Environmental Change, Security, and Social Conflicts in the Brazilian Amazon

by Alexander López

Abstract: The links among environmental change, notions of security, and social conflicts in the Brazilian Amazon are multiple and complex. Successive Brazilian governments and the Brazilian military have found a distinct relationship between environmental matters and security issues through a focus on state sovereignty. This relationship is often articulated in terms of defending national sovereignty instead of preserving Brazilian ecosystems. Furthermore, the links between environmental change and social conflicts should be understood through a multi-step process of externalities, referred to here as "side-effects," where ecological scarcities contribute to other political, social and economic conditions that more directly precipitate conflict. Hence, *direct* causal links between environmental change and social conflicts are rare in the Brazilian Amazon.

The case of the Brazilian Amazon illustrates how governments can be subjected to intense influence from the international community. Demands from the international community have had critical impacts, both positive and negative, on the environment of the Brazilian Amazon. In recent years, the assertion of interests by some multilateral institutions (World Bank), industrialized countries (United States and Germany) and nongovernmental organizations (NGOs) has precipitated a number of reactions from the Brazilian government. It is important to note that such reactions have often been framed in security terms. The Brazilian government has reacted with a defense of Brazilian sovereignty in the Amazon while accepting the importance of some global environmental standards and international cooperation. However, this governmental acceptance of environmental concerns is framed in terms of rights and responsibilities of states, underscoring the principle of national sovereignty and the role of national security institutions in managing the Amazon basin. Hence, environmental management in the Brazilian context remains squarely within the traditional conception of security and its preoccupation with state sovereignty.

Sovereignty and the Brazilian Amazon

Does it make sense to speak of sovereignty in the Brazilian Amazon? The question can be answered by tracing the debate on Amazonian management. Applying a territorial criterion, the former Brazilian president José Sarney declared "the Amazon is ours," in 1989 in a statement entitled *Our Nature*. Sarney goes on to state "[it] is situated in our territory."[1] The name *Our Nature* suggested that Brazil was entitled to exercise internal sovereignty on environmental policy.

Brazilian sovereignty over the Amazon rain forest has been challenged by several actors, especially NGOs, on the ecological grounds that the importance of the Amazon extends far beyond the territory of Brazil. Part of the argument is based on the fact that the Amazon rain forest extends across the borders of the sovereign territory of Brazil to neighboring states. It should be remembered that the Amazon is shared by eight states.[2] The fixed territorial space in political terms does not always coincide with the territoriality of the ecosystems, which slices across geopolitical boundaries. Therefore, sovereignty conceived in its traditional way, as rule over a fixed, static territory, becomes problematic.

An internationalized conceptualization of the Brazilian Amazon implies that in the environmental arena, sovereignty no longer merely serves as the source of the state's claim to manage natural resources in the way it chooses without abiding by international standards. As Keohane (1995) points out, sovereignty no longer enables states to exert effective supremacy over what occurs within their territories. Rather than connoting the exercise of supremacy within a given territory, sovereignty provides the state with a legal grip on an aspect of a transnational process, whether involving multinational investment, the world's ecology, drug dealers, or other transnationalized issues. Thus, sovereignty is less a territorially defined barrier than a bargaining resource for politics characterized by a complex transnational network (Keohane, 1995: 176-177).

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Sovereignty questions in Brazil require understanding two opposing perspectives that dominate the debates over environmental impacts on the principle of sovereignty. One perspective holds that sovereignty is eroding and weakening in the face of an antithetical relationship between sovereignty and ecology. Because ecosystem and environmental processes do not respect state borders, sovereignty itself becomes a key institution of global-scale environmental destruction. International treaties to address transboundary environmental issues represent an erosion of sovereignty as states agree to proscribe their actions. The second perspective claims that international processes, and in particular, the emergence of multilateral institutions for environmental protection, do not inevitably erode state sovereignty and may even strengthen it. By placing states at the center of institutional responses and strengthening their capacity to act collectively, it is argued, the menu of choices available to states is being expanded not restricted (Conca, 1994: 702). Furthermore according to Conca, treaties that may limit state actions vis-à-vis other states (external sovereignty) may simultaneously newly empower states domestically (internal sovereignty). In the case of Brazil, Conca suggests this more complex combination strengthens state and military actors internally while ceding external sovereignty through international treaties.

