

INTEGRATING URBAN AGRICULTURE IN TEGUCIGALPA TO ADDRESS THE URBAN ENVIRONMENT



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Andrea Oyuela
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ABSTRACT

Emerging urban development challenges of the last decades, particularly in the Global South, have led this research into exploring an alternative solution for responding to the continuous social, economic, and environmental concerns of cities. Furthermore, recent planning discourses aim at the improvement of the urban environment through sustainability concepts, even though the path to sustainability remains unclear. Focusing on the city of Tegucigalpa, in Honduras, this research attempts at understanding a medium to shift to more sustainable development, as well as transitioning the planning system from its current top-down approach into a more adaptive scheme that evolves alongside the city. In order to impulse this process, the topic of Urban and Peri-urban Agriculture (UPA) has presented itself as a practice that is characterized by a bottom-up development framework and as tool for urban environmental management. Based on a literature review, interviews with stakeholders, and observations, the setting of UPA and urban development in Tegucigalpa is displayed throughout the research. Even though a food movement is still absent from the scene, citizen empowerment is already emerging as the needs of the population drive them to come out of under-development. Likewise, 'top-downers' are investing in urban interventions and collaboration for improving the conditions of a city that is dominated by social disparity, urban violence, and environmental degradation. This study highlights lessons to be learned from past experiences, in order to identify windows of opportunity for the improvement of existing UPA initiatives and its integration into planning towards a more collaborative form of spatial production.

Keywords: sustainable development, urban and peri-urban agriculture, bottom-up development, empowerment, & collaboration

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SUMMARY

Global changes of the last century on social and economical aspects have produced the phenomenon labeled as the 'urban explosion', which has particularly affected cities of the Global South. The capital of Honduras, Tegucigalpa, is also part of the rapid urbanization process. From the 1950's decade onwards, the Honduran metropolis has increased its population to 1.2 million inhabitants due to a continuous rural-urban migration, driven by the people's needs for better employment opportunities and the promise of an improved quality of life in urban areas. However, the city's planning system has not been able to cope with the increasing demands, resulting in the urbanization of poverty conditions in the area.

Today, an estimated half of the population lives in vulnerable settlements, with limited access to basic services and exposed to risk from natural hazards. Moreover, the city is an urban area characterized by social inequality and a predominant informal economy guided by the urban poor, adding to issues such as health, mobility, education, insecurity, and environmental degradation. Under this context, Tegucigalpa's future is dependent on a shift towards more sustainable development, although the planning scene has not presented the conditions for this scenario as it continues to be framed by inflexible top-down approaches that do not respond to the changing urban conditions.

The theme of urban and peri-urban agriculture (UPA) comes into this setting with its characterization in the literature as a medium that aids the transition into more collaborative forms of city making in cases across the Globe. Still, uncertainty remains whether it might represent a solution to the urban problematic in Tegucigalpa, since its possibilities have not yet been reviewed for this context. Hence, the study aims at exploring the potential of UPA's application in Tegucigalpa, as a contributor for progressing into a collaborative planning system, while working under sustainability principles.

In order to achieve the academic objectives, a qualitative approach was applied in the research process. A literature review, interviews, and site visits took place for the production of information related to UPA and urban development. To illustrate the UPA movement in the city, five formal case studies were further studied, along with a small set of findings regarding informal practices. With the analysis, identification of the opportunities for integration of UPA, its effects, and the limitations of its implementation in Tegucigalpa was exercised to understand the potential of the practice.

Research findings demonstrate how UPA in Tegucigalpa is a mechanism for the most vulnerable groups to improve their household and community conditions. The major contributions of UPA are observed in the people's nutritional intake, skill-building, financial savings, and social cohesion, among others. Likewise, UPA is a medium for the development of human capital with the training of target groups, an action that will benefit the city's society on the long-term. On the other hand, there is willingness from 'top-downers' to support such programs, even though this has generated a level of dependence to their resources.

Yet, there is limited availability of resources and inputs in the area, and under poor conditions, for the application of UPA projects. Moreover, knowledge and diffusion of UPA practices has presented itself as the most critical foundation for the development of a food movement that remains doubtful in the capital's setting. Therefore, planners and developers of Tegucigalpa might face the challenge of managing such aspects, taking into consideration that UPA's social assets could compensate for the unfavorable access to resources in the city and would serve for the empowerment of the urban population.

1. INTRODUCTION

1.1. Background

In today's globalized world, urban population continues to increase with an approximate 54% of the world's total population now living in urban areas, and it is expected to rise over the following years (UN, 2014). Historically, the acceleration of this process has been associated to economic and social transformations of the 19th and 20th centuries that led people in rural areas to migrate to the cities (Cálix, 2008; UN, 2014). Furthermore, despite the advantages cities possess, they continue to be places of social inequality and environmental degradation. Therefore, as cities are centers of opportunities as well as challenges, good planning and urbanization are needed in order to support sustainable development and improve the livelihoods of city-dwellers in the future (UN, 2014).

Urban planning is the tool that shapes the built environment and the surroundings of cities to prevent and solve the problems presented by urbanization (Campbell, 1996). As the Global North has evolved its views of planning in order to adapt to today's urban issues, developing countries continue to be characterized by blueprint approaches that are unable to respond to the rapidly changing conditions of urban areas (Mubvami et al., 2006). However, the need to evolve into a different planning scheme has recently presented itself in the Global South, as it now becomes part of the bottom-up development trend that has grown in the developed world over the last decades (Satterthwaite, 2003).

One common medium that aided the transition into more collaborative forms of city making has been urban and peri-urban agriculture (UPA), as it is a practice that attends to urban societal issues such as household economics, health and urban environment, among others (Bryld, 2003; Wekerle, 2004). In addition, city gardening has proven in most cases to become a tool for citizen empowerment by the share of responsibilities between top-down actors and the public when it comes to urban development, as citizens work to resolve the ills of their own communities when the authorities are not able to respond. Thus, UPA may serve as a starting point to engage the problems of modern urban society and for developing countries to come out of under-development (Bryld, 2003; FAO, 2014; Mubvami et al., 2006).

However, as UPA is a context-specific practice for its progress and outcomes, models and practices need to be created or adapted to the economic, social, and political circumstances each setting presents (Bryld, 2003). Hence, this research analyzes the conditions for the development of UPA and the possible effects it may have over urban planning across a specific city by identifying and studying local gardening initiatives and their characteristics.

1.2. Problem description

The city of Tegucigalpa, Honduras, has been a product of modern changes and its consequent urbanization process since the 1950's decade, as the country's economic ideologies were switching from agricultural to industrial activities and the State became the highest employer and supporter of internal migration (Martín, 2010). Under such productivity principles, the urban planning system for the capital was generated; encouraging the development of a city based on blueprint-Northern models of urban development (Angel et al., 2004; Cálix, 2008). The management of migration flows became one of the greatest concerns for the city's planners and decision-makers. However, the inflexibility of the planning system at the time failed to adapt to the city's new population and their increasing needs, leading to a series of poverty strips that now encircle the central city (FAO, 2014; Martín, 2010).

Nowadays, the city is an urban area characterized by social inequality and that continues to be driven by market forces and an informal economy of the urban poor. The expansion of vulnerable areas and their increasing population have led to problems such as housing, provision of public services, land ownership, public health, communication, environmental management, violence, and food provision, among others. Furthermore, the constant demand for natural resources guides the city's expansion along major transportation routes and natural corridors, endangering with a period of resources deprivation in the future.

Tegucigalpa's future development is highly dependent on a sustainable-planned development. Nevertheless, the current planning system has not presented the conditions for this scenario and it is not capable of answering and managing the complex web of urban problems in the city through its model of conventional top-down planning practices. Hence, a rupture of the current system is necessary in order to transition into more innovative and collaborative approaches of urban development, which can adjust to the changing urban issues and promote sustainability of the area and its citizens.

1.3. Problem statement

Tegucigalpa's planning system needs to transition to a more adaptive scheme that is able to cope with the evolving needs of the city's population, and working towards promoting sustainable development. When it comes to UPA, uncertainty remains whether it might represent a solution to these issues since its potential has not yet been fully studied for Tegucigalpa's planning system.

1.4. Research objective

The guiding aim of this research is to explore the potential of UPA's application in Tegucigalpa, as a contributor for transitioning the city's current planning approach into a more adaptive and collaborative system that works under sustainability principles. Furthermore, this study aims to identify a window of opportunity for the integration and improvement of UPA practices within the city.

