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# FRAMING CLIMATE CHANGE THROUGH A LAYPERSON'S PERSPECTIVE: A LATIN AMERICAN EXPERIENCE INTHE BRAZILIAN SAVANNA - CERRADO

## RESUMEN

Este trabajo trae la atención a la vulnerabilidad de los sistemas humanos y naturales del segundo mayor bioma de América del Sur - la sabana brasileña (Cerrado). Los argumentos en el papel avanza la vista en perspectiva de desarrollo sugerido por el creciente número de investigadores externos que están utilizando estrategias de aproximación basados en la comunidad para incorporar la adaptación al cambio climático en la planificación y las iniciativas de desarrollo. Aquí, investigar el proceso de planificación participativa en el marco del programa dirigido por el estado Cidade pra Gente, que adelantó las políticas nacionales de desarrollo urbano en el estado de Goiás, Brasil. Mi argumento aquí es en que a través del proceso de planificación de los grupos de interés avanzaban las discusiones sobre las prácticas existentes de uso del suelo en sus comunidades, y al hacerlo de forma predeterminada abordaron las vulnerabilidades socio-económicos e institucionales de sus comunidades. A pesar de que no era ni un tema de discusión en la agenda del programa o bajo el radar de sus participantes, mientras que evaluar las prácticas actuales de uso del suelo simultáneamente avanzaron evaluaciones de la vulnerabilidad en el proceso de desarrollo de los planes maestros para las ciudades que representaban en el programa *Cidade pra Gente*.
Palabras clave: adaptación al cambio climático, la vulnerabilidad, el uso del suelo, la planificación participativa, el desarrollo

PALABRAS CLAVE: ADAPTACIÓN AL CAMBIO CLIMÁTICO - LA VULNERABILIDAD - EL USO DEL SUELO - LA PLANIFICACIÓN PARTICIPATIVA - EL DESARROLLO

## ABSTRACT

*This paper brings the attention to the vulnerability of the human and natural systems of South America's second largest biome - the Brazilian savanna (Cerrado). The arguments in the paper advances the development view perspective suggested by a growing number of researchers who are using community-based approach strategies to mainstream climate change adaptation into development and planning initiatives. Here, I investigate the participatory planning process under the state-led program City for Us, which advanced the national urban development policies in the state of Goiás, Brazil. My argument is that through the planning process the stakeholders advanced debates over existing land-use practices in their communities, and in doing so by default tackled the socio-economic and institutional vulnerabilities of their communities. Although it was neither a discussion theme on the program's agenda or under its participants' radar, while assessing existing land-use practices participants concurrently advanced vulnerability assessments in the process of developing the master plans for the cities they represented in the program City for Us.*



KEY WORDS: CLIMATE CHANGE ADAPTATION VULNERABILITY - LAND-USE - PARTICIPATORY PLANNING - DEVELOPMENT


## 1. INTRODUCTION

The combined impact of anthropogenic climate change with climate variability increases the vulnerability of human and natural systems and their exposure to extreme events in South America. A case in point, the El Niño Southern Oscillation (ENSO) increased the temperature in the Pacific Ocean, causing severe droughts, high temperatures and increased forest fires in the region which includes areas from the Brazilian savannah known as the biome Cerrado[1] (IPCC AR4). The development pathway in the Brazilian mid-western states is compromising watersheds, increasing GHG emissions and soil erosion that is depleting the biome, which covers approximately 25% of the national mass land (IBGE, 2004), and it is the second largest biodiversity region in the country after the Amazon region. The Cerrado is the predominant landscape in the state of Goiás. This paper brings the attention of the international community to the impact of global climate change on the Brazilian mid-western states and the Brazilian biome Cerrado. Here, I discuss the vulnerability debate intrinsic in participatory planning processes, and suggest its relevance to address climate change adaptation and mainstreaming it urban development and planning initiatives. I investigate the participatory planning process under the state-led program Cidade pra Gente (City for Us), which took place in the state of Goiás, Brazil.

