## Why the American West was not as wild as the Brazilian Amazon Forest? The

## **Development of Institutions**

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Whether people fight over valuable resources or engage in cooperation and trade depends on how well property rights are defined and enforced. We aim to describe the development of institutions in the Brazilian Amazon forest. The question that drives our study is why the local institutions have not been efficient in preventing deforestation and illegal logging. This exploratory research uses secondary and primary data. We argue that individuals and groups in the Amazon region could not successfully make rules for establishing rights and resolve disputes due to the weak definition and enforcement of property rights and monitoring. Regarding definition of rights, the highly politicized process of land allocation, top-down policies, and the presence of squatters increase the uncertainty of land titles. Cooperation and enforcement is difficult due to cultural differences influencing individuals' and groups' preferences. The physical characteristics of the forest obstruct monitoring and the climate conditions frequently blocks the view of sophisticated monitoring technology. This also impedes communication among communities and traffic in the region. Contrary to the American West, the Amazon forest has been with law and under-developed informal institutions that are not efficient in preventing deforestation, prevailing lawless.

# I - Introduction

Whether people fight over valuable resources or engage in cooperation and trade depends on how well property rights are defined and enforced (Demsetz, 1967). Property rights determine who has access to valuable goods and services, who reaps the benefits from them, and who must pay the costs of utilizing them (Bromley, et. al, 1992, Demsetz, 1967). Transaction costs is a crucial factor in determining whether people can define and enforce property rights without dissipating the rents they are trying to capture. Transaction costs are the costs of specifying, monitoring, enforcing, and trading property rights (Williansom, 1987). Higher transaction costs make it more costly for people to cooperate, less likely they will gain from trade, and more likely conflict will ensue.

The story of the American West and the image of the "wild, wild West" suggest that rents were dissipated through racing and fighting. In contrast, the "not so wild, wild West" book of Anderson and Hill (2004) suggests that rents were captured and nurtured as individuals and groups peacefully defined and enforced property rights and engaged in market transactions. Anderson and Hill argue that the old American West may have been without law – in the sense of having under developed formal property rights and scarce institutions – but it was not lawless. To the contrary, individuals and groups, as they call 'institutional entrepreneurs", devised innovative means for reducing transaction costs. Institutions, not law, tamed the West. The strongest claim is that they suggest the superiority of extra-legal institutions to property rights, based on collective action. They also suggest that the lessons of the West can be applied to new frontiers, such as the Amazon forest.

Based on this, we aim to describe the development of the institutions, in The Amazon forest in Brazil. Specifically, we want to shed some light in order to answer why the institutions in the Amazon forest are not being efficient in preventing deforestation and illegal logging. Data was gathered through secondary sources, historical evidence, and semi-structured interviews. We assert that individuals and groups could not successfully made rules for establishing rights and resolve disputes due to high transaction costs. Contrary to the West, The Amazon forest has been with law and under-developed informal institutions that are not efficient in preventing deforestation, prevailing lawless.

This essay is organized in six parts. The second part defines some key terms and considers the theoretical background highlighting some important views concerning the way institutions influence resource stewardship and how institutions evolve. The third part summarizes the main findings of Anderson and Hill's book of 2004 regarding the development of institutions of the American West. In the fourth the present scenario in the Amazon forest is reported. The sixth part considers the historical colonization and occupation of the area. Finally, the fifth part concludes the essay summarizing why the Amazon forest in Brazil is still wild in terms of robust institutions that influences resource stewardship and sustainable development.

#### **II** - The Theory on the Development of Institutions and Resource Stewardship

## Institutions and evolution of property rights

We follow the approach of the New Institutional Economics to define institutions as the rules that govern how people interact with one another (North, 1991). In other words, they can be defined as durable systems of established and embedded social rules that structure social interactions. North (1991) argue that institutions consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights). Throughout history, institutions have been devised by human beings to create order and reduce uncertainty in exchange. Together with the standard constraints of economics institutions define the choice set and therefore determine transaction and production costs and hence the profitability and feasibility of engaging in economic activity. They evolve incrementally, connecting the past with the present and the future; history in consequence is largely a story of institutional evolution in which the historical performance of economies can only be understood as a part of a sequential story. Institutions provide the incentive structure of an economy; as that structure evolves, it shapes the direction of economic change towards growth, stagnation, or decline.