The Debate over the Internationalization of the Brazilian Amazon

As will be illustrated with the statements by former French President Mitterand, U.S. Vice President Al Gore, and former Soviet Premier Mikhail Gorbachev on various occasions, Brazil has been requested to assume a broader global responsibility vis-à-vis the international community. In addition, some NGOs, such as International Survival, have been particularly active in pushing forward some activities considered threats by the military. For instance, in 1989, International Survival mounted its largest campaign to date to press for the restoration of the Yanomani Park in northern Amazônia along the Venezuelan-Brazilian border.

These examples undergird a so-called internationalization of the Amazon that has been perceived as a real threat in Brazilian circles. As a result, in 1991, the Congressional commission of inquiry on the Internationalization of the Amazon (CPI) was established and mandated to investigate the existence of clandestine airports and the activities of religious missions in parts of Roraima, which supposedly provoked the internationalization of the Amazon. In the final report, the CPI focused much attention on the development model followed in the region and the mineral riches of the Amazon. Many of the denunciations alleged a mainly Anglo-American neo-imperialist conspiracy, in which the environment served as a pretext for the new international order and in which NGOs played a leading role (Kolk, 1996: 121). In addition, there was a preoccupation with the potential creation of a bi-national Yanomani Park in the Venezuelan-Brazilian border region. According to Kolk (1996), the sovereignty and nationalist claims increased as the state felt threatened by environmental issues and the consequences of such a park for crucial economic considerations.

The Brazilian preoccupation with the internationalization of the Amazon can be seen in three concrete areas: the program of debt-for-nature swaps, the *Calha Norte* program, and the *Programa de Defensa do complexo de Ecossistema da Amazônia Legal* known as *Nossa Natureza*. In the first response the United States, France and the Netherlands put forward a proposal for debt-for-nature swaps, in which a portion of Brazil's foreign debt would be retorted in return for conservation projects. Brazil, with the largest foreign debt and the most extensive rain forest, was a natural target. However, in announcing the new policy (*Nossa Natureza*), President Sarney rejected the use of debt-for nature swaps on the grounds that they were an infringement of Brazilian sovereignty. Brazil worried that debt-for-nature swaps could imply not only the creation of a large Amazon reserve to protect the environment, but also a future internationalization and exploitation of minerals by international forces under the pretext of protecting the environment.

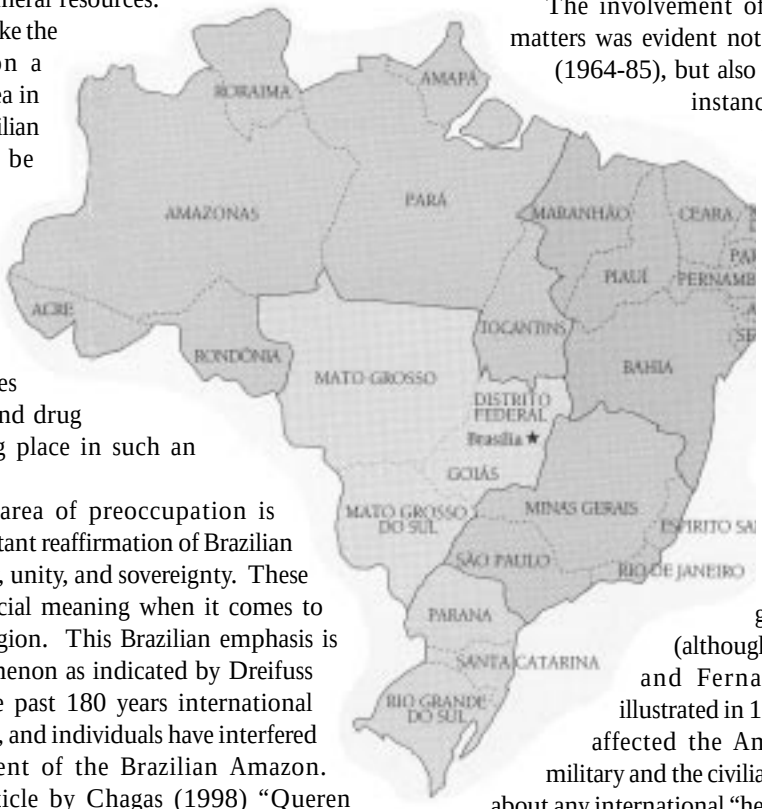
The second example is the *Calha Norte* project, which aims to intensify the military presence in the Amazon, precisely north of the rivers Solimões and Amazonas. Born out of the transition from a military to a civilian government (1985), the project was justified by a number of reasons. However, one of the most influential factors was the possible creation of a bi-national Yanomani Indian Park. The main concern was that the Yanomani Park in the Venezuelan-Brazilian border could evolve into an independent indigenous state, manipulated from abroad, due to the active participation of some international NGOs such as International Survival.[3]

