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Sustainable Development Programs in Rio de Janeiro: Assessing Conflicts Between the Environment, Society, and Industry

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Abstract: For sustainable development projects to be beneficial to the environment, society, and economy, awareness is key on all levels. I have dissected several sustainable development projects in Rio de Janeiro, in order to demonstrate the constraints forced on developing areas through Westernized ideologies and top-down approaches. It is key to focus on local members of the community and their needs before initiating a sustainable development project. Instead of the transference of ideas and projects from the Westernized nations, it is detrimental to embark upon the different cultural, social, environmental, political, and economical constraints that could produce undesirable consequences. Bottom-up approaches allow grassroots involvement and knowledge to maximize benefits of sustainable development, so that the local population and environment are at the heart of all projects. Urban sustainability is key in this growing industrial and capitalist phase of development, and the shift of focus to these different approaches will not only eliminate the conundrums in the city of Rio, but also create sustainability throughout the world as a whole.

Keywords: Sustainable development, Westernization, Urban sustainability, grassroots knowledge, Brazil, Rio de Janeiro

1. Introduction

My first visit to Rio de Janeiro, Brazil was in March of 2004. Upon arrival, the natural beauty of the city took me away from the time I landed at the airport. After visiting tourist sites, such as Pão de Açucar (Sugarloaf Mountain) and Corcovado (the Christ statue), I was able to look down at the beaches and view the city as a whole from the highest points in the city. Straight ahead lie the famous beaches of Copacabana and Ipanema, with the beautiful blue waters, golden sandy beaches, and rolling hills in the foreground and background. Then, I saw the real life of a carioca. Traveling downtown and to Guanabara Bay, I noticed the pollution and degradation these people live with everyday. Also, throughout the time I was there, I could not help but be overwhelmed at the sites of the favelas, or shantytowns, that overlook the entire city from above. In addition, many children have no place to call home, and are forced to seek a sustainable livelihood through drugs and violence. Since this trip, I have wondered how a city so enriched with natural wonders and beauty could be so consumed with environmental degradation and poverty.

I began researching "sustainable development" programs in the area, and wondering why so many are not working to produce benefits for the population or environment. The urban area of one of the most beautiful cities in the world hosts environmental problems such as water pollution, untreated sewage, lack of proper waste disposal, and degraded housing accompanied with violence (Cavalcanti 2000). In addition, deforestation, land occupation, and industrial pollution heighten the environmental risks. The importance of sustainable development in the city of Rio depends on keeping "the scale of the use of the physical space at levels that are compatible with the city's ecosystem" (Lobo 1994, 172). Sustainable development became the main discourse during the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, and soon became the driving concept behind development. Ironically, the urban poor of Rio's favelas lurched over the city during this Earth Summit, stressing the realistic challenges ahead for those involved in the development process (Adams 2009). Although sustainable development gained ground in Brazil after the 1992 World Environment and Development Conference in Rio, 16 years later it still faces a number of challenges. Unfortunately, much of the environmental emphasis has been placed on the economy rather than the community (Veiga and Magrini 2009). The population of Rio now exceeds 11 million people, establishing it as the second largest urban area in Brazil, which makes sustainable development projects a higher priority with the influx of a rapidly growing population (Perlman 2000, 1).

The concept of sustainable development provides insight to the development discourse as it challenges ideologies and ethics through an interdisciplinary approach. It focuses on not only the sustainability of the environment, but also the rights of people to be able to create a sustainable livelihood for themselves. Sustainable development seeks to encompass nature and society as a whole, as an attempt to focus on the needs of individuals within their own environment. By adhering to each community's needs separately, planning can be more diverse and flexible to provide maximum benefits for all (Escobar 1995; Adams 2009). Sustainable development has the ability to eradicate poverty, while protecting the environment by altering the relationship between nature and society (Adams 2009).