1.5. Research questions

This research develops on the idea that Tegucigalpa's planning system needs to be shifted towards other views, and that UPA may become an effective tool that will aid this transition. Considering this and the issue of a city planning system not properly defined, it is important to first understand its structure and its goals throughout its development over the last decades. Furthermore, there are few links between UPA practices and urban planning in Tegucigalpa, which takes the research to focus on this particular issue in order to find the meeting point between these two main topics. Therefore, in order to reach the study's goal, the following research questions must be answered:

1. What is the current position of the planning system in the municipality of the Distrito Central?
 - a. Where does the planning system stand, and what are its goals for the city's development?
 - b. How has the city's planning scene evolved over the last decades?
 - c. Who participates in Tegucigalpa's planning system?
2. How can UPA be applied in the city of Tegucigalpa to address spatial planning issues?
 - a. Where and by whom can UPA be practiced in the city of Tegucigalpa?
 - b. What are possible applications of UPA for addressing urban issues?

- c. What social and administrative context is needed for practicing UPA in Tegucigalpa?
 - d. How could UPA be integrated into local planning schemes?
- 3. What are the social and urban environmental effects of UPA's application in the city of Tegucigalpa?
 - a. What benefits may be derived from UPA practices onto the city and its residents?
 - b. What obstacles should planners and developers expect in the application of UPA in Tegucigalpa?

1.6. Thesis outline

Chapter Two of this report provides with an academic review on urbanization, sustainable urban development, collaborative and participative planning approaches, and the progress of UPA in the region of Latin America, in order to clarify concepts and set the context for the two main topics of urban planning and UPA in this research.

Chapter Three gives insights for the research with a brief recap of Tegucigalpa's development throughout the years, its general planning scheme, and predictions for the future city, in order to set the context and illustrate the background of UPA in Tegucigalpa.

Chapter Four describes the type of research executed and its methodology, the type of fieldwork done, and the limitations throughout the research.

Chapter Five provides with the UPA practices that are already taking place within the urban area, alongside a discussion of these case studies to answer the research questions and identify characteristics, valuable lessons, impacts, limitations and opportunities of each experience.

Chapter Six is the concluding section which outlines the study's findings and gives recommendations for further research on the main topics of UPA and urban development of Tegucigalpa.

2. THEORETICAL FRAMEWORK

2.1. An urban explosion

The world's urbanization process seems to continue; for the first time in history, the global number of urban residents matched the number of people living in rural areas by the year 2008 (UNFPA, 2007). Many factors affect this shift in population growth, seeing that urbanization is not just longer a process of rural-urban migration, but it is now composed of town transformation – conurbations – and the cities' own population growth as well (Beall & Fox, 2007). It is expected that this trend will linger as long as urban-based investment is the main driver and fewer economic opportunities are present in rural areas (Lankao, 2007).

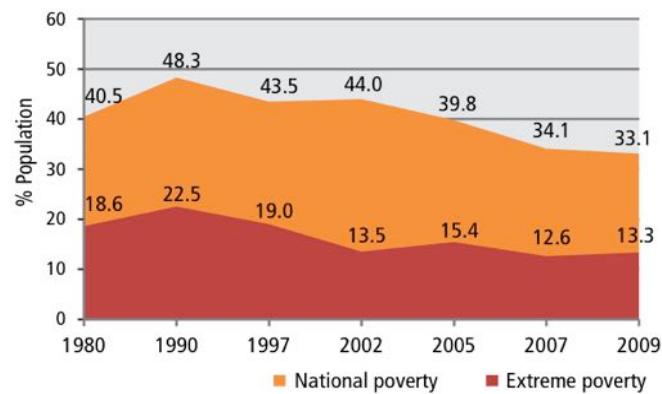
Cities are places of opportunity, where urban dwellers have access to more diversified labor markets and better livelihoods. Additionally, services, health care and education can be provided to large populations in a cheaper and more efficient manner in urban areas than in rural settlements (UN, 2014). In spite of these advantages, cities are now the sources of the “urbanization of poverty” phenomenon: as urban population grows so do the urban poor, due to the gradual shift in poverty from rural to urban areas (De Zeeuw et al., 2011; Satterthwaite, 2003).

Additionally, the world's urbanization process is mostly driven by the growth of the Global South, though there are dramatic differences in the rates across regions (Beall & Fox, 2007; UN, 2014). Within this context, Latin America and the Caribbean (LAC) is considered one of the most urbanized regions in the world, characterized by largely populated and extensive cities such as Buenos Aires and Mexico City, which now account for 80% of its total population living in urban areas (FAO, 2014). Also, an important trait of the region is the fact that its rapid growth occurred in less than 40 years, from 1950 to 1990, producing the expansion labeled as the “urban explosion”; consequently becoming a decisive stage for today's living conditions and the configuration of urban areas (UN-Habitat, 2012: 1).

It is forecasted that urbanization is consolidated throughout the LAC region, and a deceleration of the urban growth rate will occur since now the population grows at a slower pace. This is leading to a population structure where the majority of people are in their working age, placing troubled areas in a favorable situation for coming out of under-development (FAO, 2014; UN-Habitat, 2012: 1). Thus, due to their extension and labor force potential, urban centers have been positioning themselves as regional nodes, in order to obtain the economic and political benefits generated by globalization (Ossenbrügge, 2003).

Despite these opportunities and a regional economic growth in recent decades, LAC has not been successful on reducing social disparity gaps, as illustrated in **Figure 1**. Large segments of the population are trapped in a cyclical situation of poverty and inequality caused by factors such as the poor levels of education, failing or absent social protection systems, unemployment, inter-generational transmission, and the size of poor households (UN-Habitat, 2012: 2). Consequently, this population has been forced to survive on the informal sector of the economy, which now accounts for 51% of all non-agricultural employment in LAC (Beall & Fox, 2007).

Latin America and the Caribbean. Evolution of poverty and extreme poverty, 1980-2009



Source: Compiled with data from ECLAC (2010a).

Figure 1. Evolution of poverty and extreme poverty in LAC, 1980-2009.
Source: UN-Habitat (2012).

Spatially, urban areas are no longer developed according to a concentric model, but as districts or “urban patches” of diverse and polycentric zones, where one predominant land use and economic activity is the driver for development. Therefore, these cities do not longer follow a typical pattern and diffuse themselves into unplanned and confusing urban fabrics over large extensions of land (Ossenbrügge, 2003). Furthermore, social inequality is expressed in the layout of cities as the poorest population is forced to live in slums and physically vulnerable areas because of their economic conditions, adding up to 110 million people in 2010 (FAO, 2014). Hence, living in such areas reduces opportunities for upward social mobility, while increasing the risks of exposure to urban violence, health risks, and natural disasters (UN-Habitat, 2012: 2-3).

As can be seen, cities in LAC are not only affected by internal factors, but also by international activities for globalization and the opening of markets, contributing to a complex development scheme and the acceleration of urban growth (Ossenbrügge, 2003). Considering urban areas are the main centers of wealth generation, they seem to be presenting greater disadvantages than benefits for their population as planning fails to keep pace with increasing population and expansion. Consequently, questions are generated on how urban issues of cities in LAC should be addressed and a need to approach more sustainable development arises, as they are no longer able to cope with the needs of the population and the demand for resources.

2.2. Sustainable urban development

“...sustainable development, the current object of planning’s fascination, is a useful model to guide planning practice [?]” (Campbell, 1996).

The concept of sustainable development (SD) appears to provide solutions for urban problems due to the growing awareness of the links between increasing environmental issues, socio-economic concerns of inequality, and the uncertainty of humanity’s future. Although the utopian notion of sustainability gains worldwide popularity, it is important to recall its vulnerability to misinterpretation due to the economic or political position from where the idea is generated. Consequently for this research, the present notion of SD in urban areas will be considered as: *the challenge of promoting a ‘green’ city while simultaneously developing economic growth and advocating a just society* (Campbell, 1996; Hopwood et al., 2005).

The historic tendency has been to promote the growth of cities at the cost of the economy, resulting in a competition between urban areas and the environment for natural resources. Forests have been

cleared, and rivers and the air contaminated so cities could be built. Thus, the consequent labeling of urban problems as “environmental” is confusing, as they are the result of a series of political and economic decisions that impacts the use of natural resources (Satterthwaite, 2003). Furthermore, a third issue has been generally disregarded throughout urban development: social justice, meaning that societal groups in urban areas are in conflict against each other for equity (Campbell, 1996).

Hence, the process of urbanization needs to be guided by the triangle of SD (**Figure 2**): economic improvement and social development, with a fair distribution of the economic growth, while simultaneously protecting the environment (UN, 2014). However, it cannot be easily achieved due to the complex nature of today’s urban problems, which range from local and regional perspectives to a more global scale (Campbell, 1996; Hopwood et al., 2005).