The formal economic constraints or property rights are specified and enforced by political institutions, and the literature simply takes those as a given. But economic history is overwhelmingly a story of economies that failed to produce a set of economic rules of the game (with enforcement) that induce sustained economic growth. The central issue of economic history and of economic development is to account for the evolution of political and economic institutions that create an economic environment that induces increasing productivity.

According to Anderson and McChesney (2003) the key to evolution of property rights in the situations Anderson and Hill studied, such as land, water and other resources in the American West, is the emergence of entrepreneurs who perceived personal gain in taking assets out of open access. The term entrepreneur can be used to define those who create and reorganize already-existing private rights to make them more productive. The role of the entrepreneur is then crucial to understand the process of property rights creation and re-organization. However, understanding the role of the entrepreneur on property rights requires examination of collective actions problems. The basic premise is that the success of the entrepreneur is limited by the possibility of cooperation. Following Anderson and McChesney (2003) we argue that while a single entrepreneur may suffice for discover of a profitable opportunity, the establishment of new, enforceable rights typically requires cooperation with others. In the American West, the evolution of property rights was a consequence of the private associations work. Voluntary associations came to resemble government in some situations (Anderson and Hill, 2004).

In order to understand the development of property rights in the Amazon Forest and to argue that individuals and groups could not successfully made rules for establishing themselves rights and resolve disputes due to high transaction costs we aim to use Elinor Ostrom model on collective action and self-organized resources regimes.

#### Collective actions, cooperation and evolution of property rights

Collective action issues introduce the fundamental concepts of contract and force in the evolution of property rights (Olson, 1965). Self-organized regimes is based on the idea that we should expect some individuals to have an initial propensity to follow a norm of reciprocity and to be willing to restrict their own use of a common pool resource so long as almost everyone reciprocates (Ostrom, 1992, 2002). If a small core group of users identify each other, they can begin a process of cooperation without having to devise a full-blown organization with all of the rules that they might eventually need to sustain cooperation over time. The presence of a leader or entrepreneur, who articulates different ways of organizing to improve joint outcomes, is frequently an important initial stimulus.

Ostrom (2002) question the ability of self-organized resource regimes that rarely rely on external third-party enforcement to frequently outperform government-owned resource regimes that rely on externally enforced, formal rules. Following this argument she affirms that successful self-organized resource regimes can initially draw upon locally evolved norms of reciprocity and trustworthiness and the likely presence of local leaders in most community settings. More important, however, for explaining their long-term survival and comparative effectiveness, resource regimes that have flourished over multiple generations tend to be characterized by a set of design principles. These design principles are extensively discussed in Ostrom (1990) and

have been subjected to extensive empirical testing. She summarizes the importance of these principles as follow when the users of a resource design their own rules (Design Principle 3) that are enforced by local users or accountable to them (Design Principle 4), using graduated sanctions (Design Principle 5) that define who has rights to withdraw from the resource (Design Principle 1) and that effectively assign costs proportionate to benefits (Design Principle 2), collective action and monitoring problems are solved in a reinforcing manner.

The operation of these principles is then bolstered by the sixth design principle that points to the importance of access to rapid, low-cost, local arenas to resolve conflict among users or between users and officials. Rules, unlike physical constraints, have to be understood to be effective. The capability of local users to develop an ever-more effective regime over time is affected by whether they have minimal recognition of the right to organize by a national or local government. This is the seventh design principle. While some resource regimes have operated for relatively long times without such rights (Ghate, 2000), participants have had to rely almost entirely on unanimity as the rule used to change rules. Users frequently devise their own rules without creating formal, governmental jurisdictions for this purpose. But if external governmental officials presume that only they can make authoritative rules, then it is difficult for local users to sustain a self-organized regime (Johnson and Libecap, 1982).

When common pool resources are somewhat larger, an eighth design principle tends to characterize successful systems - the presence of governance activities organized in multiple layers of nested enterprises. Consequently, among long-enduring self-governed regimes, smaller-scale organizations tend to be nested in ever-larger organizations.