Sustainable development attempts to restructure the development discourse and reframe the priorities within the context of conservation. It carries many definitions, highlighting social justice and

environmental protection, but the most prominent definition is derived from the Bruntland Report, in Our Common Future. They define sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Adams 2009, 5). Above all, this approach draws environmental issues into development planning (Adams 2009). Key aspects included in sustainability are preserving native biological processes and nutrient balance to keep the natural ecosystem in a balanced state, while maintaining social justice (Fearnside 2000). The model of sustainable development repositions the discourse for a qualitative alternative to the concept of economic growth (Binswanger 2000). By shifting the key aspects of development to better understand both the environment and people affected by the process, development goals can adhere to individual needs, and these goals can be met with fewer environmental, social, economical, and political conflicts.

This paper seeks to unravel the consequences of sustainable development projects in the urban area of Rio de Janeiro. I take a poststructuralist stance as I break down the theoretical framework of Arturo Escobar and others, to demonstrate how it relates to the organization of these projects. I have chosen to illustrate several projects of different concern to outline the conundrums that have resulted from improper ideologies following the development discourse in this urban area. By viewing multiple projects, I hope to exemplify the wide range of problems that arise out of ineffective procedures, as well as reveal the various types of people and ecologies negatively affected by the development process.

2. Theoretical Background

Because many development projects have failed in the past, new ways of thinking about the development discourse are key to understanding the processes of the developing world. Political ecology focuses on not only the impacts of capitalist development, but also on the effects it has produced for the poor people through the state and industrial sectors (Forsyth 2004). The work of Michel Foucault has provided a window for many researchers to look beyond preconceived notions of the studies of development. Edward Said advances this idea of "Orientalism, as a Western Style for dominating, restructuring, and having authority over the Orient" (Escobar 1995, 6). Arturo Escobar has expanded this notion to demonstrate the dominance that the Western World has over the Third World. Many difficulties arise because the developing countries attempt to follow a development discourse led by "Western modernity" following only one specific form of knowledge while all others are viewed as inadequate (Escobar 1995, 11). These modern culture forces of the West define the identity of others, while exerting its hegemonic dominance over development. Eurocentric views and ideologies continue to pressure other cultures to follow a certain discourse. Poststructuralists analyzed development as a discourse derived from Western origin, that has become a power system for the cultural, social, and economic production of the developing world (Escobar 2008).

Western concepts of nature and culture are key elements in the development process, which make it difficult to incorporate these projects into societies who have different notions on their relationship with the environment. Neil Smith argues that industrial capitalism is to blame for these Western conceptualizations of the environment. As a result, nature is perceived as being outside the social realm, and thus less significant in the development process. In addition to nature, the developing societies are constituted as outsiders by Western ideals. This concept lessens the power of their voice

as a community, making it increasingly difficult for them in the development process (West 2006). European culture exhibits a higher status in race and culture, thus stereotyping the latter as savage, backward, and ignorant (Zerner 2003). Because both nature and the people colonized do not fit into the molded ideals of European civilization, they are considered inferior, which justifies colonization through the supremacism of the Eurocentric hegemony. Human-centeredness has enveloped the colonization process, and continues to follow in development practices. Western civilization patterns converted nature into a resource, which is why it has become increasingly important to work with the locals and give their land more respect (Plumwood 2003). Escobar adds to this argument by questioning the meaning of nature to non-Western peoples to note the ecological and cultural differences in order to better inform and carry out development efforts (Escobar 2008). This is a derivative of the work of Immanuel Kant, who stressed the importance of treating others fairly through freedom and consensus, so they can distinguish what is useful or harmful to them (Proops et al 2000). Western environmentalists act as if they are more privileged and knowledgeable about the global environmental discourse. The Western cultural, economic, and political biases give an improper representation of the global environment (Dove 2003).

