combination of contextual factors plays a decisive role. Research has proven that conflicts triggered by degradation of renewable resources (water, land, forest, vegetation) "generally manifest themselves in socioeconomic crisis regions of developing and transitional societies if and when social fault lines can be manipulated by actors in a way that social, ethnic, political, and international power struggles occur"[11].

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[9] Renner, Michael, "Resource Wars Plague Developing World" in *Vital Signs 2003*, Worldwatch Institute 2003, p. 120.

[10] Homer-Dixon, Thomas D., *On the Threshold: Environmental Changes as Causes of Acute Conflict,* Peace and Conflict Studies Program, Part 3, University of Toronto, International Security, Vol. 16, No 2 (Fall 1991).

[11] Baechler, Gunther, *Violence through Environmental Discrimination*: Causes, Rwanda arena, and Conflict Model, Dordrecht:Kluwer, p 86.

B. Conflicts arising from resource *wealth* situations (see Annex 1 for examples)

In contrast to the scarcity driven conflict, "the resource curse" theory links resource wealth to economic underdevelopment, political instability, poor institution, and poor governance, which are also likely to promote armed conflicts[12].

As a general analysis, unfortunately, ample resource endowments tend to have negative consequences on the overall development of the countries, since countries grow overly dependent on these resources, allocate inadequate capacities and labour and under invest in critical social areas such as education and health. Being especially capital-intensive, extractive industries provide only a limited number of jobs, and many of them go to skilled labour force from developed countries. Therefore the resource extractive industries create only small wealth and have few linkages with the rest of the economy, especially since most of the natural resources are exported without being processed in the developing countries. Benefits are limited to the economy and population. These have negative consequences on the health of the economic system and inhibit further economic growth.

A recent study by the World Bank indicates that "countries which have a substantial share of their income (GDP) coming from the export of primary commodities are dramatically more at risk of conflict," in particular during periods of economic decline8. "The most dangerous level of primary commodity dependence is 26% of GDP. At this level the otherwise ordinary country has a risk of conflict of 23%. By contrast, if it had no primary commodity exports (but was otherwise the same) its risk would fall to only one half of one percent"[13].

Abundant natural resources play a key role in theories of conflict that emphasize opportunity (also known as greed theories).

B. 1. Disputes arising from site-specific exploitation concerns

These disputed arising from site-specific exploitation, such as logging, mining etc. are unlikely to cause large-scale organised violence. They are typical to the developing countries.

<u>Conflicts arising from the distribution of the benefits of resource exploitation</u>

The economic benefits of mining and logging operations go to a small business or government elite and foreign investors, although the local communities burden the social and environmental costs. In certain cases that has led to small case violent conflicts (acts of sabotage, human rights violations by state security forces and rebel groups, roadblocks etc) in places like Nigeria's Niger Delta, Bougainville in Papua New Guinea, as well as several provinces in Indonesia[14].

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[12] Gledistsch, Nils Petter, "Beyond Scarcity vs. Abundance: A Policy Research Agenda for Natural Resources and Conflict", *Understanding Environment, Conflict, and Cooperation*, UNEP, p.16.
[13] Collier, Paul, *The Economic Causes of Civil Conflict and their Implications for Policy,* The World Bank, 2000, p. 5.
[14] Renner, Michael, *The Anatomy of Resource Wars*, p. 8;

In same cases, government troops use extreme violence to de-populate resource-rich areas in order to keep the benefits of their exploitation only to the government elites (i.e. Sudan).

Illegal resource exploitation

Illegal resource exploitation (especially of oil, timber, metals, gemstones) allows wars to continue that were triggered by other factors. At the same time war provides the means and conditions that allow continued illegal access to these resources. It is a self-sustained vicious cycle.

In about quarter of the roughly 50 wars and armed conflicts of recent years, resource exploitation helped trigger or exacerbate violent conflict or financed its continuation[15].

The benefits of the exploitation of these resources are used to procure arms – therefore the proliferation of small arms and light weapons play a key role in resource-based conflicts in developing countries, since they are cheap, easy to smuggle, widely available, easy to use and maintain[16].