Finally, the program *Nossa Natureza* (Our Nature) was formulated to diffuse international pressure due to the international outcry at the rate of deforestation, the murder of the leader of the Amazonian rubber tappers Chico Mendes, and the Indian action in Altmarira aimed at stopping dam construction at the Xingú River. The centerpiece of the *Nossa Natureza* plan was a proposed five-year $100 million program to undertake agro-ecological zoning of the Amazon. The program addressed six basic areas, namely: forest protection, chemical pollution from mining, the structure of the system of environmental protection, environmental education, research, and the division of the Amazon between protection areas, indigenous areas, and extractive areas (Costa y Ramos, 1992: 433). The military played a prominent role in Nossa Natureza as well. The working group for the plan was coordinated by an interministerial commission that was the institutional successor of the National Security Council headed by General Rubens Bayma Denys who was also in charge of the *Calha Norte* project.

The Military Preoccupation with the Amazon

The Brazilian military is preoccupied with the Amazon for at least two fundamental and interrelated reasons. The first one stems from the nature of the physical space, and the second relates to the international valuation of that physical space. The length of Brazil's Amazon borders, which have traditionally been

viewed as vulnerable, concerns the military as a possible security threat although no open inter-state conflict has resulted. From Oiapoque, in the extreme north of the country, to Chui, in the extreme south, the land frontier stretches 16,500 km. The Amazonian region is bordered by a line of frontiers of 10,948 km, four times the distance from Madrid to St. Petersburg and the equivalent of approximately 70 percent of the total extent of the Brazilian international border (Dreifuss, 1998: 15).[4] It should be remembered that according to the treaty for Amazonian Cooperation,[5] seven more states share the Amazon, and Brazil borders six of them (Bolivia, Colombia, Peru, Guyana, Venezuela, and Suriname). Moreover, the extension of the borders is accompanied by such factors as low population density and poor communications, as well as the sensitivity of the area due to mineral resources. All these factors make the Brazilian Amazon a very vulnerable area in the eyes of the Brazilian military. It can be argued however that nowadays the real threats do not come from the neighboring states, but from the illegal activities (gold smuggling and drug trafficking) taking place in such an area.



The second area of preoccupation is evident in the constant reaffirmation of Brazilian territorial integrity, unity, and sovereignty. These concepts have special meaning when it comes to the Amazonian region. This Brazilian emphasis is not a new phenomenon as indicated by Dreifuss (1998). Over the past 180 years international agencies, countries, and individuals have interfered in the management of the Brazilian Amazon. Following the article by Chagas (1998) "Queren Internacionalizar Nossa Amazônia," Al Gore was quoted as saying, in 1989, "Contrary to what Brazilians think, the Amazon is not theirs, but all of ours." Francois Mitterand declared that Brazil needs to accept a relative sovereignty over the Amazon. In 1992, Mikhail Gorbachev declared that Brazil should delegate parts of its rights over the Amazon to a competent international organization. No wonder, then, from the military perspective, that a clear view of the preservation of territorial integrity and the unity of Brazil is constantly reasserted as one of its crucial goals. It has been stated by the armed forces that sovereignty will be preserved as long as possession of and jurisdiction over the territory is guaranteed, along with its indivisibility and the possibility of political actions that aim to preserve Brazil's vital interests. They have argued that the flexibility of the concept of sovereignty can not go beyond this limit.[6]

Militarizing the Brazilian Amazon or Greening the Military Apparatus

Some scholars (Deudney, 1990; Käkönen, 1994) have been skeptical about linking the environment to the military sphere because they argue that by placing both together, one could contribute to militarizing the environment instead of making the military industry "green." As Elliot points out (1998), even though environmental stress is identified as a non-military threat, environmental politics are militarized because the threat element is defined in the final analysis not by the impacts on human security or even economic security but by its relationship through the potential for conflict with the military and geopolitical security of the state (Elliot, 1998: 230).