This idea of Westernization stems from western expansion and colonialism, which has oppressed local cultures and knowledge. Modernity must challenge Eurocentric forms of development and rule out coloniality as a means of articulating alternative projects and ways of thinking. Coloniality is linked to "Western mechanistic views of nature" and power, and classifies it into a system of hierarchy by placing non-moderns, primitives, and nature at the bottom (Escobar 2008, 121). Because modernity is understood to have originated in Europe, the concept must be restructured from the inside to create new models for the development discourse. In addition, Escobar states that modernity and coloniality co-exist, and that "there is no modernity without coloniality" (Escobar 2008, 168). Peter Brosius continues the argument with the Malaysian rhetoric that connects the environmental activism of the Westernized nations to be a modern day form of colonialism, which is the cause of the environmental destruction still taking place today (Brosius 2003). Imperialist and capitalist expansion is traced back to the colonial periphery, which paralleled with the plundering of nature. Because development favored scientific knowledge over local knowledge, separated nature from human life, and regulated nature by bureaucratic control, it has worked against nature instead of with it (Adams 2003). Most European and American academics are unable to conceptualize the importance of the epistemic difference that would result from overcoming modernity.

Ulrich Beck agrees that experts do not always accurately provide solutions to development problems, arguing that we should stop following the existing model (Adams 2009). Increased opposition only validates the power of the Western hegemonic development discourse, creating a more difficult setting for alternative forms of development to be carried out (Rangan 2004). Western concepts of conservation are not always appealing in developing areas, as different people possess diverse understandings of the notion of wilderness and the environment (Adams 2003). The conception of "Westernization" is still a major conundrum in the Brazilian development discourse, especially for many development projects in Rio de Janeiro.

The "Brazilian miracle" of the 1960s provides an example that Western discourses are not always suitable for other cultures (Escobar 1995). These top-down approaches to development failed to achieve what had been promised both economically and socially. Robert Chambers developed a new model for development, emphasizing the importance of bottom-up approaches, involving local

participation in the development of their own community. Top-down approaches neglect local needs, because those making development decisions are not affected by the outcome of the results. Without knowledge of local economics and politics, development goals cannot be achieved successfully. It is detrimental to liberate the constrained ways of thinking about development and the environment, as well as open up to new ideas and understandings in order to achieve sustainable development from below (Adams 2009). Paige West agrees that these top-down approaches to development do not work, and that community participation is more beneficial for economic development (West 2006). Enrique Dussel adds the possibility of "transmodernity" to the discourse, which focuses on thinking about the process of development and modernity from the inside, from the viewpoint of the "excluded other", which involves working with social movements that encompass their own degree of autonomy (Escobar 2008, 169). Unfortunately because bureaucratic development initiatives have overpowered local interests, local participation is often non-existent (Chambers 1989).

Because development projects and industrialization are new to developing areas, urban environmental risks are unknown to local populations. As a result, outside decision-makers dominate development projects, without recognizing local experience of risk. These unfair development practices oppress local people and their environment, leading to increased tension and conflict (Forsyth 2004). Even the local people realize the importance of engaging development from within the community. One man from Maimafu village in Papua New Guinea emphasized that the government continues to send in people from other places without local knowledge or cultural practices to educate children. He continues by stating that the only way to achieve sustainable development in this area is to provide education for the children, so they can sustain their own community in the future (West 2006).

Development programs in Rio are more difficult for outsiders to undertake because they underestimate the situation of poverty and its consequences in the city. Also, they tend to have different ideas about economic and social priorities, and misunderstand local systems of knowledge. The poor should be given the opportunity to properly define their condition, and thus set up their own system of priorities to better their situation. Chambers suggests that professionals should encourage community involvement to make priority decisions, and welcome their modification throughout the development process. He advocates policy based on three key aspects: poor people first, sustainability, and feasibility. An addition problem occurs when defining local participation. Many define this aspect as pressuring the local people to agree to a project previously designed, and working under an outside manager on the project. This type of participation does not establish any rights for the locals, implement their needs, or give them a voice (Chambers 1989).