The program advanced the national urban development policies aligned with the federal law Statute of the City enacted in 2001. The program was implemented in three phases, as reported by coordination of the program (2007), by the end of the first phase it engaged 1,100 stakeholders from 88 municipalities in various activities, including the monthly capacity building workshops while advancing the development of the master plans for their respective cities. Under the condition of visiting scholar I observed the implementation of the second phase, which included monthly workshops and public meetings held by the program participants statewide. The program participants were grouped accordingly

1 The Cerrado is an extensive and complex biome, characterized by rapid and abrupt land cover changes, and shares ecosystems with five out of the six Brazilian biomes including the Amazon, Caatinga, Pantanal, and Atlantic Forest. It holds the springs of the three largest watersheds of the South America continent (Amazon/Tocantins, São Francisco, and Prata), and it is present in 14 out of the 27 Brazilian states (Ministry of the Environment, Brazil, 2012). Due to its dimension and physiognomic variations, the Cerrado plays an important role concerning the water, energy, and carbon fluxes at both the regional and global scales (Ferreira et al, 2011; Felfili, Jeanine A. et al, 2007).

with the cities they represented in the program. They engaged in program activities, and delivered various products (documents) including participatory mappings and the master plans for the cities they represented in the program. There were two elements in particular in the participatory planning process that caught my attention. The first was that when assessing existing land-use practices the stakeholders simultaneously engaged in debates over land-use, and the socio-economic and environmental implications of these practices to the wellbeing of their communities. A second element I observed was that the land-use debate carried by the participants in the planning process was founded on both the stakeholders' learned empiric data provided by the program's coordination and other sources, and by the program stakeholder's shared living experiences and hardships when facing social-economic and environmental uncertainties, and political and cultural constraints. Their environmental concerns were framed within the sustainability paradigm which was not always explicit, yet it was intrinsic in the social-economic concerns identified in their land-use.

The adaptation scholarship in the social sciences presents the concept of adaptation as a response to risks associated with human vulnerability or adaptative capacity to hazard impacts (Smit and Wandel, 2006). The authors sustain that practical adaptation studies are community-base studies that focus on documenting the knowledge building of community members and decision-making processes, which examine local adaptative capacity and the capacity needs of the community that has experienced hazard, with the purpose of recognizing ways to implement adaptation measures and improve the adaptative capacity of the community. My argument in the paper is built upon my observations, literature pertinent to the case study I am investigating – the program City for Us, and underlined with the vulnerability and adaptative capacity elements pertinent to pratical adaptation approach. Identification of risk and hazard (of any kind) was included in the land-use assessments advanced by the program participants. Thus, I argue that the socio-economic and environmental implications associated to existing land-use practices discussed by the program participants concern their exposure to risk (and hazard), and so it concerns to their vulnerability and capacity to adapt to natural and human induced stresses. Although it was neither a discussion theme on the programs agenda or under the stakeholders' radar, while assessing existing land-use practices they concurrently advanced a vulnerability assessment in the process of developing the master plans for the cities they represented in the program. My investigation aims to answer the question "How do existing land-use practices discussed in the participatory planning process relate to vulnerability, and what does this mean for how vulnerability can be relevant in other participatory planning processes?

The researchers are pragmatists (Rossman and Rallis, 2003) who shares common principles with social constructivism (Crotty, 1998). The conceptual framework that underlies my arguments in this paper advances the "development view" suggested by a growing number of researchers who are using community-based approach strategies to mainstream climate change adaptation into developmental initiatives. It explores how the contribution of local knowledge shared by impacted communities can become a systematic part of the learning efforts to address adaptation to climate change while linking it to sustainability, and to mainstreaming adaptation and vulnerability reduction with existing projects and developmental initiatives. The various adaptation and vulnerability research traditions have contributed to the advancement of the climate change research; they are interconnected, and purposely used by different authors, a number of whom are cited in my work. Yet the "architecture of entitlements" and "pressure and release" traditions (Kelly and Adger, 2000; Adger et al, 2004; Adger, 2006; Smit and Wandel, 2006; Wisner et al, 2003; Moench, 2007) better suit the focus of my investigation on the "social vulnerability" of human systems that have experienced some sort of climate or non-climate stress with limited capacity to cope or adapt.

This article reflects a work in progress, and its findings mean to be incorporated in a subsequent paper. The qualitative literature suggests that a phenomenon can be approached in different ways, and investigated by using different techniques. Researchers are pragmatics and combine various techniques to reach a desired outcome (Crotty, 1998; Creswell, 2007). My main purpose is driven by the instrumental (Rossman and Rallis, 2003; Rossman and Rallins, 2012 cites Patton, 1997; Creswell, 2007) purpose of my investigation, which entails the development of a conceptual framework supported by the combination of climate change and planning literature review, partial observation of and use of archives and publications associated to the planning process I am investigating, and the use of semi-structured interviews, interview guides, and journaling, that I have done in an earlier stage of my investigation. This is a small study with time and budget constraints. I begin with an overview of adaptation and vulnerability, and the implications of the diversified definitions in the climate literature. The conceptual framework supporting the arguments in the paper follows with the focus on the multisectorial and specific