The involvement of the military in environmental matters was evident not only during the military regime (1964-85), but also in the recent civilian period. For instance, the traditional preoccupation with national integration was increasingly overlaid with concern that Brazilian sovereignty in Amazonia was being called into question. This concern became the dominant theme in the Sarney administration's response to international criticism. The military's intervention, from designing to implementing environmental policies, continued in subsequent governments of Collor de Mello (although to a lesser degree), Itamar Franco, and Fernando Henrique Cardoso. As illustrated in 1998 during the enormous fires that affected the Amazonian state of Roraima, the military and the civilian government were very suspicious about any international "help" including the assistance offered by the United Nations. The military rejected assistance on the grounds that such assistance could be utilized for external forces to claim international control over the Amazon.

The paramount role of the military in Amazonian environmental policy did not constitute a military monopoly on environmental policy. But the military's strong role in governance has been a constant feature of Brazilian leadership. To illustrate this argument, one can examine the civilian government's successor to the dictatorship's secret service (SNI). The successor body, called the Secretariat for National Defence (SADEM), coordinated *Nossa Natureza*. Former president Collor integrated SADEM into the Secretariat for Strategic Affairs (SAE) as the Department for Special Programs, whose responsibilities include *Calha Norte*. Another SAE department for macro-strategies has *Macro-Zoneamiento Ecolólico-Económico da Amazonia*. As part of the Collor program for the environment, SAE was given an important role in the

preparation of environmental policy. In addition, the weak and competing former Environment Secretariat (SEMA) and the Forestry Institute (IBDF) were combined, along with two other small units, to produce a unified environmental agency (IBAMA). Nominally under the Ministry of Interior, IBAMA operates with financial autonomy under the leadership of Sarney's former press spokesman Fernando Mesquita (Kolk, 1996, Domask, 1997).

The most recent relevant example of military participation in designing and coordinating environmental policies is found in the establishment of the *Sistema de Protecâo da Amazonia* (SIPAM), and the *Sistema de Vigilancia de Amazonia* (SIVAM). The SIPAM has three regional bases (Portho Velho, Manaus, and Belém), and general headquarters in Brasilia. It is under the umbrella of SIPAM that the much talked about SIVAM satellite system (*Sistema de Vigilancia de Amazônia)* is being implemented. SIVAM is once again a civilian-military project, integrated under the SAE.

According to Brazilian officials, the principal aim of SIVAM (which started to function in July 1997 and is expected to be operational by the year 2002) is to allow for the effective implementation of SIPAM, providing the Brazilian government with the necessary information for sustainable development (Dreifuss, 1998). Some of the most important information that the system will provide to the Brazilian government will be to track land occupation and usage, conduct surveillance and border control, identify illegal activities, and develop economic and ecological zoning. The remote-sensing SIVAM infrastructure includes eight meteorological and environmental satellites and five sensor-equipped Embraer ERJ 145 airplanes for aerial early warning (AEW) that are capable of registering images through the dense tree forest cover and providing information on soil quality. In addition, the system includes three Embraer 145 RS planes for remote sensing and Swedish radar and twenty radar stations coordinated by Cindacta (Dreifuss, 1998: 28-29).[7]

SIVAM has also been placed within the sovereignty discourse. For example, the company Raytheon (the American company building the system) and Brazilian authorities have stated that among the principal benefits Brazil will gain from SIVAM are the capacity to have positive control over the area and the capacity to promote the integration of communities among themselves and with the ecosystem. These capacities are viewed as a way to guarantee Brazilian sovereignty in the Amazon.[8]