3. Examples of Sustainable Development Constraints

Industrial development is one growth sector that has suffered tremendously after following project models of Western modernization. State and market transformations lead to the increase in industrial expansion in these developing countries, leading to harmful environmental impacts (Watts & Peet 2004). Like China and Vietnam, the industrial sectors entered into a stage of rapid modernization and pollution, creating unaccustomed stresses on the environment and natural resources. The model of development that followed "combines the worst of central planning and state control, with the worst of capitalist exploitation" (O'Rourke 2004, 245). Because of the promotion of industrial expansion and

the hunger for profits, environmental regulations are limited because of their industrial costs, creating increased conflict. States are only motivated to induce regulation if presented with dangerous pollution crises, or when profits are threatened by pollution. Urban industrial development impacts include: resource depletion, biodiversity loss, interruption of land use patterns, and water, air, and soil pollution. Industries increase energy use, toxic compound emissions, hazardous wastes, vehicles emissions, and consumption habits (O'Rourke 2004).

In 1984, the explosion of a pesticide factory in Bhopal, India was the result of local differences in government and culture. Plans were not followed as efficiently as those for the project in the United States, and the Indian government did not have the same automatic controls, which are standard in the USA. As a result, about 20,000 people died from the inhalation of poisonous gas from the explosion (Adams 2009, 332). In another example, lead poisoning caused a number of deaths and chronic health problems in Thailand beginning in 1989, because industrialization and urbanization increased the demand for lead-based products, such as lead, leaded gasoline, and factories using lead for soldering (Forsyth 2004). These urban hazards stem from the application of projects without regards to understanding, regulating, or governing the process as done in the West. Because developing countries have a lack of pollution control, they can achieve an industrial comparative advantage as production costs are decreased, which can fuel increased incidences of corruption, combined with environmental hazards (Adams 2009). Because of the lack of resources and political support, it is difficult for the government to enforce environmental restrictions listed in their policies. Federal support and monitoring of pollution in urban areas has been placed aside in Brazil's efforts to combat the deforestation of the Amazon rainforest. Certain pollutants emitted by Brazilian industries, such as sulfur dioxide, nitrogen oxide, and carbon monoxide, are not sufficiently monitored by the government (May 2000). Lobo expresses the effects of the pollution in Rio de Janeiro:

> *[Guanabara Bay] is the second largest industrialized zone of the country: 10,000 industries, ten oil terminals, twelve shipyards, and two oil refineries. On its right side lies the most famous symbol of Rio's natural beauty—the Sugar Loaf.*
>
> *The discharge of organic materials reaches 465 tons per day, and only 68 tons receive adequate treatment. Industrial liquid wastes are responsible for 100 per cent of the pollution caused by toxic substances and heavy metals of the Guanabara waters* (Lobo 1994, 175).

An attempt to infiltrate the industrial sector with more sustainable development practices has been ignited in Rio de Janeiro, with little cooperation of the state. The concept of eco-industrial parks (EIPs) seeks to minimize the environmental impacts in industrial areas by working together as a community. These EIPs collaborate by exchanging industrial resources and wastes, such as energy, materials, water, and by-products in order to lower natural resource consumption and pollution. EIPs also increase the productivity of resource use and the industry, as well as provide employment opportunities, which increase the quality of life (Veiga and Magrini 2009).

This practice is already successful in both Europe and the United States to overcome environmental damage while improving development, thus inspiring developing markets to follow pursuit. However, due to Rio's unstable economic growth urban and industrial concentration, and lack of waste management, sustainable development practices become a bit more complicated. The push to become more Westernized has caused many sustainable development plans to be adopted, without recognition of how they will be carried out. The state government recently withdrew the program after five years, because of changes in political and public agency leadership. Also, the Rio de Janeiro Environmental

Protection Agency (FEEMA), along with other public sectors, is no longer supporting the development of EIPs. In addition, community participation is detrimental to the planning process to develop a clear strategy best suited for the specific and unique needs of the city of Rio de Janeiro. Lack of knowledge paired with the lack of commitment make it even harder for these programs to be carried out to the fullest extent to maximize benefits (Veiga and Magrini 2009).

Another sustainable development project resting on the shores of the Guanabara Bay is the Usina Verde project, which was designed to turn urban waste into forms of energy. Waste management is a key issue in Brazil, as 30.5 percent of all waste in the country is disposed of in open dumps, according to the national sanitation report of 2000 (Hudnut 2007, 1). Unfortunately, the situation is even worse in the urban are of Rio de Janeiro, as the city disposes of over 14 tons of solid waste per day, which is equivalent to 5,110 tons annually (Hudnut 2007, 1).