approaches to vulnerability, risk reduction, and the concept of "windows of opportunity". The subsequent section is presented in two subsections. The first subsection advances the concept of mainstreaming support by an array of authors, with focus in the vulnerability-adaptative capacity interplay. The following subsection advances the community-based arguments, with emphasis in the "practical adaptation". Then, I present the conceptual framework. I introduce the program City for Us, the case study of my investigation, and bring some insights drawn from both my pilot findings from interviews that took place earlier in my investigation, and the conceptual framework discussed in preceding sections. I continue the analysis in the subsequent section but with focus on risk-reduction and mainstreaming. The conclusion of my discussion follows.

## 2. ADAPTATION AND VULNERABILITY IN PERSPECTIVE

The bibliography of adaptation (and vulnerability) carries an array of interrelated concepts from different fields including adaptation, vulnerability, sensitivity, adaptation capacity, risk, hazard, and so on whose relationships are not so clear (Books, 2003, cites IPCC; Adger et al, 2002; Burton et al, 2002; Smit et al, 2000; Smit and Wandel, 2006). These concepts may suggest different meanings and applications accordingly to a given context, the author and or the area of study, whether in the social, or natural sciences (Books, 2003; Brooks et al, 2004; Füssel, 2010; Smit and Wandel, 2006). Adaptation to climate variability and extreme events is intrinsic to climate change adaptation (Smit et al, 2000) and it is a social process in which "the ability of societies to adapt is determined, in part, by the ability to act collaboratively" (Adger et al, 2003). Smithers and Smit (2010), and Gidley et al (2009) suggest that the conceptual and analytical approaches to climate change adaptation continue evolving. Gidley et al (2009) introduce the concept of "future studies" to address the complexity of climate change adaptation, and propose five typologies which include the predictive-empirical, critical-postmodern, cultural-interpretative traditions, and the prospective-action and integrative-holistic approaches. These typologies reflect different paradigms yet they are not mutually exclusive, and knowledge exchanges between typologies can be created based upon shared underlying epistemology and approach to climate change (Gidley et al, 2009).

The community-based view of adaptation is supported by the differentiation of adaptation processes in which the design and selection of a specific adaptation measure are influenced by the circumstances under which it will be implemented, the levels of the stakeholder's participation (Smit et al, 2000; Smit and Wandel, 2006), and representation and deliberation of such measure. The authors maintain that adaptation measures are manifested through the human and natural systems' capacity to adapt and to reduce the vulnerability of these systems. Adger (2006) maintains that IPCC's (McCarthy et al, 2001) definition of vulnerability considers the characteristic of a given system and the function of the system's exposure, sensitivity, and adaptative capacity. On a similar vein, Smit and Wandel (2006) use their "nested hierarchy model of vulnerability" to explain the interconnectivity between the processes of exposure, sensitivity and adptative capacity of local human and natural systems in response to climate related risks and hazard impacts. The model suggests that local and broad (regional, national, global) forces factor in these processes and their outcome (stress). The exposure and sensitivity elements of vulnerability are the outcome of the interface of environmental and social drivers, while the adaptative capacity is driven by economic, social, cultural, and political factors (Smit and Wandel, 2006).

Füssel (2010) makes reference to the definition of climate vulnerability among others to the work of Adger (1999), Kelly and Adger (2000), Brooks (2003), O'Brien et al (2004), Füssel (2007), and O'Biren et al (2007). As it concerns to the determinants of vulnerability Füssel (2010) suggests among others Chambers' (2009), Sánchez-Rodriguez' (2002), and Pielke Sr. and Guenni's (2003) "internal and external" arguments for dimensions of vulnerability, and Brook's (2003) and Füssel's (2007) "biophysical and social" knowledge domains of vulnerability. The various interpretations of vulnerability (and its determinants) differ in their conceptual framework, rankings of (groups) systems or regions, and in the strategies to reduce vulnerability (Füssel, 2010). If on one hand Füssel (2010) sustains that the integration of vulnerability assessments from different schools add to the current confusion in the conceptualization and vulnerability terminology, on the other hand Adger (2006) portrays such integration (diversity) not as weakness but as "strength and sign of vitality in the vulnerability" scholarship. In his review of the various vulnerability schools Adger (2006) sustains that while these research "traditions" hold different approaches analysis, they advance cohesive arguments as it concerns environmental change. These research traditions maintain that vulnerability is socially constructed since accessibility to resources is determined by political economies and power distribution, and that vulnerability is generally factored by the exposure and sensitivity of groups and systems and their capacity to adapt to stress (Adger, 2006). The author points that it is noteworthy that both the studies of vulnerability created from lack of entitlements and the vulnerability to

natural hazards are the propulsion for the current vulnerability research.