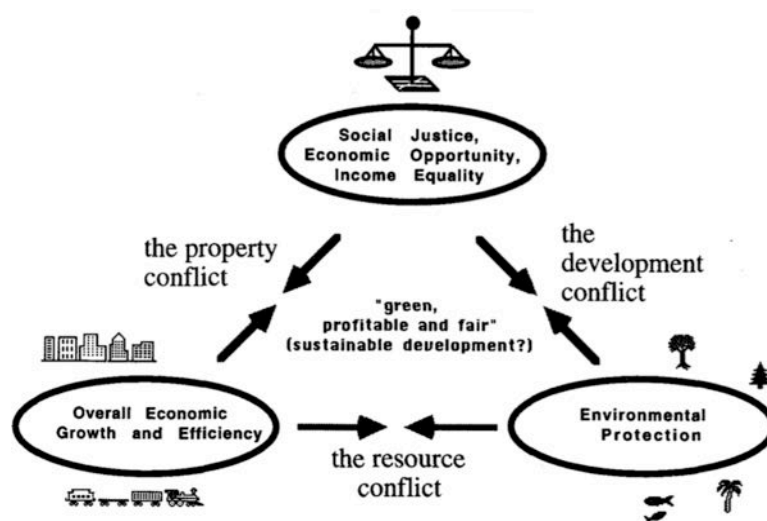


Figure 2. The triangle for the three goals of SD and their associated conflicts.
Source: Campbell (1996).

As the process of urbanization and transformation of society is irreversible, the path to sustainable growth lies ahead and not behind us (Campbell, 1996). It is within the core of the planning system, land use, where a balance for satisfying the needs of the three pillars of SD can be found (Lovell, 2010). As cities grow, they reshape their surroundings, for which land use management is key to protecting and adding value to the environment while responding to the conflicts of the urban poor (Satterthwaite, 2003).

Yet, rapid-unplanned growth threatens SD when policies are not implemented and proper infrastructure is not developed, consequently leading to sprawl, environmental degradation, and unsustainable consumption patterns in many cities around the world (UN, 2014). Ironically, levels of urban poverty in LAC produce lower levels of resource consumption and waste generation as they have less industrial activities and developed urban areas, which along Africa and Asia has helped to constrain global environmental degradation (Lankao, 2007; Satterthwaite, 2003). Once again, this opens an opportunity for developing countries in LAC to come out of their uneasy state.

On the other hand, such positive elements are clouded by the limitations of poorer areas of the cities to become more sustainable, such as the financial resources to switch to more innovative ecological responses. Also, cities in LAC lack the eco-social morality needed in order to adapt their ways of life according to more sustainable principles of development. More pressing issues, such as immediate attending to local health and pollution conflicts, have more weight than dealing with the consequences of modernity and its industrialization process (Lankao, 2007).

Therefore, LAC cities do not present the conditions and should not be bound to follow models of ecological and technological improvement as the Global North. The focus should rather be placed on alternatives that start a SD process through a different pattern of development and industrialization. Instead of pursuing economic and technological change (e.g. correction of the damage through technological means) it should be first about accessing the resources for environmental modernization, promote social inclusion and reduce gaps through local employment, and structure “good” governance systems (Lankao, 2007).

Lastly, due to the diversity of topics that compose spatial planning provided in this section and the linkages between them and urban concerns, a multi-disciplinary approach is needed when it comes to finding solutions for the latter (UN-Habitat, 2012: 3). Even with the general acceptance of SD, planners and developers will not always be able to solve all issues given the limitations, bureaucracy, and political points of view of the practice. Inclusive governance and allegiances with people from all branches are needed in order to generate the intricate web of location-specific and integral interventions that will lead to sustainable urban development (Beall & Fox, 2007; Campbell, 1996).

2.3. Collaborative and participative planning

As provided, contemporary society is rapidly changing and in some cases the planning system is not able to evolve along with it. Thus, the debate on whether conventional rational practice continues to be the ideal form of planning (Allmendinger, 2009). Considering the different actors and dimensions that shape development, it is necessary to move from the ‘fixed’ state of planning into a more interactive process (Healey, 2003).

Collaborative planning is a theory that has evolved since the 1970’s, which encourages consensus building and negotiation between groups for responding to urban issues. In addition, it acknowledges the socio-political diversity of citizens, and even ethnic groups within the area (Innes & Booher, 1999; Mubvami et al., 2006). The notion of active communication sets collaborative methods apart from rationalist theories in its search for more freedom in the planning process (R. Brand & Gaffikin, 2007). Hence, generating the potential to break predetermined positions through the integration of different views, which are provided by dialogue and cooperation (Innes & Booher, 1999).

Furthermore, the theory assumes there is equal distribution of power among the participants in the negotiating process. Such communicative forms of planning encourage people or groups to integrate into society, by allowing them to demand their interests and reconfirm their values and identity (Allmendinger, 2009); this openness allows for attention to be given to smaller issues such as gender, ethnicity, and disabilities (R. Brand & Gaffikin, 2007).

Within this model, the planner is envisioned as a leader and mediator in the practice of reaching consensus instead of imposing blueprint models to the people involved (Mubvami et al., 2006). Agreements are achieved through discussion rather than decision-making through majority rule, with the use of methods where all stakeholders involved are heard and respected, and where solutions aim at mutual gain (Innes & Booher, 1999).

Moreover, collaborative planning is not about the type of participation, but about identifying participants that set the working framework. Hence, when it comes to which stakeholders may be included in participative processes, anyone who is affected or interested in development plans in a given urban area may be considered (Voogd & Woltjer, 1999). The characteristics of such multi-stakeholder process, regarding objectives and participants, are expressed in the following **Figure 3**.

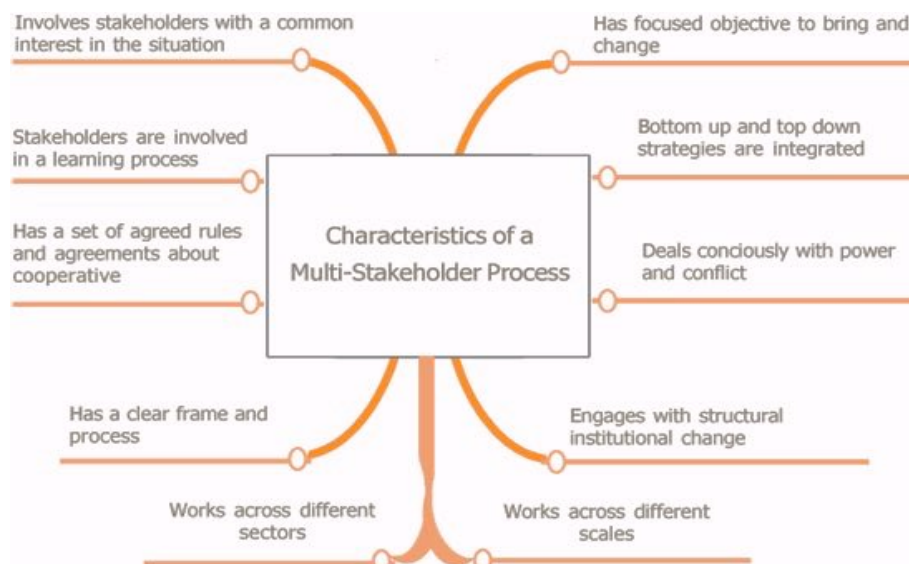


Figure 3. Characteristics of a multi-stakeholder process.
Source: van Veenhuizen (2006).

For the case of LAC as well as in other regions, it is not so much about development projects, but more about partnerships that strengthen local authorities in order to enable them to generate responses for the urban problematic. It is common that local governments are too rooted in politics and their clientele to be effective, becoming a limitation to other types of cooperation between local or broader organizations. For example, when the private sector has to channel funding for local initiatives through the local government, the implementation of projects may be delayed due to the intermediate bureaucracy. And even though the collaborative model does not open the doors for something as valuable as e.g. international cooperation, new channels are forming to support local initiatives more directly and efficiently (Satterthwaite, 2003).

Conclusively, as Healy (1997) suggests, collaborative planning is a “path”, and not the end for spatial development. It is the coming together of multiple stakeholders, their features, a consideration of future generations, and more recent concerns such as the environment. The integration of these components into development schemes is what makes collaborative planning go hand-in-hand with sustainable urban development. Lastly, considering this theory works on a more abstract level, the following section specifies the form of collaborative and participative planning in the practice and the focus of the research.