Usina Verde was created by the Ilha do Fundão Campus of the Federal University of Rio de Janeiro, in order to reduce the amount of wastes they send to landfills, as well as generate electricity for the campus. It not only provides additional employment opportunities for the community, but it also is a more efficient way to deal with the waste in the city (Kantor 2006). The waste of the city is burned with poisonous acidic gases, which create the energy to produce electricity. The ash produced from the burning of this waste is later used to create bricks and other building materials. About two megawatts of electricity are generated daily from these incinerators (Hudnut 2007, 1).

Usina Verde has not been registered as a Clean Development Mechanism (CDM) by the Kyoto Protocol, which questions how many carbon credits it will generate. Also, socio-economic and environmental impacts are uncertain, as the incinerators disperse harmful dioxins, furans, and heavy metals, which are not heavily regulated by the government (Hudnut 2007, 2). These toxins are also known as persistent organic pollutants, or POPs, which were condemned by the 2001 Stockholm Convention because they are dangerous to our health. Because it is not yet proven if the ash material is not toxic, it is yet to be used in other materials, such as in agriculture. The head of the Brazilian Forum of Non-Governmental Organizations and Social Movements for the Environment (FBOMS), Temístocles Marcelos, stated that:

> *Dioxins are carcinogenic, affect the endocrinological system and are transmitted through the food chain, including through mother's milk. The POPs present in the gases, ash, and other residues from incineration are dangerous, even in proportions lower that those allowed by national regulations* (Osava 2006, 1).

Although the process of incinerating wastes is productive in 35 countries, especially in Europe and the United States, Brazilian constraints and policies are not suitable for this project. Brazil currently burns large amounts of garbage without regulations, aside to Usina Verde. Because environmental restrictions interfere with sectoral interests within the government, they are either declined or neglected. This creates improbable solutions for environmental restrictions, as they cannot be integrated into sectoral or macroeconomic policies (May 2000). Marcelos also explains that this project will prevent other more viable solutions for the use of urban waste if the Kyoto Protocol eventually approves the project. He advocates for greener solutions to combat environmental degradation, such as recycling (Osava 2006).

Other areas of concern stem from environmental conflicts over sustainable development projects, which are often the result of social inequalities. Government and private investment channel their funding primarily to the South Zone of the city, and development projects often involve

extracting resources or relocating impoverished families. One project in particular under the Macro-Drainage Program of the Rio Zone of the Sepetiba Bay Basin, involves channeling and dredging the Piraquê River. The project was designed to prevent floods, by clearing out all mangrove swamp vegetation, although this area encompasses the largest mangrove swamps of the region, resulting in "massive ecological damage" (Bredariol and Magrini, 2003, 493).

Because the local population consisted of low-income families living in favelas and disproved of the project, their opinions were disregarded throughout the dispute. Also, because the location of the favela was problematic for the project, the removal of this neighborhood was suggested in order to protect the mangrove swamp. As Bredariol and Magrini state the opinions of the decision-makers:

> *Removing the mangrove swamps would have massive negative effects on the local ecology, while removing the favela slum would have very positive effects on the community…* (Bredariol and Magrini 2003, 509).

Bredariol and Magrini agree with Chambers that the shift from a top-down to a bottom-up approach would settle these conflicts more efficiently (Bredariol and Magrini 2003). Unlike the Chipko movement of India, the local population of the favela was unable to organize and unite against the project and its imposing environmental degradation. Grassroots struggles are not necessarily against development, but wish to seek alternatives in a sustainable manner (Rangan 2004).

The growth of favelas is another major cause for environmental concern in the city, which already inhabits over 600 of these shantytowns (Phillips 2009,1). The four largest in the area- Rocinha, Jacarézinho, Complexo de Alemão, and Complexo de Mare- have a combined population of over half a million people (Perlman 2004,107). Over the last 50 years, the populations of these communities grew faster than the city of Rio de Janeiro alone, as policies relocated over 100,000 people to these impoverished areas (Perlman 2004, 108). Rapid urbanization has caused the urban populations to account for 80 percent of the country's total population. In Rio alone, the urban population is equal to 76 percent of the state's total population, while inhabiting only 15 percent of the state's territory (Lobo 1994, 172).