Thus, when is not possible to have collective action, or in other words, when there exist collective action problems, the property rights could also not be efficient in resource use. In the

case of the Amazon Forest collective action, from the past till recent days, is not being efficient on order to prevent deforestation and socio-economic problems. Factors that influence the longterm viability of self-organized collectives could be both exogenous and endogenous. Major migration (out of or into an area) is always a threat that may or may not be countered effectively. Out-migration may change the economic viability of a regime due to loss of those who contribute needed resources. In-migration may bring new participants who do not trust others and do not rapidly learn social norms that have been established over a long period of time. Since collective action is largely based on mutual trust, some self-organized resource regimes that are in areas of rapid settlement have disintegrated within relatively short times (Baland and Platteau, 1996). In addition to rapid shifts in population due to market changes or land distribution policies, several more exogenous and endogenous threats have been identified in the empirical literature (Sengupta, 1991; Ostrom, 1998; 2002). These include: a) efforts by national governments to impose a single set of rules on all governance units in a region; b) rapid changes in technology, in factor availability, and in reliance on monetary transactions; c) transmission failures from one generation to the next of the operational principles on which self-organized governance is based; d) turning to external sources of help too frequently; e) international aid that does not take account of indigenous knowledge and institutions; f) growth of corruption and other forms of opportunistic behavior; and g) a lack of large-scale institutional arrangements that provide fair and low-cost resolution mechanisms or conflicts that arise among local regimes, educational and extension facilities, and insurance mechanisms help when natural disasters strike at a local level.

Contextual variables are thus essential for understanding the initial growth and sustainability of collective action as well as the challenges that long-surviving, self-organized regimes must try to

overcome. Simply saying that the context matters, however, is not a satisfactory theoretical approach. Adopting an evolutionary approach is the first step toward a more general theoretical synthesis that addresses the question of how context matters. In particular, Ostrom (2002) argues that we need to address how context affects the presence or absence of conditional cooperators and willing punishers and the likelihood that the norms held by these participants are adopted and strengthened by others in a relevant population.

# III - The "Not so Wild, Wild West" depicted by Anderson and Hill

The nineteenth-century Western frontier was a crucible for the evolution of property rights. Both Indian and whites had to create new rights to land, wildlife, minerals, water, and livestock in the face of new technologies and a physical environment that was very different from the East and from England, and had to restructure social organizations to coordinate production. Anderson and Hill (2004) showed in the book that lessons can be learned about how property evolved in the West and what are the impacts of property rights on resource stewardship and prosperity.

They showed that Indians stooped living in the large groups that had enable them to capture the scale economies of hunting buffalo on foot when the horse came to the plains. Instead, they formed smaller groups capable of following the buffalo migration and harvesting animals from horseback. Those herds rose to the top of social hierarchy. Similarly, the organization of wagon trains was necessary to govern groups of people and equipment trying to cross the Great Plains in search of riches farther west. Because mining technology required water to be moved from streams to sluice boxes and hydraulic lines, miners hammered out the prior-appropriation doctrine to replace the older riparian doctrine carried over from water-rich England. Branding and brand registration evolved as effective means of defining ownership to livestock on the open

range, and ranchers formed cattlemen's association to manage the range before it was enclosed with barbed wire.

By rewarding owners for good stewardship, property rights thwart the tragedy of the commons. Instead of leaving rents from natural resources up for grabs and thereby encouraging wasteful rent seeking, property rights promote voluntary, positive-sum exchange. Because defining and enforcing property rights s costly, people will not engage in definition and enforcement activity until it is economical to do so. The main idea is that where group action was called for, the tendency was to minimize wasteful rent dissipation because members of small groups had a larger stake in the efficiency of the outcome. In this case, the book explores the case of small, privately organized irrigation districts that produced more cost-effective irrigation projects than the massive ones built by the Bureau of Reclamation. The example of the cattlemen's association shows that small groups could also capitalize on their more homogeneous cultures to enforce property rights and promote cooperation among group members. To the contrary the homestead acts offer example of how people competed in a race to capture rents because federal government began to dictate institutional change, dissipating resources in the process of creating property rights.