## 3. CONCEPTUAL FRAMEWORK

### 3.1 Multisectoral Approaches: Shifting from Biophysical to Social Processes

The increase of the incidence of and frequency of climate (natural) disasters in the past decades has brought climate variability and change to the attention of policy-makers and the media, yet such acknowledgement may be an opportunity for policy-makers to neglect the relevance of adaptation policies to address natural hazard (Handmer, 2003). The author sustains that the increased impact and losses from natural disasters, faced by the more vulnerable groups, more often has to do with non-climatic factors like social-economic and political factors that inhibit the vulnerability and adaptative capacity of human systems. These factors include world population, urbanization, disruptive socio-economic trends, globalization, and environmental degradation, cluster of poverty, and wars or civil unrest. Thus, instead of focusing on the risk (the overall problem including climate) that individuals and communities might experience, and to whom and where losses are felt, the author suggests that adaptation policies should focus in the causes leading to vulnerability to climate (Handmer, 2003). The author suggests that in this case a multisectoral generic approach to hazard research would be more effective for those at risk than the specific approach, yet in certain circumstances a specific measure or the combination of both generic and specific measures may apply. The effectiveness of the multisectoral approach is explained by the fact that it addresses multiple goals, covers many areas and so promotes adaptative capacity, and by default it possibly will increase resilience to all climate hazards through the improvement of buildings and infrastructure, planning, and by easier access to resources when disaster hits (Handmer, 2003).

The disproportional vulnerability among impacted groups based on social-economic factors and the use of multisectoral approaches to increase adaptative capacity, and so to decrease the vulnerability of impacted groups, is also pertinent in Moench's (2007) work. The author makes reference to case studies from U.S., Netherlands, Pakistan, India and Nepal when arguing that systemic factors inhibit adaptative capacity and increase vulnerabilities, and so adaptation measures or public interventions should be founded in a common approach that integrate adaptation and reduction of disaster risk. Here, the author refers to Winer's et al (2004) concept of disaster vulnerability framed with the pressure and release approach, and suggests that it focuses on the connection between the progression of vulnerability, disaster and hazard, in which the progression of vulnerability is associated to its "*root causes, dynamic pressures, and unsafe conditions*". The systemic factors observed in Moench's (2007) study can relate to the human health vulnerability caused by systemic factors concerning the individual and group inaccessibility to public services and urban infrastructure. A case in point, the inefficiency of the public system (urban management), and/or the lack of accessibility of individuals and groups to public services, infrastructure, sanitation and health services on a regular basis (systemically) is a non-climatic uncertainty that impacts human health (Balk et al, 2010). This is aggravated with the impact of climate variability, which increases individual and group vulnerability to extreme events and their capacity to cope or adapt to climate change; under these conditions individual and groups are double-exposed to risk and to the impact of hazard (Handmer, 2003; O'Brien and Leichenko, 2000; Blaikie et al, 1994). The author's argument is framed with the pressure and release approach to adaptation studies.

### 3.2 MAINSTREAMING ADAPTATION POLICIES THROUGH DEVELOPMENTAL INITIATIVES

The prospect of high costs to implement adaptation measures is drawing the attention of policymakers to the urgency of addressing climate change adversities through anticipatory adaptation (UNFCC, 2007) measures mainstreamed in existing projects, planning and development programs, which requires decision-makers' increase awareness of the prospective adversities caused by climate change before mainstreaming such issues in their actions (Huq and Reid (2004). The literature that supports mainstreaming points out that the link between climate change adaptation and development is observed at the local through the sectoral, national, regional and global levels, and that it takes place in both more advanced economies and the developing countries. Smit and Wandel (2006) cite Huq and Burton (2003), Huq et al (2003), Huq and Reid (2004) and point out that generally the adaptation measures to reduce vulnerability are not stand-alone initiatives, instead they mainstreamed with and are incrementally implemented to adjust existing water or risk management and other developmental strategies. Whether explicit or not the adaptation processes are greatly discussed in the risk and resource management, community development, planning, and sustainable development fields (Smit and Wandel, 2006). The success of adaptation policies

is conditioned to their comprehensiveness when addressing the determinants of vulnerability, which Schipper (2007) states to be the role of development policies. Te former leads to the understanding that adaptation initiatives are inherent to development policies (Burton, 2004; UN Habitat, 2011; ICLEI, 2013, Schipper, 2007) since they can address simultaneously social-economic and environmental vulnerabilities.