2.3.1. *Bottom-up development*

Over the last decades, there has been a rise in the number of citizen initiatives throughout the world, particularly within cases of the Global North in cities such as New York and Amsterdam (Miazzo & Kee, 2014). Bottom-up claims of the city and diverse grassroots movements are being translated to the institutional level. The result is that notions of active community and citizen appropriation (or empowerment) have gained worldwide momentum, producing a series of “new” urban politics based around issues of sustainable development and social justice (Stickells, 2011).

A label for these movements is not yet agreed upon, but among the concepts to come across are: “DIY urbanism”, “guerrilla urbanism”, and “tactical urbanism”. Characteristics of these initiatives include their small scale, urban *informality*, and the intended uses of public space as a form of spatial construction or renewal. The activities are usually carried out through techniques of architecture, art, activism, and citizens-institution cooperation; the demands range from topics such

as cycling in the streets, to operating of informal businesses and gardening in the city (Miazzo & Kee, 2014; Stickells, 2011), the latter of which this research focuses on.

In addition, there are two main characters to highlight within these cases. First, the “bottom-uppers”, or the individuals and grassroots groups who organize themselves to initiate the movement. And secondly are the “top-downers”, or the local government, urban developers, and private organizations. The former is originally projected as the *consumer* of the urban environment; in contrast, bottom-up development imagines them as the *co-creators* of an urban intervention (Miazzo & Kee, 2014).

As citizens become more active in their urban environments, local organizations must work to accommodate community participation through collaborative planning. It generally occurs that place-based movements which have evolved independently from the local government can later influence the authorities’ actions, in a manner that may bring benefits to such civilian groups and lift the burden off institutions (Satterthwaite, 2003; Wekerle, 2004). Such benefits and lessons of bottom-up practices are still not properly acknowledged in the literature, a feature that could change conventional planning perceptions. Therefore, local governments continue to be inadequately prepared to support bottom-up initiatives, due to lack of funding or a normative that allows these activities to take place.

When it comes to food movements, authorities have failed to perceive food justice as a social movement, giving little importance to the topic of food security in an urban area and the generation of policies to achieve this goal. Moreover, developers perceive food services as an activity that may interfere with their frameworks, landscape, or the local economy (Wekerle, 2004). Lastly, food movements (specifically UPA) should be a concern for the public as they are the ones most affected by it. Increasing demand of UPA activities through bottom-up initiatives will encourage local authorities to place it on their agenda, and will motivate citizens themselves to become more self-sustainable and collaborate towards community empowerment.

2.4. Urban and peri-urban agriculture (UPA)

Even though UPA is a practice that can be traced back for decades, it was not until recently that the concept was labeled by the literature and international organizations, such as the United Nations (Mougeot, 2000: 2). The concept has evolved along with challenges in climate change, demographic growth, exhaustion of natural resources, and sustainability discourses for development. Its definitions vary among authors, but it can be observed that the most widely spread descriptions are Mougeot’s (2000: 2) and Smit’s et al. (1996), where urban agriculture:

“...is an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, (re)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area.” (Mougeot, 2000: 2)

“...can be briefly defined as the growing of plants and trees and rearing of livestock within or on the fringe of cities (intra-urban and peri-urban agriculture, respectively), including related input provision, processing and marketing activities and services.” (Smit et al., 1996)

According to the Food and Agriculture Organization of the United Nations, FAO (2014), an approximately 800 million people worldwide are already engaged in UPA activities. This should not

be surprising considering that if urbanization increases, so do the population's need for food (Bryld, 2003). Moreover, as urban areas spread onto rural land, the distinction between these two lifestyles is fading with the convergence of rural and urban activities, adding to the development of UPA (De Bon et al., 2010). Additionally, an important point to consider are the drivers for its practice since the conditions of developed countries vary from those of nations in the Global South e.g. it is practiced for recreation in the former and for food access in the latter.

One of the main drivers of UPA in developing countries is the increase in rural-urban migration that has occurred in the last centuries, accompanied by the worsening economy of the urban population. The poorest parts of the city are the most affected by this phenomenon since they have little access to market prices of essential foods. Therefore, most UPA practitioners are involved in producing as a means of survival, in order to satisfy financial and nutritional needs; producing locally becomes a strategy for the sustainability of urban citizens (Bryld, 2003).

The most frequent type of UPA model is the household garden, where a small-scale commercial production is combined with self-consumption to aid the household's income. As formal employment is absent in many urban areas (in the economy, industries, and services), food production continues to be an important contributor for livelihoods. For the poorest households, it becomes a form of occupation, which positively contributes to the household's sustenance by reducing food expenses. Conclusively, the value of UPA will not decrease for the public even if urban growth continues (De Zeeuw et al., 2011; FAO, 2014).

In addition, there are other types of UPA models as well, such as community gardens and school gardens, demonstrating that the model is not restricted to a single scale, or to a particular population group. Urban producers come from all age groups and social strata. Still, women are an important driver for UPA, specifically in developing countries where they are usually the administrators of the household. This feature can be observed in cases such as the cities of Managua and Haiti, where women are in charge of 90% and 86% of the family gardens, respectively (FAO, 2014). Therefore, UPA also proves to be a tool for the empowerment of women, or for that matter the more marginalized groups of society.

Ultimately, UPA is an essential part of the urban system as it makes use of resources (labor force, land, water), grows food for citizens, is influenced by the setting (policies and markets), and has an effect over urban areas at the same time (food security, poverty, health, and strategies). For governments, they must become aware of its multi-functionality, and the importance of managing and guaranteeing the safety of its products and the environment (De Bon et al., 2010). Even though numerous authorities continue to view UPA as a problem, countries like Brazil and Cuba are already implementing it in their development plans since it is a viable strategy for equitable and sustainable development (De Zeeuw et al., 2011; Pearson et al., 2010).

2.4.1. Potentials and risks of UPA

With the general overview provided, this subsection aims to identify the main potentials and risks of UPA activities. Besides its contribution to food systems, it has potential for responding to general environmental, economic, and social issues of urban areas, as well as tackling with the dependency of regions to globalized forms of food production (FAO, 2014). Urban agriculture can be characterized as a multi-dimensional practice for urban development, as can be seen in the following **Figure 4**.

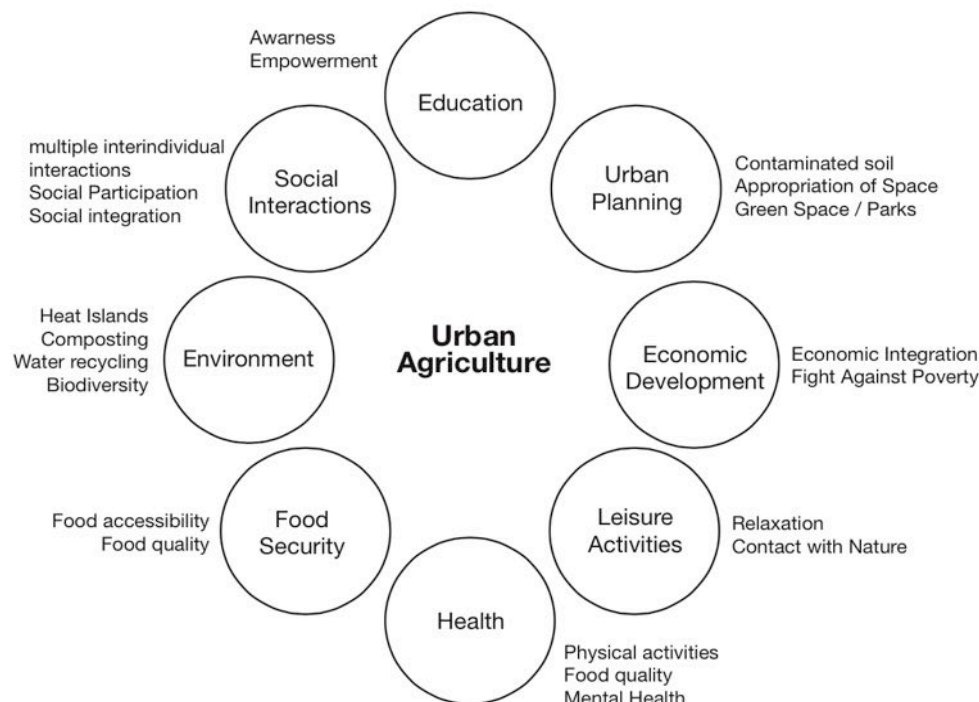


Figure 4. Multi-dimensional features of UPA.
Source: Duchemin et al. (2008).

a. Strategy for improving food security and nutrition.