The institutional history of the West depicted by Anderson and Hill, full of details, provides a very different image of a wild and wooly region. Despite, it shows that the American West was generally peaceful because of stable institutional environment that evolved in the "lawless" vacuum. Institutions encouraged cooperation and gains from trade and the Wild, Wild West, was really "not so wild". For this reason, institutional entrepreneurs become the heroes who promoted law and order, efficient use of the natural and human resources, and good resource stewardship.

The motivation of this essay came from two sources. The first one is based on Anderson and Hill assumption that developing countries are much like the frontier of the American West. We can observe that in the Amazon forest government got there before "privately funded adventurers", or entrepreneurs, and the value of this new frontier is being dissipated through conflict rather than conserved through cooperation. The second source is the present reality of the Brazilian Amazon forest in terms of resource stewardship and social problems. These arguments provide insights to ask about the conditions that promoted conflict in the Amazon forest instead of cooperation. Or in other words it shades some light to answer why collective action has not worked in the Amazon Forest in order to develop efficient property rights.

### **IV - The Amazon Forest**

The data used in this essay to explain the development of institutions in the Amazon Forest comes from different secondary sources of information mainly based on historical writing, and primary data on demographical, socioeconomic and deforestation rates published by the Brazilian Institute of Geography and Statistics (IBGE), an by the National Institute for Spatial Research (INPE). Interviews were also conducted using semi-structured questionnaires with Amazon community, researchers and entrepreneurs in order to explore the perceptions about the specific environmental, social and economic problems of the region.

### Geography, culture, and socioeconomic aspects

The Legal Amazon Forest is a vast geographical area that extends for approximately 5.1 million thousand kilometers square (INPE, 2007). It represents almost 60% of the Brazilian territory and is composed, in total area, of nine different Brazilian States: Amazonas, Pará, Amapá, Acre, Roraima, Rondônia, Tocantis, Mato Grosso and part of Maranhão (see figure 1, green area).

## Figure 1: Brazilian Legal Amazon Forest



Source: IMAZON, 2007

The Amazon biome is compressed of different types of forest such as early primary succession communities; Amazon white-sand woodland; dense savanna woodland; contact zone; seasonally deciduous tropical forest; open tropical rain forest and dense tropical rain forest. The dense forest is composed by large species, sometimes surpassing the 50m high marks.

This immense region is well known for its rich biodiversity. The region is home to about 2.5 million insect species, tens of thousands of plants, and some 2000 birds and mammals. To date, at least 40,000 plant species, 3,000 fish, 1,294 birds, 427 mammals, 427 amphibians, and 378 reptiles have been scientifically classified in the region. Scientists have described between 96,660 and 128,843 invertebrate species in Brazil alone (Turner, 2001; Silva et al, 2005; Lewinsohn and Prado 2005). The diversity of plant species is the highest on earth with some experts estimating that one square kilometer may contain over 75,000 types of trees and 150,000 species of higher plants. One square kilometer of Amazon rainforest can contain about 90,790

tones of living plants. Moreover, the region is one of the most important reservoirs of water and has important role in the storage of carbon. Amazonian evergreen forests account for about 10% of the world's terrestrial primary productivity and 10% of the carbon stores in ecosystems.

In terms of seasons, it is a tropical region where rain and humidity are the prominent weather conditions. The seasons are relatively static with an average temperature of 80 degrees Fahrenheit during the day. At night, the temperature falls dramatically to about 50 degrees Fahrenheit. Heavy rainfall occurs at short durations of time and accumulates to about 300 cm per year. January through April is the wettest season while June through November are the dry months. The Amazon region is defined by the Amazon basin that has the largest river of the world, the Amazon River. The average width of the river Amazon is of approximately 5 kilometers. During the rainfall, the river goes up 10 meters on average, reaching in some areas 18 meters. This means that half of the year, great part of the Amazon region, is submerged.