A mainstreaming situation is observed in Moench's (2007) arguments for the integration of risk reduction and climate change adaptation. The author suggests that adaptation policy may entail incremental change, or a robust change that generally takes place in the aftermath of the disruption of regional infrastructures. The author puts forward that the aftermath of the disruption caused by the Hurricane Katrina (US) created a "window of opportunity" for the implementation of long term adaptation measures to minimize risks via reconstruction action (s). The responses to disaster risk requires not only an interdisciplinary approach but a cross-sectoral approach as well since they will engage public, private and no-profit organizations linked to land-use and planning, and education, for instance (Moench, 2007). In a move from adaptation and disaster risk theory to action Moench (2007) considered a local-context that holds a pluralistic setting of representation, and developed a systematic course of actions that includes scoping, building common understanding, and structural review of potential strategies and, when applicable, include financial evaluations. In that context the author suggests that this set of actions may support the argument for integration of climate change measures (policies) with sustainable development strategies, yet generally mainstreaming adaptation policy through development programs tend to be incremental. However, development contexts are a primary window of opportunity since they allow the identification and analysis of and long-term solutions for problems, if they advance planning it will be an "entry point" to implement more robust change (Moench, 2007).

The adaptation scholarship cited in this section points to the relevance of development contexts, and the propensity of and the benefits from mainstreaming adaptation measures through developmental initiatives. Framed with a similar perspective the following section advances the arguments for community-based vulnerability approaches, with emphasis on the "practical adaptation" approach sustained by Smit and Wandel (2006). In the section I pursue a preliminary analysis of the land-use assessment developed by the participants of the participatory planning process I am investigating. The purpose is to understand the vulnerability element intrinsic in their land-use assessment, and if so how that took place.

## 3.3 PARTICIPATORY VULNERABILITY ASSESSMENT AND THE VALUE OF INDIGENOUS KNOWLEDGE

***"We (...) must never provide the people with programs which have little or nothing to do with their own preoccupation, doubts, hopes, and fears." (Paulo Freire, in "Pedagogy of the Oppressed", cited by Jarraud et al (2012)***

Climate (and non-climatic) adaptation and vulnerability are "context-specific", and so the various determinants (drivers) of exposure, sensitivity, and adaptative capacity of communities to adapt or cope, when living in risk and facing hazard impact are "community-specific" (Smit and Wandel, 2006; Adger, 2006; Handmer, 2003). Very often government sponsored generic or specific approaches do not improve local adaptative capacity, or so the resilience of impacted communities, because of existing socio-economic and cultural power structures based upon hierarchies, gender, and others (Handmer, 2003). The community-based approach is the most desirable and effective of the approaches because it is where the groups at risk are (Handmer, 2003) and the more recent vulnerabilities are for the advancement of risk assessments (Huq and Reid, 2004). It is about decision-making and deliberation processes, social change, and human and natural resources. The authors introduce the Australian Landcare Programme, which engages 5,000 groups of local land owners and sympathizers in processes which locals identify land-use issues and related problems, and create and decide for the more appropriated solutions for the problems they are facing.

Smith and Wandel (2006) points to the limited adaptation research that center their investigation in the process of implementation of adaptation, and argue for practical adaptation whereas the attention is centered on the relevant conditions identified by stakeholders, not through external assumptions. These studies use "bottom-up" scenario-based approaches in which stakeholders make use of experience and knowledge to assess their community's conditions and sensitivities, to develop and decide for strategies to increase the resilience, and therefore, the adaptative capacity of their community. The authors sustain that practical adaptation studies are community-base studies that focus on documenting the knowledge building of community members and decision-making processes, which examine local adaptative capacity and the capacity needs of the community with the purpose of recognizing ways to implement adaptation measures and improve the adaptative capacity of the community.