UPA's main priority is to enhance food access and provision. When it comes to the topic of food access, the population in urban areas is affected as the prices for food continue to rise. For the urban poor, who are usually dependent on cash salaries for the purchasing of food, means that their dietary intake will vary according to their income and the market's prices. Furthermore, due to fluctuating nutrition, the majority of the population living in low-income urban areas is exposed to diseases that decrease their opportunities for personal development, which affects their capacity to learn and work, and as a consequence their labor and economic opportunities (Bryld, 2003; De Zeeuw et al., 2011).

For the case of Honduras, a 16.6% of children between the ages of 1 to 59 months present moderate or severe levels of malnutrition across the country (2001), an important point to address within the country's commitment to the Millennium Goals in 2015. The effect of food insecurity over personal development can be observed in the proportion of students completing their education, where 92% of people affected by malnutrition only achieve a primary level education (Martínez & Fernández, 2007).

Therefore with urban farming, the situation can be improved by reducing malnutrition through better quality food intake. Additionally, some of the financial resources of a household can be freed to purchase other kinds of food to balance the diet reducing the citizens' dependency to their fluctuating salaries for their nutrition, and having an opportunity to focus their attention in other household expenses such as the family's health (FAO, 2014).

b. Potential for economic improvement.

Even though the small scale of UPA models may have a smaller economic significance, the number of households and communities involved is often high, allowing for UPA to have a role in the survival strategies of the urban population. As provided, the production from UPA practices serves as an economical relief and increases welfare, especially for low-income households who can now afford to invest in healthcare, education, or housing improvements (De Zeeuw et al., 2011).

Also, urban gardening is a form of employment regardless of its scale, and it provides for occupation both in the agricultural and non-agricultural sector. For the latter, it means a possible commercialization of food products and non-edible products e.g. inputs needed for gardening; this goes hand-in-hand with the fact that UPA is practiced close to a higher amount of population with purchasing power. Additionally, the demographic group that is most rewarded with employment from UPA activities is women. This mostly applies to developing countries where women usually only tend to the household instead of their own development and formation, reducing their job opportunities and resulting in one less income for the home (FAO, 2014; Pearson et al., 2010).

However, the economic aspect of UPA is fragile and its related benefits hold an uncertain future due to the lack of regulation of the resources needed for its practice and development. There is doubt on whether UPA may serve to improve household economics in a stable manner, as income is obtained from a practice that is dependent on the condition and availability of other urban resources (Bryld, 2003). For example, it is practiced on temporarily unused lots in urban areas or land not suitable for construction that is probably exposed to risks of floods, landslides, or pollution.

In a broader framework, UPA has an economic impact when viewed from the perspective of food security and health. An example is the economic effects of malnutrition over a country's healthcare system and productivity. In Honduras, an average 201 thousand cases (2004) in need of health attention were caused by the exposure to malnutrition, resulting in a cost of USD 47.6 M for the country. Likewise, levels of lower academic performance caused by malnutrition have further translated to a loss of USD 413 M (2004) due to the effects on the working capacities of the people (Martínez & Fernández, 2007). Therefore, the economic value of UPA could translate into savings from preventing losses as the ones described beforehand.

c. A response to urban environmental issues.

Asides from the benefits previously described, UPA offers environmental advantages worth noticing, even when the effects occur indirectly, at a small scale, or on the long-term. The production of food in city gardens must make use and be managed by an agenda that encourages the protection of the environment. Firstly, most cities do not have in their agenda policies related to proper waste administration and nutrient recycling; reusing organic waste for compost is one of the most efficient ways of reducing the ecological footprint of urban citizens. Likewise, urban gardening must be administered through a land and water program for an efficient consumption and recycling of these inputs of food production (De Zeeuw et al., 2011; Mubvami et al., 2006).

Similarly, the rise in UPA initiatives has brought with it new spaces for its development e.g. house gardens, community lots, public lands, parks, roadsides, and buffer areas that are not suitable for building (Bryld, 2003). The greening of urban land contributes to improving the microclimate of cities, and to preserve green belts and land exposed to risks, such as erosion. Additionally, open green space is a tool for stormwater control and storage within an urban area, and which further allows for rainwater infiltration into the ground for the water cycle recharge (De Zeeuw et al., 2011).

d. A tool for empowerment

As social disparity in cities continues, marginalized groups in a society tend to become more dependent on others, such as charities or aid from the government, as they cannot sustain themselves. Continuous individual and community participation, or work on a specific activity e.g. urban gardening, leads to higher competencies, confidence, a sense of responsibility, and a degree of independence from the people, producing an empowering population. Therefore, through social and economic empowerment, these groups may have access to the opportunities they lacked in

previous occasions, opening the door for self-improvement and sustainability (Florin & Wandersman, 1990; Friedmann, 1996).

In the case of UPA, household and community farming may support low-income or marginalized groups by helping them to maintain a healthy lifestyle and contributing to the household income, resulting in an effect over the social and economic problematic mentioned beforehand. Building a sense of ownership through a continuous productive activity leads to individual or collective empowerment, where those involved have a greater feeling of self-esteem and pride, adding value to the tasks they perform (van Veenhuizen, 2006: 6). Consequently, empowering people with skills and knowledge on UPA activities may not only contribute in improving the current situation of the population, but also to increase resilience and reduce the degree of vulnerability in at-risk societal groups when thinking ahead into the future.

e. *Risks of UPA*

Even though UPA presents many benefits, there can also be some downsides to its development (**Figure 5**). Firstly, poor management of its practices can result in health hazards to the processing of solid waste for compost, and the use of chemical enhancers to increase production that later be consumed (Mubvami et al., 2006). Secondly, it is an activity that occupies land, and the urban poor seldom have access to land with good farming conditions (FAO, 2014). In addition, the space required for urban gardening is also needed to satisfy the housing needs of citizens, making the people prioritize on which is most necessary (Bryld, 2003).

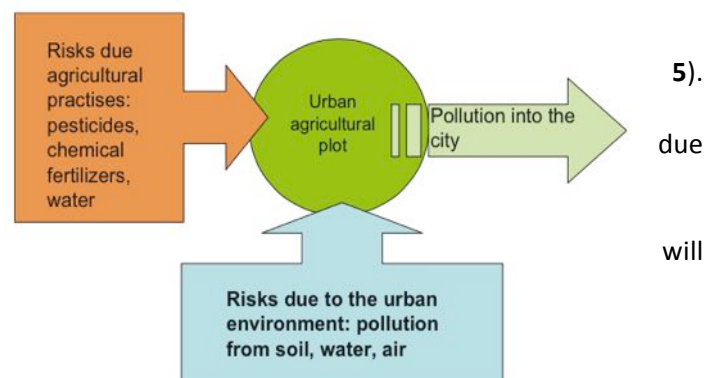


Figure 5. The risks in the relation between city and UPA.
Source: De Bon et al. (2010)

Conclusively, these disadvantages are enhanced considering that UPA is still illegal in most countries and therefore, it cannot be properly regulated and acknowledged within the city's planning in order to assign a land use for UPA, and promote organic practices to protect the health of citizens and the environment (Mubvami et al., 2006).

2.4.2. *Implications for policy making and planning*

Although UPA offers many benefits to the urban environment and its population, it is still not an unproblematic strategy as it could result in health hazards and unsustainable land use if conducted without planning. Therefore, programs and legislation can be introduced in order to promote UPA within a framework of sustainable cities (Bryld, 2003). Support from the national and local governments is necessary as they are responsible for establishing the priorities for development. They also possess most of the land and resources, and conduct waste and water management programs. Consequently, it is in their power to provide or limit the resources needed to develop UPA and protect it from unplanned urban growth (FAO, 2014).

Still, urban authorities and planners continue to view UPA practices as something from the past, which does not match the views of the modern city. The banning of gardening practices leaves producers disempowered and the city with fewer resources for responding to issues. However, as long as other alternatives or resources become available to resolve the urban problematic, there will

be no other option than to legitimize urban agriculture. Through its legalization, the right environment for food production can be established and services for its practice can be provided, which is so important for cities of developing countries (Bryld, 2003).

Which policies to develop will depend on the scale and goals of UPA practices, as illustrated by the policy perspectives in **Figure 6**. The development of UPA is dependent on the instrument used for its progress and diffusion. Voluntary work and information systems appear to work on the smaller initiatives, whereas regulation is needed to extend UPA practices to a macro scale. Most of the rewards perceived from UPA arise from citizen participation and small projects, while the biggest urban environmental benefits could be obtained from publicly owned activities and planning (Pearson et al., 2010).