Both state- and non-state groups (secessionists movements, rebels, warlords, predatory groups) use natural resources to finance military activities.

There are certain factors that influence whether a state or a non-state group is able to exploit natural resources:

- proximity to the centre of the countries – distance make it more difficult to control and therefore more likely to be exploited illegally by non-state actors;
- diffusion character of resources (such as alluvial diamonds);
- "lootability" (since non-sate actors do not have enough technical and financial capabilities to exploit natural resources that are not easy to reach – such as timber, alluvial diamonds)[17];

Diamonds represent in this context a special case. They are easy to smuggle across border. It is difficult to establish gemstone origin, in the broad context of an industry that lacks transparency, of aversion from outside scrutiny, of incomplete and contradictory trade statistics, of inadequate national customs regulations. Conflict diamonds accounted in 1999 for about 4% of the world's rough diamond production of 6.8 USD billion. Some estimates to be around 20%[18].

[15] Renner, Michael, "Resource Wars Plague Developing World" in *Vital Signs 2003*, p. 120, Worldwatch Institute 2003.
[16] Renner, Michael, *The Anatomy of Resource Wars*, p. 7and 20;
[17] Renner, Michael, *The Anatomy of Resource Wars*, p. 13;
[18] Renner, Michael, *The Anatomy of Resource Wars*, p. 11;

C. Conflicts over energy resources

Resource wars have been common since the beginning of the state system. This affirmation is mostly valid when we refer to non-renewable resources, such as oil, coal, minerals. Arthur Westing has compiled a list of twelve conflicts in the twentieth century involving resources, beginning with the World War I and ending with the Falklands/Malvine War. Access to oil and minerals was the issue in ten of these twelve conflicts.

Oil and natural gases are of existential strategic significance. They play a specific role among the natural resources, and therefore there is specific literature dealing with energy resources and little reference to them in the natural resources – conflict specific documentation. For the same reasons I treated them separately. Several recent events have proven, once more, if needed, the vulnerability of the modern world in front of any changes on energy markets (regarding the quantity of the available resources – oil and natural gas- causing therefore short term shortages in energy supply, as well as huge raise in oil and gas price driven as well as from the global scarcity of energy resources). The constant diminishing of fossil fuel resources, the continued growth in energy demand (world energy consumption in 2030 is foreseen to be almost 60% higher than in 2002, according to IEA World Energy Outlook, a growth expected to be mostly fossil fuel based), the limited development and spread of clean energy technologies, as well as their high investment price will only intensify the global quest for control over conventional energy resources.

Nearly 80% of the world's energy comes from oil, coal, or gas[19]. This heavy reliance on fossil fuels puts energy security at risk, and, moreover, the general implications are over the security of humankinds. Humankind will have to face to a certain point in the future the moment when the fossil fuels will be gone.

There is a massive triangle within which the world's largest supplies of oil and natural gas are to be found. Within the area of this triangle are to be found regions and countries such as: the Caspian Sea (with surrounding countries Kazakhstan, Turkmenistan, Iran and Azerbaijan); Central Asia (including Kazakhstan, Uzbekistan, Tajikistan, Kyrgyzstan, Turkmenistan, Afghanistan, Pakistan and into China and India); the Persian and Arabian Gulf states (Oman, United Arab Emirates, Qatar, Saudi Arabia, Iraq and Iran). These areas - this triangle of oil and natural gas - hold the world's greatest reserves of oil and natural gas, which are mirrored, in the global politics of oil.

The geopolitical game of this century focuses on gaining access and control to the exiting oil and gas reserves, as well as over the distribution routes. The fight over the energy resources takes the shape of an **armed conflict, (i.e Sudan, Iraq) political intimidation (Russian Federation versus Ukraine), trade and economic sanctions, embargo.**

The huge reliance on fossil fuels puts pressure on the existing reserves, exploiting them at a fast race, at their maximum capacity, and paying little attention to the environmental degradation caused by their exploitation, transport, distribution, and manufacturing.