This discussion has illustrated how the environmental politics surrounding the Brazilian Amazon has been framed to a large extent within the security framework. It is logical that the institutions defending national integrity and independence have reacted with skepticism to an emphasis on transboundary effects of environmental change in the Amazon basin. Regardless of this skepticism however, the military has not adopted a position of open confrontation over environmental management of the Amazon. On the contrary, they are actively participating in such a process. A clear example is their influence in SIVAM as well as in the elaboration of the *Macro-Zoneamiento Ecolólico-Económico da Amazonia.* For example, in a document produced in 1995 with the participation of SAE, a strategic perception of the Amazonian region—without diminishing the importance of national frontiers—places great emphasis upon environmental concerns and needs as well as the wealth of natural resources (biodiversity, waters, and minerals). The combination of these factors results in a potential paradigm shift for frontier sustainable development. This perception is confirmed in a recent statement by the Army Chief of Staff General Gleuber Veira, that "the new mission is co-operating with socio-economic development."[9] However, it remains to be seen if the military will become an agent of environmental protection, or on the contrary, if it will use the environment as an excuse to exercise more control over the Amazon, leading to more environmental disruption.

Environmental Change and Social Conflicts in the Brazilian Amazon

This sovereignty and environment discussion provides a critical context for now examining environmental change and the social impacts of this change. Deforestation presents the best known case for exploring the indirect links between environmental change and conflicts. An in depth look at deforestation follows a brief overview of systemic environmental change in Brazil.

The systemic nature of environmental change becomes apparent in the social consequences of the disruption from the three most important environmental functions: (1) a source of natural resources, (2) a source of environmental services, and (3) an assimilator of waste. Overuse of natural resources in the Amazon has proceeded in large part because of non-participatory, authoritarian, and badly administered development measures. The impoverishment of living space is provoked above all by ill-conceived macro-projects; e.g., large dams, cattle ranching, and mining activities. A clear linear relationship of impoverishment of living space is built from *deforestation* to *soil erosion*, to *loss of nutrients*, to *deficient crops*, and consequently, to *decrease in the well being of the Amazon population*.

The social consequences of the overuse of natural resources, overstrain of the sink capacity, and impoverishment of the space of living, are evident. Among the most important are a decrease in food security, threats of new diseases, and expansion of the already existent, low level of colonization stability that contributes to high rates of intra-regional migration. This last factor of migration, implying high rotation rates, has a direct effect on the social conflicts taking place in the basin.

The Brazilian Amazon's three most important resources, land, water, and forest, provide examples of the social implications of environmental change. For land, the low ecological carrying capacity of the Amazon basin, especially in the tropical *terra firme* soils (land not subject to annual inundation), brings specific limitations to colonization and agropastoral activities. As an example, the rapid decrease in agricultural production on colonized soils inhibits capital accumulation, settlement stability, and consequently, the construction of stable social relations. Thus, this situation causes

a perpetual state of human migration and further deforestation. This cycle often results in open conflicts over access to land resources.

Water resource issues in the Amazon present several examples where environmental change has strong social implications. The best known example comes from mining activities and the associated mercury contamination of watercourses. This pollution has contributed to conflicts mainly between Indian populations and *garimpeiros* (miners). Second, conflicts occur due to the increasing pressure on fishery-resources of smaller lakes. Pressure for regional urbanization, the development of fishing technology, the spreading of motor canoes and motor boats, and the growing number of regional ice factories, create these conditions (Shönemberg, 1994: 26). Both community and commercial fishermen ignore and externalize the environmental impacts of their activities. Their practice is to move on to the next fishing ground when one is cleared.

Social conflicts as a result of forest depletion in the Brazilian Amazon have been reported in several instances. The most well known case has been the 1988 assassination of Chico Mendes, the former president of the Rubber Tappers Union by ranchers. The process of deforestation through ranching activities in general has had a direct effect on the life of the forest-dwellers. The most evident conflict has been the expropriation of the customary lands of forest peoples. This clearing of forest for cattle ranching undercuts the survival strategies of Indians, rubber tappers, and nut collectors, whose way of living is strongly related to nature and whose social organization is based on the communal use of natural resources. This way of living is in opposition to the private exploitation of these resources by miners, large landowners, mining companies, and logging enterprises.