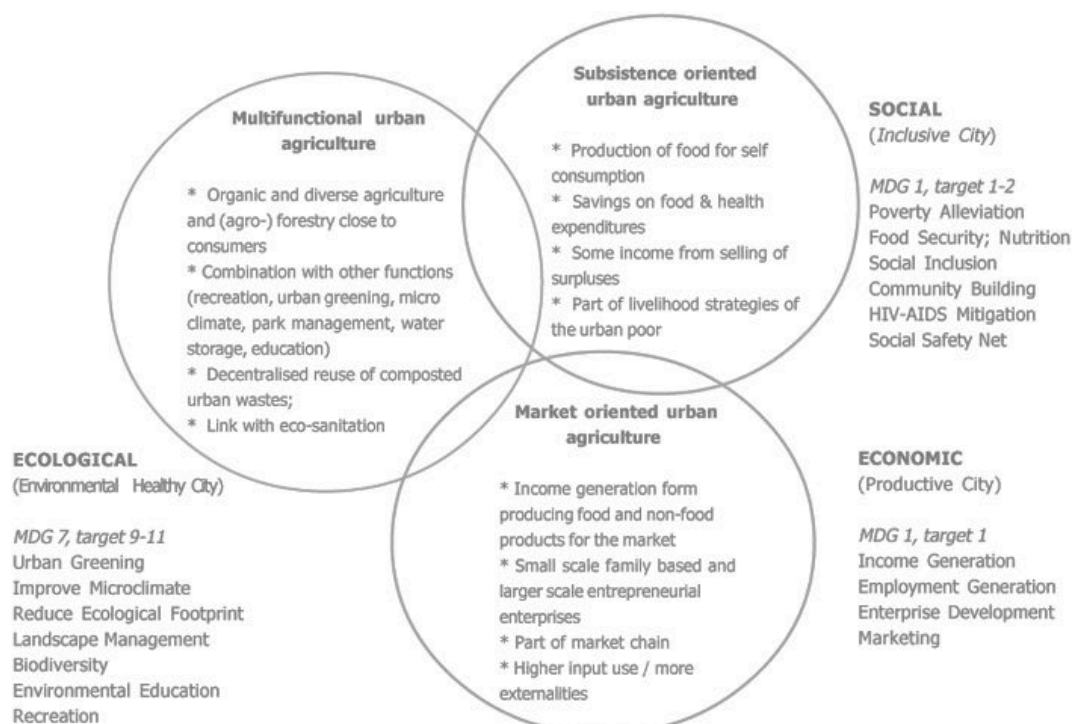


Figure 6. Main policy perspectives on UPA.

Source: De Zeeuw et al. (2011).

Yet, there is no single model for urban agriculture to follow, each solution is context-specific and adapts to the urban environment and the social, political, and economic factors under which it is developed. Planning will have to evolve along with it through a good governance framework that allows for agreements and cooperation. Thus, the linkage between UPA and collaborative models of planning is found where voice is given to urban producers and consumers, particularly since it is an activity driven by demand (Bryld, 2003; Mubvami et al., 2006).

Furthermore, other actors that could become involved in UPA development are the private sector, such as companies and professional associations who own the skills and financial resources to aid food gardening agendas. Non-governmental organizations (NGOs) and academic institutions (e.g. universities and schools), manage volunteer programs, environmental learning, and the knowledge to educate people on the reasons and best practices for UPA. An example of this collaboration is in the countries of El Salvador and Honduras, where NGOs have collaborated with the municipalities to promote UPA projects (FAO, 2014).

Through collaborative planning, power and responsibility can be distributed among stakeholders and a common position for the development of urban gardening can be negotiated. UPA should emerge through a community need and be expressed as such so it can find its place in urban development (Mubvami et al., 2006). Such good governance framework will result in good practices and the full benefits of UPA. However, this process is difficult to initiate when UPA is not recognized and legalized, and this is where the greatest contribution of local governments may come along.

3. RESEARCH BACKGROUND

The country of Honduras has taken part in the world's urbanization trend with its urban inhabitants now ascending to 50.5% of the country's total population, an 8.55 million people (INE, 2014). Additionally, it is among the poorest countries in the world, with an urban population under one of the highest rates of urban poverty in LAC. For the year 2010, 59.8% of them were living under the national line of poverty (FAO, 2014; INE, 2014). Conclusively, the capital of Honduras, Tegucigalpa (**Figure 7**), is an emblematic representative of the development challenges the country is facing, as it is the place of 1.2 million (2010) of the country's urban inhabitants.



Figure 7. Map of Central America.

3.1. The City of Tegucigalpa

3.1.1. Overview

The capital or *Distrito Central* (Central District) is conformed by the two twin cities of Tegucigalpa and Comayagüela, which administratively belong to the Central District Municipality¹ (AMDC, by its Spanish acronym). It is located in the center of the country at a height of 990m above sea level, and the Choluteca River divides the cities from North to South (AMDC, 2011). For the purpose of this research, the capital will be referred to as Tegucigalpa, taking into account that it includes both the territories of Tegucigalpa and Comayagüela (**Image 1**).

Today, Tegucigalpa is considered the biggest city in Honduras with an extension of approximately 201 km². It is estimated that if its 4.4% growth rate continues, enhanced by rural-urban migration, the city may have to occupy 100 km² more in the future (AMDC, 2011; Angel et al., 2004). Another

¹ Honduras is divided into 18 departments with the subdivision of *Municipio* (translated to Municipality), of which there are 298 across the country. Within a Municipality are cities, towns, villages, or any other form of residency in the extension of its territory (Decree 134-90).

characteristic is that steep slopes between 16%-30% compose its territory. Mountains surround the urban area as well, with the hills of El Berrinche, el Pedregal, and El Picacho, and La Tigra protected forest area located North of the city. The vegetation is mostly coniferous and broadleaf forest, a resource currently under pressure by the forestry industry and the wildfires during the dry season of the year (Martín, 2010).

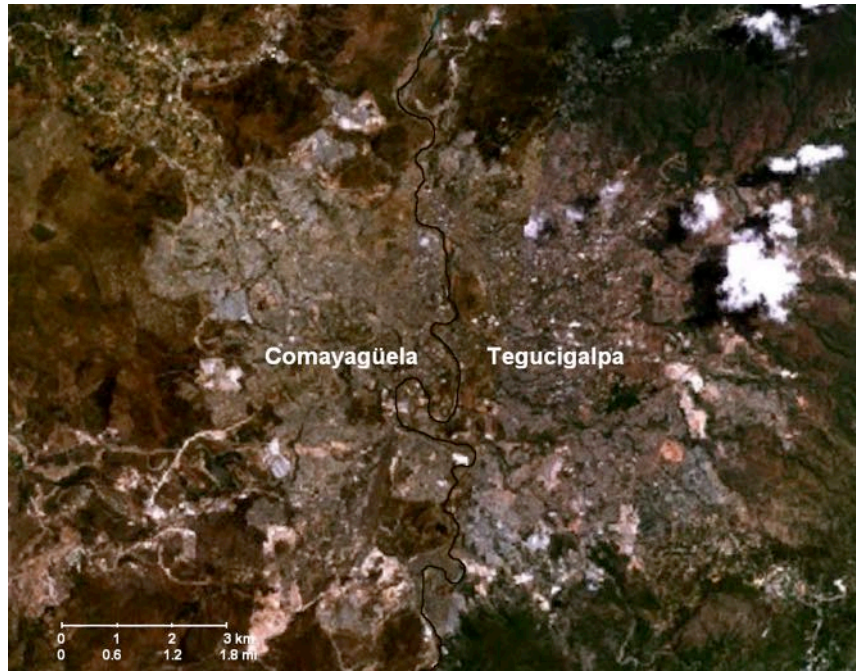


Image 1. Tegucigalpa and Comayagüela divided by the Choluteca River.

Source: NASA World Wind imaging program.

A tropical rainy climate is found in the lowest parts of the city, while a temperate humid climate encloses the highest parts of the area. The average annual temperature may vary between a maximum of 27.2°C and a minimum of 17.4°C. The average annual precipitation is 1000 mm, most of it during the rainy season in the months of May to October, which also results in the flooding of a 30% of the urban area each year (AMDC, 2014; Martín, 2010).

Spatially, the urban area presents a horizontal growth (as seen in **Image 2**), and it is administratively divided into municipal sectors (30 of them in the whole Central District). The city center holds the historical colonial architecture with narrow streets and cobblestones roads. Meanwhile, the rest of the city is a suburban type of composition formed by neighborhoods that have become either residential or commercial areas, specializing in one particular land use.