There is a continuing need for all the world countries to respond to the worldwide competition for access to increasingly scarce resources of energy. Therefore the concept of **energy security** encompasses the today's world preoccupation of access to long term energy sources at an affordable price. In order to ensure a global energy security, in the

[19] Rottman, Katja, "Fossil Fuel Use Continues to Grow" in *Vital Signs 2006-2007*, Worldwatch Institute, p. 32.

framework of a constant raise in energy demand and a fossil fuel scarcity, the countries have to take into consideration developing a diversified energy mix, which implies development of renewable energy sources, more energy efficiency, consolidation of infrastructure networks and energy markets, investment in research activities and new technologies.

Except for national strategies that aim to securing energy sources for each country, there is a constant need to act on a regional and global level. International instruments may be used in order to ensure the energy security, i.e. the Kyoto Protocol to promote the shift from using mainly fossil fuels to renewable resources in order to reach the green gas emissions limits.

4. Environmental security

While conducting the research for this paper I faced a moment when I was overwhelmed by the huge number of complicated links among natural resources -conflict - war - security - economic development- political and social instability-environment degradation. Therefore the term **environmental security** seems to be the best suited to deal with the complex issues raised from this natural resources-security linkages: it is the paradigm that deals with natural resources scarcity, global environmental degradation, and human activity induced ecological accidents.

Environmental security reflects the ability of a nation or a society to withstand environmental asset scarcity, environmental risks or adverse changes, or environment-related tensions or conflicts[20]. Among the most urgent environmental security issues are those related to the scarcity of renewable resources like water and land. Some environmental threats are with long-term effect as opposed to immediate.

It is not yet a global accepted term; it is not yet clear defined and related to the other terms (such as sustainable development). Few countries have an official definition of environmental security, such as Russian Federation, Commonwealth of Independent States, the United States (which has several working definitions), and China. The relevant international organizations have not created a definition to guide policy.

Sustainable development and environmental security are mutually reinforcing concepts and directions for policy. Sustainable development focuses on environmentally sound development that is economic, financial, social, and environmental sustainable. Environmental security focuses more on preventing conflicts and loss of state authority due to environmental factors. But both of them are matter of national security.

Environmental threats often involve trans-border and/or global impacts that would require international cooperation. But there are no international organizations specially created to deal environmental security or with the relationship between security and environment. The activities within the international organizations are concentrated either on the larger field of environmental protection and development issues (UN, EU, ODCE) or on the security issues, which encompassed the soft security dimension in the last years (NATO, OSCE). Analyzing the international organizations with preoccupations in the field of environment and security, one can notice that there are several initiatives with the same object of activity, that there is little concentration on the link between security and environment, as well as a constant lack of sufficient financial resources to promote

[20] Chaleki, Elizabeth L., *Environmental Security: A Case Study of Climate Change*, Pacific Institute for Studies in Development, Environment and Security, www.pacinst.org.

concrete projects. Moreover, there is limited coordination among UN structures, as well as among all international bodies dealing with environmental protection and security.

Although NATO and OSCE are under permanent criticisms regarding their internal incapacity to reform, the two organizations prove to have better adapted themselves to the new challenges to the international security than UN and EU. In the environmental security fields, these two organizations have already promoted concrete projects, in order to solve the problems of their member and partner states.

6. Conclusion

When I gave the title of my presentation the energy-security matrix I intended to draw a model and to describe all the existing connections/linkages between natural resources – development – conflict – security. It is a vicious cycle that proved to be very difficult to draw in the end. The dichotomy resource *wealth* and resource *scarcity* could not be illustrated in the model, so I concentrated on the overall global scarcity of natural resources. A version of **this matrix is available in Annex 2**.

What the model cannot illustrate is what research has already proven, and that is that conflicts have their own very specific geographies, most often occurring where resource – related problems coincide with political divides and underdevelopment. What the model can also not underline is that environment can be the structural source of a conflict, a catalyst, or a trigger.