The weather and the dense forest biome complicate not only mobility but also monitoring through satellite images. Although technology has changed the ability of people in order to prevent deforestation, some areas in the Amazon region can not be observed because of cloudy weather. Moreover, the deforestation estimative through digital images is relatively new. The National Institute for Space Research (INPE) started to use digital images to calculate deforestation in 2002. The estimative is not based on the total area, deforestation is calculated based on some images and then they extrapolate the data to estimate the total deforested area.

All this geographical characteristics, size, type of vegetation, weather, and hydrology, has been influencing the mobility of people in the region, not only today but also in the past. Roads and railroads were not well developed in order to support local communities and to guarantee communication and cooperation.

Culture and demographic configuration also influences collective action. The idea is that a homogeneous and small group could be more efficient in developing informal institutions that influences resource stewardship.

In the Amazon, beyond its recognized natural wealth, the region shelters indigenous and traditional populations who include extractors of all types. Data show the existence of at least 50 groups of aboriginals that has no regular contact with people outside the forest (Picoli, 2006). Regarding the languages, the most widely spoken language in the Amazon is Portuguese; however there are hundreds of native languages still spoken in the Amazon, most of which are spoken by only a handful of people, and thus seriously endangered. One of the most widely spoken languages in the Amazon is Reengage, which is actually descended from the ancient Tupi language which until the mid-18th century used Tupi more than the official Portuguese to communicate (Picoli, 2006). There are some data affirming the existence of 160 different tribes speaking 160 different languages, besides 11 isolated languages (Picoli, 2006). In the past, this large number of languages and different cultures impeded groups to communicate influencing negatively cooperation and the development of the institutions.

Population growth is also a factor influencing resource stewardship. In the Amazon area the total population was in 2000 almost 22 millions of inhabitants. Though, it is the largest Brazilian region in size, it presents a demographic density of 4 inhabitants per square kilometer. Population growth rate since the 50ths has been superior of the national average. In 1950 it represented 5.8% of the total growth and in 2000 it represented 12.2%. This growth is a consequence of higher fecundity and migration from other Brazilian States. Figure 2 shows the growth in population rate and calls attention to an increase in population in urban areas which influence the demand for more infrastructures in a broad sense.



Figure 2: Population growth in the Amazon Region

Source: IBGE, 2000

The migration from other Brazilian States to the Amazon region was also influenced by the national colonization and integration projects, that begun during the 1970s. Most of the families who migrated to the region were motivated by the offer of lands and subsidized credit. Those families were mostly distributed in Incra (National Institute for Colonization and Land Reform) settlements, concentrated along the Transamazon highway in the State of Pará, and near the BR–364 highway in Rondônia. The settlements have been very important in land distribution and have already benefited in the Amazon region up to 2002 231,815 families, occupying more than 231 thousand square kilometers. Those settlements are vital for land distribution and have already benefited these families. On the other hand, activities developed by the families, such as agriculture and logging, have great potential for generating deforestation and forest degradation in the region (Brandão Jr. and Souza Jr., 2006, Picoli, 2006). Brandão Jr. and Souza Jr. affirms that the total deforested area in settlements is of 106 thousand square kilometers up to 2004, representing 15% of Amazon deforestation.

Although there exist criticism about the relation of poverty and deforestation, regarding who causes what, these variables are essential to understand the Amazon context. The myth of the region without misery based on the argument that it is rich in natural resources should be revised by the State and civil society as a whole. The region presents deficiencies in infrastructure and serious problems in sanitation, education, health and habitation that have been increasing since the urbanization of the area. These social problems are a result of the inequalities and of limited access of much of the population to economic opportunities, in other words, concentration and exclusion. Poverty in this sense has been influencing deforestation.

Based on the scenario described above we could affirm that the natural characteristics of the Amazon region limited the collective action.

Moreover, in order to better understand the actual scenario we should look back on the past. The occupation and colonization of the region was designed by governmental models that aimed to bring progress to the region. Next section explores, briefly, the main interests of the State in the Amazon region, how it planned to bring progress through occupation of the land, what influenced the economic activities that is developed in the area as well as the pattern of deforestation.