Image 2. Horizontal configuration of Tegucigalpa, image of the central city.
Source: Panoramio on Google Maps.

Lastly, the city's location in the center of the country has been strategic for the articulation of transportation and distribution networks to satisfy the internal market of the central, South, and Eastern regions of Honduras. The city's main economic activities include commerce, construction, services, and textile industries. Its population is mostly composed of professionals and technicians, salespeople, and workers of the textile, mechanical, and construction industries. Therefore, the Honduran capital presents some of the best indicators of the country, although the lack of urban development plans has generated poor living conditions for a large portion of its inhabitants over the years (AMDC, 2008).

3.1.2. *Urban development of Tegucigalpa*

Tegucigalpa's modern urban history begins in the 1950's decade when a series of economic and demographic shifts throughout the country initiate a rural-urban migration process. The rural population is driven by the industrializing economies of the cities of Tegucigalpa and San Pedro Sula (in the North), therefore, attracting the surrounding rural population each (Martín, 2010). By the year 1961, the city had a population of approximately 165 thousand people (AMDC, 2008).

Later on, the first initiatives for planned urban development occur in the 1970's decade when the *Esquema de Ordenamiento Metropolitano, EDOM* (Master Plan) is created. Also, the concept of "zoning" is introduced, where new areas of the city are developed according to the market and existing activities. However, the plan's results were not as expected due to massive land occupations and the authorities' lack of capacity to provide basic needs. The result is a concentric urban configuration of the city where the application of the normative and regulations is limited (AMDC, 2014).

Further on into the 1980's and 1990's decades, a national revision of liberal views takes place, resulting in a Neoliberal doctrine that is influenced by the financing international organizations and which encourages the private market (Cálix, 2008). The privatization of agricultural land was the decline of the more traditional cooperative model (*ejidal*) of land. Now, agriculture attracted investment that aimed at modernizing farming techniques, in order to increase the production and open themselves to the international market. Consequently, the rural environment is disrupted and less labor force is needed to sustain agricultural production; it is in this last point where the greatest migration flow affected the urban areas (Angel et al., 2004).

With the social services crisis produced in the 1970's and the lack of employment during the 1980's, the informal economy phenomenon is produced; an issue that is enhanced throughout the years with the constant migration and the absence of proper urban planning to respond (Martín, 2010). The weak position of local institutions, and the political and socioeconomic context of the time did not allow for a more participative planning of the area. The segregation between the public and decision-makers reflected onto Tegucigalpa itself, with an unequal development of the city driven by a typology of neighborhoods determined by social class (Cálix, 2008).

In the late 1990's, a new transition of the city's spatial arrangement occurs when North-American models of urban development are adapted e.g. closed neighborhoods and business areas constructed according to labor activity or status. The urban composition no longer corresponds to the population, which is mostly from rural areas, with little education and economic potential. The social inequality was further translating itself onto other aspects, the most notorious being the city's insecurity (Cálix, 2008).

In 2001, Tegucigalpa has an estimated 850,000 inhabitants (INE, 2011). Market forces become stronger by a retreating local government in public investment and the privatization of public services. Cálix (2008) calls the resulting urban area a "mosaic" of responses to this situation, among which are the following examples. The city's historical district, which was once an administrative, financial and recreational center, is abandoned and deteriorated. Private initiatives try to replace these functions with the development of shopping centers or "malls" that attract middle or upper class citizens. Plus, gated communities become the ideal form of living for the most privileged in an attempt to deal with the insecurity issue.

A final particularity of the capital's evolution is the disregard for the city of Comayagüela, due to its historic inferiority throughout the centuries, since it was the place where the labor force lived while the administrative functions were carried out in Tegucigalpa. Comayagüela has evolved into the center of informal commerce and illegal occupations where most of the capital's population lives. Whether this is influenced by its historical status is uncertain, yet, it is the product of the lack of integral development (Cálix, 2008).

Conclusively, in a matter decades Tegucigalpa's population increased from half a million to a million inhabitants concentrated in 614 (2006) *barrios* and neighborhoods (AMDC, 2008); refer to **Image 3** below for the chronological expansion. However, this growth was not done through the urban processes necessary to provide the population of proper housing and basic services. An estimated half of the population now lives in inappropriate land for settlements, with no access to urban services and where they are exposed to risk from natural disasters due to the physical conditions of the region (Martín, 2010); adding to all of the other issues across Tegucigalpa such as health, education, transportation, security, and social inequality, to name a few (AMDC, 2011).

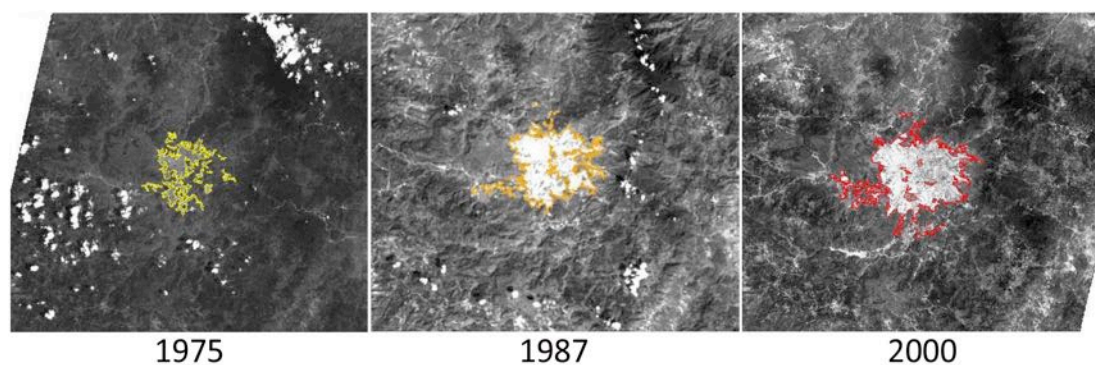


Image 3. Urban expansion of Tegucigalpa.
Source: Angel et al. (2004).

3.1.3. Predictions for the city

The current size and characteristics of Tegucigalpa are important conditions for reaching a future sustainable urban development and better livelihoods for its inhabitants. Even though Tegucigalpa's growth rate has decreased, it is expected that the city will double its population size by the year 2031 (Angel et al., 2004). And before any forecasts are made on what the future of Tegucigalpa holds, it must first be determined whether unplanned or planned growth is expected.

The tendency has been to occupy any available space within the central city due to the proximity of economic opportunities. Throughout the years, however, this resource has become scarce for which settlers are now locating themselves along major transportation routes where infrastructure has opened the path for formal and informal developments. Additionally, Tegucigalpa's territory is located between 900m and 1150m above sea level, where part of this land is steep slopes prone to landslides or riverbanks exposed to flooding. And although flat land is available at higher elevations, the tendency shows that the population prefers to settle on vulnerable areas as long as it brings them closer to the city center (Angel et al., 2004; Martín, 2010). By the year 2000, an approximate 6.4 km² of urban area was already located in areas exposed to landslides (SERNA).

In addition, Tegucigalpa's expansion must be controlled in order to protect the city's water resources and supply. The Guacerique watershed (**Figure 8**) is one of the three most important water sources with an area of 21 km² and is located West of Tegucigalpa; it is already being affected by urban growth (Martín, 2010). Furthermore, other reservoirs are also located South of the city, where the expansion has been the strongest over the last decade as a result of the main peripheral road being finished. For the water supply, the condition is that any urban settlements must be located below 1150m above sea level in order to keep providing water through a gravity system (EDOM, 1975).