The Legal Brazilian Amazon

The Case of Deforestation

Deforestation is the most visible and quantifiable aspect of environmental change and is utilized here to explore the possible links between environmental change and social conflicts in the Brazilian Amazon. On a general level, the main direct sources of deforestation in the Brazilian Amazon can be attributed to cattle ranching, colonization and agricultural settlements, road building, mining, logging, dam construction, and urban development. Agropastoral activities are placed as the most important source in most of the Amazonian literature. Private capital investment in cattle ranching through tax incentives, agricultural production through rural credits, and small farmer settlement, are the most important direct factors influencing the source agropastoral activity, thus placing it as the most important source of environmental change.

As the most visible aspect of transformation taking place in the Amazon, deforestation is at the center of public discussion. Debates focus on the extent as well as the impacts of deforestation on the Amazon basin. The extent of deforestation has lead to academic and political debate for two reasons: the extent of damage is poorly known even though the tool of remote sensing has been utilized, and deforestation has direct implications on policy making. For instance the Brazilian government has been concerned about the empirical data published by studies on Amazonian deforestation, especially after a 1988 World Bank study on Amazonian deforestation found a high rate of deforestation of close to 12 percent.

According to May and Reis (1993), in the mid-seventies deforestation was practically restricted to the so-called Bragantina area, located on the eastern border of Pará with Maranhâo, and to the north of Tocantis. During the late seventies and throughout the eighties deforestation rates within the region showed spectacular growth, most specifically in northern Mato Grosso, following a northwest path of expansion toward the states of Rondônía and Acre, stimulated by the paving of highway BR-364. This area also received a disproportionate share of economic activity, government investments, and regional development incentives.

Although deforestation is recognized as a critical problem, it is difficult to present an exponential rate for the region that will mean that the cleared area could rapidly expand to encompass the entire region. Rather than an exponential rate, forest depletion rates vary from year to year and vary from region to region. Some of the trend analyses made in the early 1980s (exponential ones) indicate that the states of Pará, Mato Grosso, Maranhâo, and Rondônia would be completely deforested by 1990. But data from the National Institute for Space Research (INPE) obtained from satellite imagery show that in 1990, no more than 12.6 percent had been cleared in Rondônía, the most deforested of Amazonian states.[10]

Over the past ten years, INPE (1998) estimates indicate that the total area deforested has increased from 401.400 square kilometers in 1989 to 517.069 square kilometers in 1996.[11] However, when considering the relative numbers, it is possible to see that there has not been a constant increase in the annual rate of deforestation in the Brazilian Amazon. Thus, the rate of deforestation during the period 1990-91 (0.30) is lower than during 1989-90 (0.37). Along these lines, the rate for the year 1995-96 (0.51) is also lower than during the year 1994-95

(0.81).[12] The Brazilian Amazon therefore is an open system ruled by internal and external forces that determined years of incremental rate of deforestation.

The problem of deforestation therefore must be viewed in context. One must understand that Amazonian deforestation is strongly associated with socio-economic variables. The deforestation should not just be presented as a problem in which members of the Brazilian society are cutting down the trees in the Amazon region. Instead the problem is a more deeply rooted problem relating primarily to the way millions of Brazilian people live.

Fearnside (1987) divides the present causes of deforestation into two categories: proximate causes and underlying causes. Proximate causes motivate landowners and claimants to direct their efforts to clearing forest as quickly as possible. The underlying causes are linked to wider processes in Brazil's economy (Fearnside, 1987: 42). Among the main proximal causes of deforestation are land speculation, tax incentives, and negative interest loans. Land speculation brings forest destruction as clearing establishes proprietary claims and raises the resale value of land. Certain tax incentives allow businesses to avoid paying taxes owed on enterprises elsewhere in Brazil if money is invested in Amazonian ranches. Finally, some financing of government-approved ranching projects comes at nominal interest rates lower than inflation.