Case studies showcasing participatory research programs used worldwide indicate positive

outcomes resulting from its application yet they are not necessarily proved because of the difficulty to quantify qualitative data (IPCC A4). They can be costly, lengthy, and enforce existing socio-economic and structures and power groups (Selener, 1997; Stringer, 2997; IPCC A4), yet they can create networks and improve dialogues, accessibility to climate change information and communications among impacted groups, stakeholders and decision makers (IPCC AR4; IPCC cites Toth and Hizsnyik, 2005; Bizikova et al, 2010; Jarraud et al, 2012; Boon et al, 2012). On the other hand a second group of researchers argue that community participation may be limited to research at a local level, that (generally) the communities do not truly participate in decision-making because they lack technical skills to understand and to engage in a science based dialogue, and because of the difficulty that communities have in connecting local to regional and global climate change (IPCC AR4). Thus, these researchers question if community participation truly ever takes place.

A counter-argument to the former can be made on the basis of Smit and Wandel's (2006) argument that through participatory vulnerability assessments the stakeholders are able to identify the social-ecological determinants of (individual and) their community's vulnerabilities, and that the stakeholders identify the co-relations between sources of exposure, sensitivities and their adaptative capacity over subsequent climate events. The authors also suggest that the impacted stakeholders identify the sources (and cross-sectoral nature) of their "exposures, sensitivities, and adaptative capacities function across-scales – from individual to national (and global). When using this approach the community is the subject of interest, and the facilitators apply (ethnographic) methodology while using semi-structured interviews, participant integration and focus groups. The approach entails the assessment of existing exposure, sensitivity and adaptative capacity by the community. In a subsequent step they integrate the findings of their assessment with information originated from scientific sources, policy analysts, and decision-makers to identify future exposures, sensitivities, and adaptative capacity to determine future vulnerabilities. In the final step policy-makers and public agencies will seek for opportunities to reduce future vulnerabilities.

## 4. BUILDING A CONCEPTUAL FRAMEWORK FOR MAINSTREAMING CLIMATE CHANGE ADAPTATION

I have been through an evolving analytical process since the earlier stages of my research endeavor, from the conceptualization and definition of my research purposed through the bibliographic search, elaboration of the research questions (s), and the research design. This process continued through the interviews and transcriptions. While being through this analytical phase, and aware that it need further investigation with deeper analysis of the interviews, in this section I will make use of few pilot findings from the responses to interviews done with a purposely selected number of responders that participated in the program City for Us as community work group (GTC) members. In this section I bring insights drawn from both the pilot findings, and the conceptual framework presented in the earlier sections, concurrently with the introduction of the program City for Us. My purpose it to provide the reader of this article with a sense of how I will proceed methodologically to develop a conceptual framework for mainstreaming climate change adaptation in developmental initiatives, in the context of master plans revision.

### 4.1 THE PROGRAM CITY FOR US

The Brazilian federal law Estatuto da Cidade (Statute of the City) enacted in 2001 set the parameters for urban development policies nationwide. Its guiding principle concerns the social function of the city, to be carried by the master plans, and whereas the urban land shall serve the collective interest. These policies have been implemented through various urban program initiatives led by the National Secretary for Urban Programs, under the Ministry of Cities. One of these programs is the program Plano Diretor Participativo – Cidade para Todos – PDP (Democratic Master Plan), that was implemented nationwide through state-led initiatives. A case in point is the state-led program Cidade pra Gente (City for Us). The program was under the leadership of the Secretaria das Cidade de Goiás (Secretary of Cities of Goiás State), which was responsible for the advancement of the state's regional and urban development policies that aim to strengthen the cities' management and administration, and their integration and cooperation with the state. The program sought to strengthen city management and administration state wide through the development, revision, or assessment of master plans. These master plans advanced local urban development policies. The program ran from 2005-2008, and at a certain point it engaged approximately 1,100 stakeholders from 88 municipalities in the development of the master plans for the cities they represented in the program. Funding and institutional support were provided in different ways by the federal, state, and municipal branches of government associated to the program City for Us , yet the role of the Secretaria das Cidade de Goiás was determinant for the success of the program.

The program was implemented through participatory planning methodology, founded in

a process of capacity building and integration of a range of stakeholders including local public managers and administrators, community leaders, and professionals from the fields of geography, pedagogy, health, education, and architecture, to name a few. It is worth mentioning that urban planning in Brazil is a concentration study offered under architecture or geography programs, and so the architects and geographers are the professionals in the urban planning field. The fact that planning is not an independent field of study, and that the Statute of the City was the first national urban development policy setting the parameters for land-use practices advanced via local master plans, may help one to understand the relevance and implications of such national policy and the state-led participatory programs such as the City for US., at all levels including the cultural shift and perspectives of layperson, public administrators, professionals, and academics as it concerns urban development and planning. I understand that this paradigm shift is what Moench (2007) suggests as the "window of opportunity". The author maintains that development contexts are a primary "windows of opportunity" since they allow the identification, analysis, and long-term solutions for problems; if they advance planning it will be an "entry point" to implement more robust change.