A recent project to curb this growth consists of placing a 650-meter long concrete barrier around a favela to protect the nearby Atlantic rainforest from illegal population. This "eco-barrier" is being compared to Israel's security barrier and said to be a form of "social apartheid" as it is similar to what the Israel does to the Palestinians (Phillips 2009, 1). Although it is said it will improve living standards and provide protection from drug traffickers, human rights activists argue it will only segregate the population. In addition, Rio's environmentalists state that a wall will not keep the growing population out of the rainforest, unless something is done to better their housing situation (Phillips 2009). This is yet another example of a project that should have involved community members in order to better service ideals of sustainable development.

The city of Rio de Janeiro launched the Community Reforestation Project to combat environmental degradation and erosion, while involving the local community. It reintroduces native tree species to the area that were once cut down as a consequence of the rapid population growth within the favelas. In addition, the Atlantic rainforest will be restored, and protected from illegal housing (ICLEI 1998).

This project not only provides a better standard of living in impoverished areas by reducing ground slides and flooding, but also offers employment opportunities to the residents. Each individual community selects a local project manager, who then becomes responsible for the twelve workers selected from the local community as well. Once the site for restoration is prepared, fertilizer made

from composted waste is used to plant cultivated seedlings from a locally owned model farm forest (Viveiro Florestal da Fazenda Modelo), which also employs local residents. Fruit-bearing trees are also planted not only to assist the growth of other tree species, but also to provide additional food for the impoverished families. The city has also implemented a community education program to teach the importance of the reforestation project, in hopes that the communities will better protect the environment and trees in these areas (ICLEI 1998).

Because of the project's success, it is now implemented in over 58 favelas (ICLEI 1998, 4). The involvement of the local residents has raised political awareness and cooperation in protection of the forest. Because the local government respects the local community's right to land, they work with the people instead of around them, and they respect them as individuals instead of treating them as a destitute community (ICLEI 1998).

However, despite the project's claimed success, it still faces many conflicts. Although it involves community members, it still suffers because it operates through a top-down approach. Problems have risen from community residents cutting down trees to create land for grazing, as well as to provide firewood. Civic leaders are not easily motivated to finance such projects. Because the impoverished communities within urban areas often suffer the worst environmental consequences, a bottom-up could be more beneficial if organized properly (Perlman 2000). The stress on the importance of local institutions is heightened, as the locals are much more knowledgeable of the area. However, this request has been neglected by federal and state governmental agencies, such as the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA), leading to frequent conflicts with local populations (Begossi 2000). Also, grassroots organizations are more effective in pressuring the local population to protect and maintain the areas once projects have begun. It is key in this instance, to keep people from invading and cutting down an area that is being maintained. Grassroots organizations can enforce limits and balance the responsibility among community members to protect the destruction of the surrounding forest. The government has attempted to control the boundaries and enforce regulations, but has failed because of the persistence of the local population (Fearnside 2000).

4. Conclusion

For sustainable development projects to be beneficial to the environment, society, and economy, awareness is key on all levels. I have dissected several sustainable development projects in Rio de Janeiro, in order to demonstrate the constraints forced on developing areas through Westernized ideologies and top-down approaches. It is key to focus on local members of the community and their needs before initiating a sustainable development project. Instead of the transference of ideas and projects from the Westernized nations, it is detrimental to embark upon the different cultural, social, environmental, political, and economical constraints that could produce undesirable consequences. Bottom-up approaches allow grassroots involvement and knowledge to maximize benefits of sustainable development, so that the local population and environment are at the heart of all projects. Urban sustainability is key in this growing industrial and capitalist phase of development, and the shift of focus to these different approaches will not only eliminate the conundrums in the city of Rio, but also create sustainability throughout the world as a whole.

Conflict of Interest

The authors declare no conflict of interest.

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