There is a evident need for international cooperation in order to overcome the trans-boundary risks steaming from the environmental issues. At the same time there is a constant need to integrate environmental, development, foreign policy, and defence policies to deal with these issues.

Environmental security may be one of the theoretical solutions that need global practical implementation in order to cover the broad issues of environment-security linkages. There is no need to create new structures but rather adapt the infinity of environmental and defence bodies, coordinate and integrate them, in order to have efficient regional or global organisms.

Key words: *natural resources; resource scarcity; resource wealth; environmental stress; environmental security*

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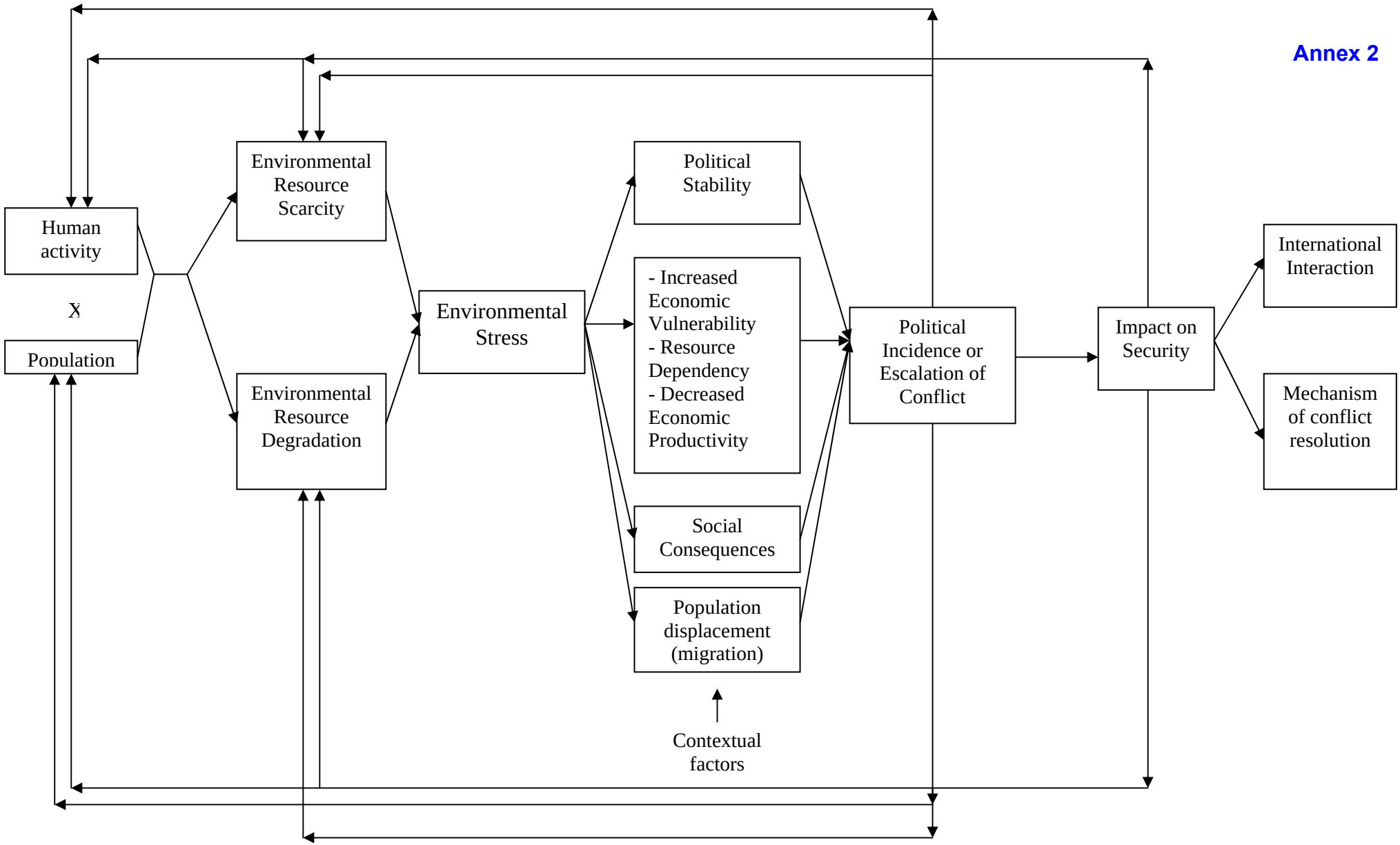
Annex 1