I used semi-structured interviews, which I would initiate asking the respondents to share with me any aspect of their experience as a participant of the participatory planning process. New questions were based on the answers from the preceding questions. Their answers pointed to the learning experience as it concerned the urban planning subject, and their learning process. The concepts of master plan and participatory planning were generally new terrain for both the GTC's members, and to certain extent for many of the City for Us coordinators which was composed by college graduates in different fields. It is noteworthy the general comments from the program coordination illustrated how little they knew, and how much they learned from the GTC's about the cities of their state. For example, how to exam the dynamics of their city, and which aspects of the city to consider when elaborating master plans; the "pedagogic" element inherent in the participatory process, their motivation and mobilization, were values conveyed in their first answer. With that said, I am not suggesting that this was the general tendency throughout the interviews. In fact, the tone would vary depending on the respondent's experience of the subject of the question, and on the phase in the program implementation it was related to. Those were noticeable "red flags" that I investigated as well. Much of that, which was not an underlying element in their responses, had to do with power structures, self-serving individuals within the GTC's, and mistrust. However, from my perspective, much can be learned from those observations about community-based adaptation processes, and "practical adaptation" (Smit and Wandel, 2006).

The cities participating in the program were represented by community workgroups (GTC's) enacted thru municipal decrees. The number of members constituting a GTC was determined by the size of the city's population, and it consisted of at least seven stakeholders including two representatives from the executive branch, one from the legislative branch, one city council, one leader from each urban and rural community, and a high school student. The heterogeneity between and within groups concerns variables such as one's role in the implementation of the program City for Us, gender, levels of education, household income, political affiliations, life experience in or outside of the metropolitan region, urban or rural dwellers, and one's exposure to risk and hazardous impact caused by socio-economic uncertainties, political constraints, and vulnerability to climate variability and change. In spite of the participatory framework of the planning process there was an implicit hierarchy within and between the participant groups. That concerns the decision making power associated to one's accessibility to information and technology, representation within the local, state and federal spheres of the public administration, and leaderships within the community represented in the program.

The aim of the program City for Us was to have the GTC's producing the master plans for the cities they represented by the end of the program, which was accomplished in three evolving steps. The first consisted of an assessment of existing urban and rural land-use practices within their municipalities. Based on those results they characterized the various land-uses of both urban and rural areas, defined the urban perimeter, and determined the master plan' guiding principles, visions and goals (elements), key strategies, and directions. In the third step the GTC's wrote their master plans and submitted the document for the city councils, which was eventually enacted into municipal law. The master plan's guiding principles were generally underlined with principles of sustainability, the social function of the city, and equity. However, how fully these policies are actually implemented, once the master plan was enacted as the law of the land, remains to be seen. I observed and documented in my interviews the generalized bittersweetness of respondents toward the end of the planning process, and most of all with the perceptions of cynicism about the ultimate ability to have the executive and legislative government branches abide by the master plan. A couple of respondents pointed to the lack of specific legislation (ordinance),

which was a limitation for the enforcement of key elements of their master plans. They shared with me that local administrators, developers, and farmers might take advantage of these and other loop holes in the plan.

## 5. PLAUSIBLE LAND-USE PRACTICES LEAD TO RISK REDUCTION

This paper investigates the community-based state-led program Cidade pra Gente (City for Us), that took place in the state of Goiás, Brazil. I discuss the vulnerability debate intrinsic in participatory planning processes, in which the program's participants developed master plans for the cities they represented in the program. The program was implemented in three phases. For research purposes I focused my investigation on the first of the three phases, in which the participants advanced land-use assessments through a participatory mapping process. The program participants were grouped in "community work groups" (GTC's), and each group worked with the city they represented in the program. Under the guidance and technical support of federal, state, and municipal agencies and planning professionals, the program participants assessed the problems and potentialities of their municipalities (participatory mapping). The GTC's compiled data of all kinds and from all sources, they mapped their cities' current urban and rural infrastructure, social services, city governance and budget, urban and rural risk areas with propensity to cause hazard to individuals and groups, and to be avoided for specific land-use practices, and local economic strength and potentiality. The GTC's discussed their institutional, social, economic, environmental and cultural weaknesses and potentialities with their team players, and other GTC's in the 2-days monthly workshops held in the state capital. They assessed the necessary conditions for the implementation of these potentialities whereas if within a short, median, and or long term, and the social-economic and environmental impact of these implementations. The GTC's identified, quantified and prioritized their cities' many problems and potentialities, and systematized and encapsulated their findings in final reports, from which copies were handed to the executive and legislative bodies of their respective cities.