## Occupation and colonization: the development of Property Rights, Economic activities and

## Deforestation

In classic work on the Brazilian social formation, Sergio Buarque de Holanda (1936) demonstrated magnificently that our gift and, consequently, our future are linked to our past. Thus, to modify our destination, we have to search and try to understand the deepest causes of our social formation that presently determine and characterize the State, the society and the

mentality of entrepreneurs. Saying that, it is wise to understand the occupation and colonization of the Amazon region because the consequences of the colonization and the interests of the State, entrepreneurs and society as a whole has shaped the Amazon region as it is today.

The territorial occupation and the models designed to enhance economic growth in the Amazon region is in line with extreme inequality that lack balance not only among different groups of society but also among society and natural environment.

Prior to the early 1960's, access to the Amazon was incredibly restricted and aside from partial clearing along rivers the forest remained basically intact.

The occupation of the region and the use of the land has been a policy goal since the beginning of the 1960's The military government in power from the 1960's to the 1980's aimed to promote the occupation of the region feeling that such empty land was an ideal "release valve" for pressures arising from a growing population. Many also felt or hoped that the region offered boundless resources, and those in power apparently shared those visions of progress. To open the region, roads were built, accompanied by colonization and titling projects. The road network expanded significantly over the decade 1975-1985. Subsidized credit was offered, and income taxes were forgiven if the funds went to approved development projects. Dams were constructed and a free trade zone was created in Manaus.

Public policies aiming the progress of the region since the 60ths were authoritarian and centralized in Federal government hands. Regional government and civil society did not participate in the decision making process. Consequently these policies had low legitimacy and did not achieve satisfactory results. Moreover, the social organization was considered inefficient because norms and internal rules based on group beliefs could not impede violence and conflicts.

The result of this historical regional development is violence and contestation of any rights to access and use natural resource.

According to IBGE (Brazilian Institute of Geography and Statistics, 2000) 24% the Amazon territory was characterized in 1996 as private property and 76% as public property. From the public property 29% was considered protected areas, such as National Parks, Extractive Reserves, and indigenous areas. Public areas, including protected areas, are constantly invaded by squatters. The occupation of public lands provides considerable profit and is followed by violation of human rights in order to expand the Amazonian border.

According to the Brazilian legislation in order to transform ownership (illegal occupation from squatters) into legal property it is necessary to make the land productive, this means the cutting of the trees and investment in agriculture. This relationship between squatters and deforestation dates from the beginning of the twentieth century based on a traditional land legislation that requires the transformation of the forest into a productive activity (meaning agriculture, and cattle raising). This productive status was also required in the seventies to guarantee users the access to financial credits and fiscal incentives. Recently, this productive status is still a reality; but the environmental legislation should be obeyed. However, there are serious problems with the enforcement of the environmental national legislation, varying from the technological aspects of monitoring the illegal activities through corruption (Picoli, 2006, National Geographic, 2007). The environmental costs resulting from illegal occupation of public land positively influences deforestation and irrational use of natural resources. The heterogeneity of the production systems in the Amazon region illustrates its natural and social diversity. The main activities developed in the region are meat production, small scale agriculture, timber logging, mining, and

in some areas large scale production of soy bean, especially in the Mato Grosso State (Picoli, 2006).

The exploration of the forest follows a pattern that starts with the illegal occupation of public land. Generally, illegal lumbers are the first to arrive. They build clandestine roads and cut off the most unique trees that are the most important in terms of value, economical and environmental. The Ministry of the Environment estimated that 80% of the timber harvested in the Amazon region comes from illegal occupation of public land (Ministério do Meio Ambiente, 2007). When there is no more timber, these illegal lumbers migrate to other regions and leave the land to be occupied by a farmer, usually medium size. Farmers tend to place fire in order to invest on pasture for cattle raising. These farmers are the ones who politically manage to forge the documents of the land. After that, the land is usually sold to another farm that cultivates soy bean. The result of this pattern of illegal occupation and irrational use of natural resources is conflict and poverty.

According to IMAZON (Amazon Institute of People and the Environment, 2007) during the first three years of illegal logging, a typical municipality of the Amazon region can achieve an annual income of one hundred million dollars, generating 4.500 direct job positions, attracting people from other regions. After five years however the trees are gone and the income of the municipality falls to five million dollars. The remaining activity, most of the time, is cattle raising and it employees only 500 individuals. This critical destructive cycle of exploration leaves a considerable number of individuals unemployed and destructs natural resources.