Location and Resources	Observation
Colombia – oil	Since 1992, a "war tax" (more than $1 per barrel) has been levied on foreign oil firms to finance the army's defense of oil installations against rebel attack. Occidental Petroleum also made direct payments to the army. Guerrilla groups have generated some $140 million in extortion money from oil firms. Oil has become Colombia's largest export earner, but most people see few benefits, and indigenous groups like the U'wa fear growing encroachment by the oil industry. Protests against oil projects have brought military repression.
Sudan – oil	Civil war restarted in 1983 (the government reneged on a peace pact after oil was discovered in 1980), leading to more than 2 million deaths, 1 million refugees, and 4.5 million people displaced. Oil exports, started in 1999, now escalate the conflict: oil revenues pay for arms imports and helped triple military expenditures; oil industry roads and airstrips are used by the army. To depopulate oil-producing and potentially oil-rich areas in southern Sudan, government forces are bombing villages, destroying harvests, and looting livestock, and they are encouraging intertribal warfare by supplying arms to some factions. Opposition forces have targeted oil installations.
Chad and Cameroon – oil	Suppression of a revolt in Chad's Doba region (where oil production is to start in 2003) led to hundreds of deaths. In 2000, the government of Chad bought weapons with part of $25 million in "bonuses" paid by ExxonMobil, Chevron, and Petronas. Construction of a pipeline to Cameroon's coast threatens the land of the Baka Pygmies and may bring poaching and unregulated logging to Atlantic rainforest areas.
Afghanistan – emeralds, lapis lazuli, opium, heroin	Opium trafficking helped finance the anti-Soviet struggle and then civil war among Mujahideen factions. It has been a crucial source of revenue for the Taliban regime in the ongoing civil war since the mid-1990s, earning it up to $50 million a year. Opium production surged from 10 tons in the late 1970s to 1,200 tons in 1989 and then 4,600 tons in 1999. Under international pressure, the Taliban banned poppy cultivation in July 2000, but scrapped this ban following U.S. attacks in October 2001. A 25-percent tax has also been levied on timber shipments to Pakistan. The opposition Northern Alliance has relied mostly on earning up to $60 million annually from the sale of emeralds and lapis lazuli (an azure-blue semiprecious stone).
Cambodia – sapphires, rubies, timber	Following the end of Chinese aid in 1989, Khmer Rouge rebels resorted to resource looting to finance their operations. Mining and logging licenses granted to Thai companies in Khmer Rouge territory earned the group as much as $120–240 million a year in the early to mid-1990s. Gem depletion and Thai restrictions on the timber trade caused a sharp income drop after 1995, severely weakening the Khmer Rouge. The Cambodian government was making some $100 million a year in the mid-1990s from secret, illicit deals that gave Vietnamese loggers access to timber concessions. But extensive deforestation cut earnings to $20 million.

Source: Renner, Michael, "Breaking The Link Between Resources And Repression", *State of the World 2002*, p. 150.

Annex 2



Source: based on information from: Lietzmann, Kurt M, Gary D. Vest (Editors), *Environment and Security in an International Context*, Committee on the Challenges of Modern society, NATO, Final Report, March 1999, Report no.; Homer-Dixon, Thomas F., *Environmental Scarcities and Violent Conflict: Evidence from Cases,* Peace and Conflict Studies Program, Part 1, 2, and 3, University of Toronto, International Security, Vol. 19, No I (summer 1994); Homer-Dixon, Thomas D., *On the Threshold: Environmental Changes as Causes of Acute Conflict,* Peace and Conflict Studies Program, Part 1, 2, and 3, University of Toronto, International Security, Vol. 16, No 2 (Fall 1991).