In the course of the discussion aspects of the root causes and sources of the problems they face in their cities, to these conditions, emerge in their discussions. However, these problems are not linked to climate change in a manner that gives participants an awareness of the facts and implications, and the relevance and urgency to address climate change. Burton's (2004) argument for mainstreaming adaptation measures in developmental initiatives suggests that because of the urgency to address climate change, the many uncertainties associated to climate change models and scenarios, and the fact that climate change adaptation measures are embedded in the development policies, the adaptation policies should be applied in two phases. The author sees climate change adaptation as process in which phase one sets the basis for the advancement of a more climate change oriented agenda to be carried through the second phase. Both phases identify the exposure of human and natural systems to risk, their vulnerability to hazard impacts, and advance adaptation measures. However, in phase one the adaptation schemes are mainstreamed into development and land-use policies to address more immediate risks. That sets the basis for the advancement of a more climate change oriented agenda to be carried through the second phase.

Mainstreaming climate change adaptation in two phases appears to be the propensity of the respondents of the interviews done earlier in my investigation. At certain point in my interviews, while investigating the relevance of the knowledge built as outcome of their participation in the land-use assessment advanced in the program City for Us, I inquired the respondents who participated in the GTC's about the significance of addressing climate change adaptation in the revision of the master plans they developed through the program City for Us; if so how that should be incorporate in the revision of their master plan. Their responses felt in a continuum between placing climate change adaptation either as a guiding principle or having it underlining all existing guiding principles. Although it needs further analysis, while framing the program City for Us with Smit and Wandel's (2006) concept of "practical adaptation", their answers lead me to contemplate the many benefits of community-based vulnerability assessments to non-climate and climate change adaptation.

My investigation has an instrumental use, which means that even prior to data collection the investigator has intention to utilize the findings as applicable knowledge. The findings from this investigation can be used in methodological frameworks when developing or revising master plans, development policies, and capacity building initiatives engaging policy makers, city managers and planning professionals, community leaders and the general public to communicate and advance the climate change dialogue. In light of the purpose and the process experienced by the GTC's, which culminated with the elaboration of the assessment reports of the problems and potentialities of their cities, and the reports themselves, in a planning revision process when re-accessing the root causes and sources, or underling vulnerability, the participants will be

introduced to a structure to examine and discuss this vulnerability through the lens of climate change impacting their cities.

As it concerns to the current state and process, vulnerability is linked with assessment because as risk and problem areas are identified and discussed, there are natural insights that emerge that relate to climate change vulnerability due to current developmental social policies. A desired state and process would entail the re-assessment of risk as function of climate change with broader analysis of how risk elements emerged because of vulnerability factors. That gives the opportunity to fully raise, examine, and enhance vulnerability to climate change adaptation. Otherwise, the focus is an objective observation response to issues with climate variability, without a comprehensive analysis and plan.

## 6. CONCLUSION

In this paper I began with an overview of adaptation and vulnerability, and the implications of the diversified definitions in the climate literature. I shared the evolution of my own approach to the conceptual framework to support my arguments, leading to a focus on the multisectorial framework while changing the focus of vulnerability and risk assessment from the risk itself to the causes leading to it – it is about social vulnerability. It was a focus shift from biophysical to social vulnerability, with attention toward context and processes in which adaptation actions are implemented – it is about practical adaptation. I introduced the program City for Us, and my observations of the outcome of the "window of opportunity" momentum and the community-based adaptation process experienced by the participants, as derived from my interviews with participants and reflection on their experiences through the lens of my own insights and on the understanding of "mainstreaming" adaptation policies in developmental initiatives.

Brazilian cities are facing a unique intersection as they prepare for federally required updates and revisions to their urban master plans, at a time when they are facing increased impact of climate change and its associated risk. Those participating in this process will grapple with these realities. If the past, initial planning process is predictive, areas of risk will be discussion points; inherent vulnerabilities will emerge as part of that analysis. I have concluded that an optimal approach to comprehensive review of planning issues vis a vis climate change adaptability will use a multisectorial approach. This approach best positions an analysis that focuses beyond the immediate and obvious impact of climate change threats, and allows for a deliberate full scale examination of underlying social, economic, political and public policy issues that support and exacerbate vulnerability of these cities.

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