Although only 1% of the Brazilian Amazon area was deforested in the first 470 years of colonization, as a result of this pattern of occupation in the last 35 years, from 1970 till 2005, deforestation is already close to 17% of the area (figure 3).





This picture shows that in 2004 twenty seven million square kilometers was deforested and in 2005 the deforestation decreased (eighteen million square kilometers). However, there is criticism about the satellite technology and remote sensing because it accounts only for clear cuts, meaning that selective logging is not being accounted in the estimative. Selective logging causes significative damages and is less easily observable than clear cuts. Trees that have better commercial value are the first to be harvested and it also opens area to squatters.

Enforcement of the legislation is also a problem. When government agents spot deforestation they are usually hamstrung by a lack of manpower or equipment. And when they do react, the resources they manage to scrap together are modest. One government agent affirmed that in 15 years working for government to monitor deforestation in the Amazon forest he never had access to technology, even internet in his office, not mentioning guns to deal with squatters.

The development model aimed for the region during the military dictatorship was based on timber extraction and cattle. It is predatory because cause death and is not renewable. Socially it

Source: INPE, 2006

concentrates wealth. Recently, the development model for the region incorporates aspects of social environmentalism that calls for dispersion in small scale of agroforestry collectives and territorial demarcation in order to preserve areas rich in terms of biodiversity. Whether it is going to be efficient in preventing deforestation and poverty depend on the ability of the institutions to encourage cooperation and to monitor and enforce legislation.

#### V – Why the Amazon Forest is still so Wild?

There is no doubt that we need to understand how institutional, cultural, and biophysical contexts affect the types of individuals who are recruited into and leave particular types of collective action situations, the kind of information that is made available about past actions, and how individuals can themselves change structural variables so as to enhance the probabilities of norm-using types being involved and growing in strength over time.

Institutions encouraged cooperation and gains from trade and the Wild, Wild American West, was really "not so wild". For this reason, institutional entrepreneurs become the heroes who promoted law and order, efficient use of the natural and human resources, and good resource stewardship.

In the case of the Amazon forest, there is strong evidence that the conditions that promoted conflict instead of cooperation are the physical size and geographical characteristics of the area, the socio-cultural diversity, including different languages, the population growth, the State that imposed top-down policies and the inability of the State in order to enforce the legislation and to monitor the economic activities that influence deforestation. Together, these factors influenced negatively collective action and the ability to develop efficient informal rights in the Amazon region.

The transaction costs to establish efficient governance mechanisms are high due to the highly politicized process of land allocation and top-down policies, and squatters that are able to organize and expropriate private lands, thus increasing the uncertainty of land title. Moreover, enforcement is difficult because there are significant cultural differences that influence individuals and group preferences. The Amazon forest is a large area, and registered in early decades around 160 different languages. Some areas stay drained during long periods of the year and boats are the most common transport. Monitoring is also an important factor because the forest is highly dense and difficult to monitor. Furthermore, there is still some criticism about the technology available to monitor deforestation. Some areas are not visible in satellite images due to clouds and weather conditions. Deforestation rates only account clear cuts and do not consider selective logging. These factors can illustrate why the institutions are still not developed in The Amazon forest in Brazil and why deforestation and social problems are increasing.

We, especially Brazilians, still have a choice between wild and not so wild, it depends on all of us, government, entrepreneurs, researchers and civil society as a whole. It depends on how we are willing to supplant corruption and conflicts by cooperation. Further developments along these lines are essential for the development of public policies that enhance socially beneficial, cooperative behavior based in part on social norms. It is clear that past policy initiatives did not encourage collective action and crowded out the formation of social norms that might have enhanced cooperative behavior in their own way. Increasing the authority of individuals to devise their own rules may well result in processes that allow social norms to evolve and thereby increase the probability of individuals better solving collective action problems. In this context, we recommend research on the role of the entrepreneurs in recent development of the region and the private production of rights, what is in line with the new legislation that aims to concede

public land to private use through sustainable stewardship of natural resources.

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