In addition, certain general macroeconomics policies such as the income tax, the land tax, and land titling regulation are providing economic incentives for deforestation. Land taxes were aimed at converting unused forestland into more productive land. Therefore, farms containing forest were taxed higher than the ones containing only pasture and cropland. In this way, the policies created a direct incentive for large landowners to convert their land forest.[13]

Fearnside also groups together underlying causes of deforestation. He lists inflation, population growth, and road building. Inflation promotes speculation in real property, especially pasture land. Moreover, it increases attractiveness of low-interest bank loans for clearing. Population growth increases demand for subsistence production, increases the capacity to clear and plant, both for subsistence and cash crops, and increases political pressure for road building. Road building promotes immigration to the Amazon, and increases clearing by persons already present in the region (Fearnside, 1987: 45).

Natural and Social Factors in Environmental Conflict

It is often assumed that environmental disruption causes ecological scarcity, and that ecological scarcity in the same way could contribute to social conflicts.[14] However, one could argue that the problem is not scarcity of renewable resources such as cropland, forest, and water that leads to conflict even though the classical functions of the environment are clearly being undermined in the Brazilian Amazon. Instead, it is the product of social interactions that leads to the environmental change and social conflicts. Therefore, the role of ecological scarcity as a proximate variable causing conflicts is obscured by social variables in the Amazon case. Instead, environmental change, in large part created by prior social, political, and economic variables, contributes to so-called "side-effects" or secondary impacts that can in turn, precipitate conflict. Hence it is the migration or the economic disruption caused by environmental changes that contribute directly to conflict rather than the environmental change itself.

This indirect role for the environment in contributing to conflict is one that is increasingly recognized by researchers.[15] Drawing from the case of the Amazon, one can conclude the web linking environmental change to social conflicts in the Amazon experiences the following phases:

Phase I: *Environmental change*
Deforestation
Pollution from mining
Floods caused by hydroelectric projects

Phase II: *Side-effects*
Economic disruption
Population displacement

Phase III: *Conflict-issues*
Land conflicts
Mineral conflicts

One would state that environmental change has never contributed to manifest conflicts in the Amazon as a sole source, and rarely as a direct source. A manifest conflict is a process that is accompanied by conflict behavior. A non-violent disagreement is not included as manifest conflict. Instead, it has contributed through side effects, which most importantly have been a disruption of economic activities and population displacement. In the Brazilian Amazon, manifest conflicts are typically associated with the land and mining issues. The constellation of actors in land conflicts constitutes landless people, *posseiros* (settlers without legal title), *grilleiros* (landgrabbers), and large landowners. In mining, the conflicts occur between the *garimpeiros* and Indians.

Environmental change has generated several interrelated social effects that have resulted in social conflicts. The contribution of environmental change to manifest conflicts in the Amazon could be explained in terms of the externalities produced by the process of environmental change and this has to be linked necessarily to the pattern of economic growth implemented by the Brazilian State in the Amazon.

The most important side effect of environmental change has been population displacement. In the Amazon, the main sources of environmental change (agropastoral expansion, mining activities, logging, and hydroelectric projects) have increased pressure on people, particularly the native population. The relocation of people as a result of the spatial impacts of these projects means that these people become agents of further project-triggered effects, by displacing one another. Clearly in states such as Pará, different social groups compete with one another in their struggle to gain a living in frontier areas where unclaimed lands are increasingly in short supply. In addition,

environmental change has contributed to population displacement, and therefore to a high number of conflicts due to a large sector of the population that came to the area suddenly finding themselves excluded of the economic model. The exclusion occurs either because the soils were not good enough to support agriculture at commercial levels and/or subsistence level, or because the soil was already deteriorated by previous deforestation. It should be remembered that with the high deforestation in southern Pará, erosion starts to be a serious problem and the nutrient stocks normally decline. The high deforestation rates have provoked an acute process of environmental change because small farmers and colonists have to move further into the frontier, with the consequence of further deforestation.

A second important side effect has been the disruption of economic activities through the utilization of natural resources. In fact, this side effect could be linked to potential manifest conflicts, as can be observed in the negative effects on the traditional shifting agriculture. This kind of agriculture, which is fundamental for native populations in the Brazilian Amazon, requires regeneration of second growth. The practice of clearing large tracts of forest and converting the land to pasture disrupts this method. Thus, once the base for practicing shifting agriculture has been disrupted, the population living from this system has reduced opportunities to develop this type of agriculture. Moreover, the impact of environmental change on traditional floodplain agriculture, inland fisheries, and forest productivity has provoked serious disruption affecting populations such as indigenous and riverine populations who have practiced *varzea* (floodplains) agriculture for many years.

Fishing is an important economic activity that has been disrupted by environmental change. Rivers have suffered pollution from mining activities affecting fishing activities by the Indian communities. In addition, in places such as southern Pará, violent conflicts have been registered between traditional fishermen and commercial fishermen. The construction of dams is also changing the migration pattern of many Amazonian fish. Finally, the deforestation of food plain forest also contributes to the decrease of fish as many species feed of tropical fruits and seeds. All these aspects lead to serious constraints on income and job opportunities of the riverine populations, creating social stress.

Another population affected by environmental change has been the extractivist in Pará (rubber tapers, nut collectors). Deforestation has reduced and/or eliminated the production of Brazilian nuts, natural rubber, natural oil, and timber. In this area the expansion of cattle ranching, logging activities and projects such as Great Carajâs have led to the clearing and burning of large areas of rubber trees for pasture land and for charcoal. In short, the process of environmental change in the Amazon has provoked as side-effects a strong process of population movement and economic decline for the native population, with clear influence in the dynamic of manifest conflicts.

Understanding the Links Between Environmental Change and Social Conflicts

Based on this brief discussion of environmental change in the Brazilian Amazon, one can draw a number of conclusions. The links among the process of environmental change, notions of security, and social conflicts in the Brazilian Amazon are multiple and complex. Successive Brazilian governments and the Brazilian military have found a distinct relationship between environmental matters and security issues through a focus on state sovereignty. This relationship has often been articulated in terms of defending national sovereignty instead of preserving Brazilian ecosystems. The Brazilian military's direct roles in project's such as the remote-sensing system SIVAM indicate that the primacy of state sovereignty concerns remain firmly entrenched in Brazil's approach to the environment despite international calls for "internationalizing" the rainforest.

Furthermore, the links between environmental change and social conflicts should be understood through a multi-step process of externalities, referred to here as "side-effects," where ecological scarcities contribute to other political, social, and economic conditions that more directly precipitate conflict. In most parts of the Amazon, even though social groups depend strongly on the natural environment, conflicts do not emerge because of scarcity of natural resources. Even in cases of strong dependency on natural resources, manifest conflicts could arise not only because of scarcity of resources, but because incompatibility of different social structures materialized in different patterns of resource use. Rather, the conflicts emerge because (as illustrated in the state of Roraima) the spatial demands of Indians such as Yanomani and Makuxi have intersected with the demands of non-indigenous groups such as *garimpeiros* and landowners. Hence, while the environmental context in Brazil is a conflict one, *direct* causal links between environmental change and social conflicts are rare in the Brazilian Amazon.

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[1]Quoted in "Brazil angrily unveils plans for the Amazon." *The Washington Post* April 7, 1989.

[2] The eight states are Bolivia, Brazil, Columbia, French Guiana, Guyana, Peru, Suriname, and Venezuela.

[3]According to Colonel Geraldo Lesbat Cavagnary Filho "Defensa com Democracia e Desenvolvimento." In *Teoría e Debate*, no 24, Sâo Paulo, March-April, 1994.

[4]Shared frontier lengths are: French Guiana 730 km, Venezuela, Guyana and Surinam 3,649 km, Colombia 1,644 km, and Peru 2,995 km.

[5] Because of its dependent status on France, French Guiana is not a signatory to the Treaty of Amazonian Cooperation.

[6]See "*O Brasil e suas Forcas Armadas*" Estado-Maior das Forcas Armadas. Presidência da República, Brasilia, 1996, p19.

[7]Interview with Colonel Antonio Faria, Secretaria de Asuntos Estratégicos, Conference at *4th National Encounter of Strategic Studies*, Unicamp, Campinas. 10-15 May, 1998.

[8]See Raytheon's Internet web page at http://www.raytheon.com.

[9]Análises Temáticas e Sistema de Informacâo Territorial para Macro-Zoneamiento Ecológico-Económico da Amazônia. Resumo Ejecutivo. 1st version, August 1995 (Convenio FBDS/ SAE/ IBGE/ FUNCATE/

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