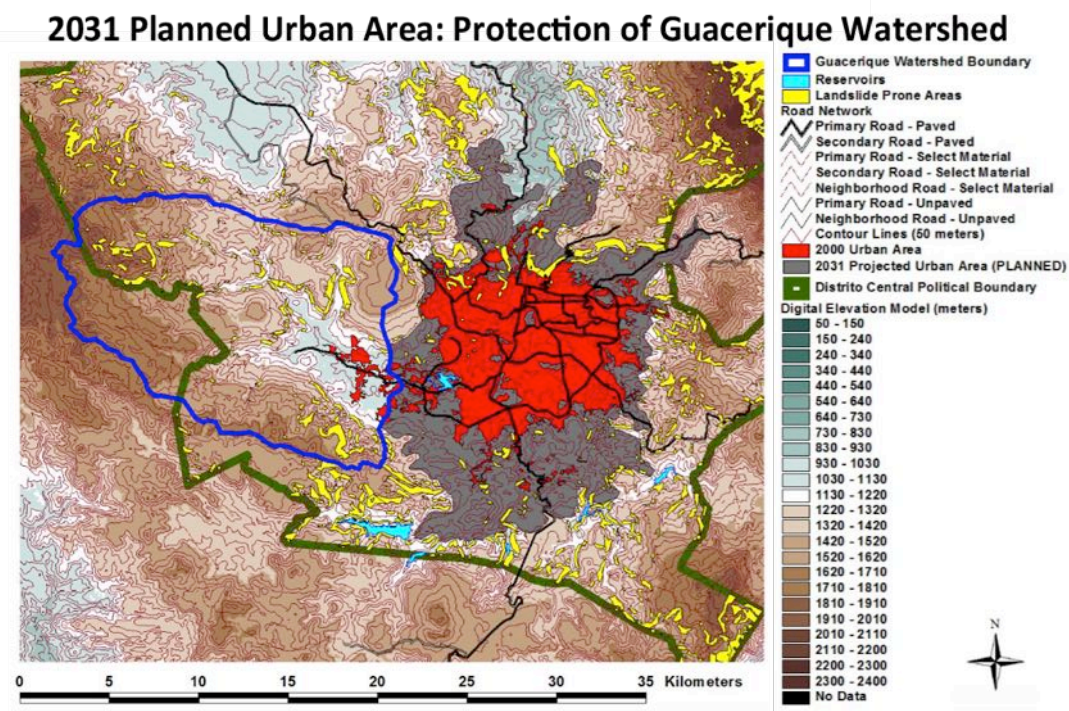


Figure 8. Planned expansion of Tegucigalpa (gray) in relation to Guacerique (blue).
Source: Angel et al. (2004).

In spite of these limitations, if the city continues an unplanned growth pattern, most of the urban area and the doubling population will be located at or below the 1150m above sea level limit and in high-risk areas; this expansion for 2031 is illustrated in **Figure 9** below. Likewise, as the city expands towards the municipal limits, collaboration will be needed with neighboring municipalities and peri-urban communities to respond to the broader effects of Tegucigalpa's urban growth.

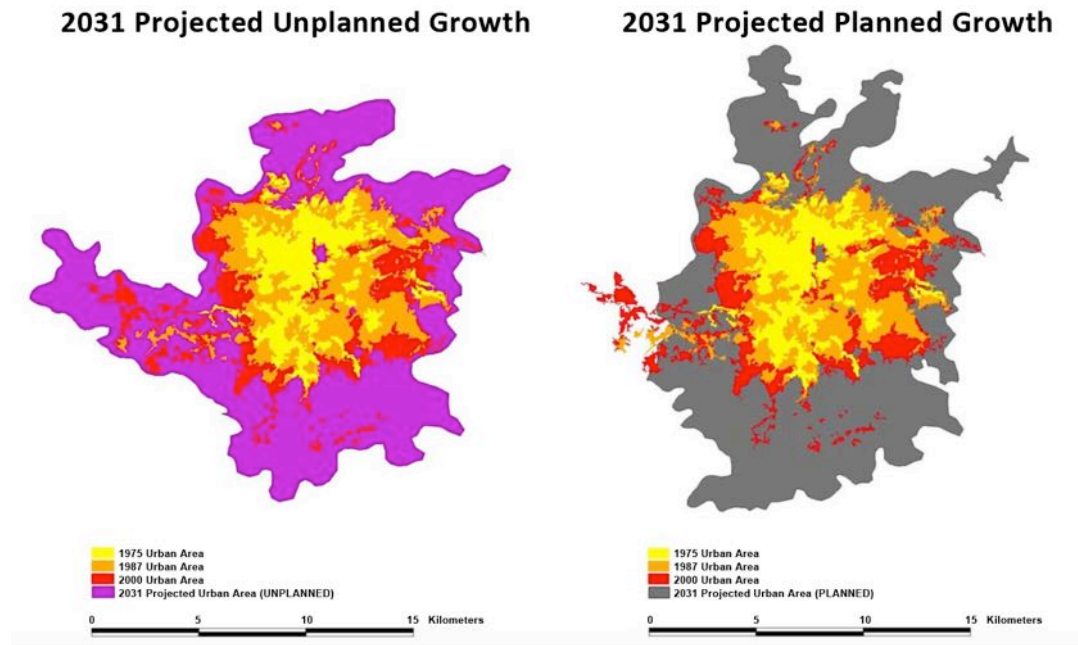


Figure 9. Predictions for Tegucigalpa's expansion.

Source: Angel et al. (2004).

3.2. Tegucigalpa's planning system

"The problem lies not in the normative, but in the practice and the incapacity to enforce these policies and standards. We could say that there are two cities: formal and informal, where the latter is governed by need and the search for its own solutions with no control over it, and the former is led by the private market, where public investment cannot keep pace and regulate growth to ensure the public's interest." (AMDC, 2011)

The law establishes that the 298 municipalities in Honduras must have their own development plan (Decree 180-2003); however, the national government is not able to provide enough funding for all of them. Until now, spatial development in Honduras has generally been viewed as a "set of project lists" with no strategic position, as they have always been too focused on the urban area without taking into account the neighboring municipalities and regional networks.

Nevertheless, after Hurricane Mitch struck Honduras in 1998, numerous planning attempts were made to recover from this natural disaster and prevent further tragedy. It can be said that the country even became a pioneer in the topic of planning against natural hazards. However, Tegucigalpa did not fit into these national development plans, since the capital's municipality should have the capacity to manage and provide the funds for itself.

Three instruments have been set to provide the outline for the country's urban development. The first being policies emitted by the National Congress that work at the national level and under which the AMDC must fit their framework e.g. *Plan de Nación* and the *Visión de País*. Second, are the instruments developed by the AMDC –agreements, delegations, and conventions– which apply for

the municipality. And the third category refers to studies, analyses, and diagnostics for the development of the urban area, which provide with information and orientation for dealing with more specific issues (Martín, 2010).

Yet, there is still no branch within the AMDC that is in charge of urban planning functions in an integral and sustainable manner (Martín, 2010). Many plans and diagnostics of the city have been developed since, but there has been no further step into executing them; refer to the **Figure 10** at the end of the section. Among the most representative and known plans for the city are the following:

a. EDOM 1975-2000

The first development plan for Tegucigalpa was the *Esquema de Ordenamiento Metropolitano, EDOM, 1975-2000*, referred to as Metroplan 1975, elaborated by the national government, the Central District Municipal Council and the Inter-American Development Bank (IDB), who financed the program from 1974 to 1976 (Martín, 2010).

As stated before, this plan offered an innovative approach for its time, although the country's economic and social shifts changed drastically, affecting its efficacy. Through the Metroplan 1975, two fundamental conditions for Tegucigalpa's development were identified. Firstly, the limitation of the 1,150m above sea level as the maximum altitude for urban expansion; and secondly, the categorization of usable land as the territory with a slope of less than 30%, in order to avoid settlements over risk prone areas (AMDC, 2014).

Today, this plan is still been applied since it remains as the only master plan to have been officialized since 1975, with slightly updated versions from 2006 and 2008.

b. Plan Capital 450

With the support from agencies such as the United Nations Development Program (UNDP) and the Chamber of Commerce and Industry of Tegucigalpa (CCIT), the AMDC developed the *Plan de Ciudad Capital 450* in 2008. It aimed at tackling the city's problems e.g. order, traffic, rapid growth, basic services, and climate change. Its vision of the city included the development of Tegucigalpa as a model in Central America, with a high quality of life for its citizens that would enjoy a sustainable, profitable, and safe city (AMDC, 2008).

The most important characteristic of the plan is the participation of the civil society in its development. Some opinions even state that it was an integral process, well structured, and with an active citizen participation. The AMDC started implementing this plan, and its 8 strategic projects continue to guide the municipal administration today.

c. Plan ¡Arriba Capital!

Tegucigalpa was struck in 2010 by the worst winter after Hurricane Mitch (1998), as a product of the *La Niña* phenomenon with precipitations of 1,370mm for that year (AMDC, 2014). Under this context, the UNDP and the Honduran Architects Association (CAH) supported the AMDC in the development of the *¡Arriba Capital!* Plan; a document which first targeted the risks and vulnerability of the city, for later structuring a municipal land use program to organize and sustainably develop the urban area. Its main contribution was an integral orientation towards risk management and mitigation of possible natural disasters, emergency actions, and resilience of the city.

An analysis of Tegucigalpa's vulnerability was done, identifying the lack of construction control, planning, and the city's rapid expansion as the main causes. Additionally, the plan states as main initiatives: to recover the city of Comayagüela, development outside of risk prone areas, "without

water we have nothing”, massive public transport systems, and aid to the population affected by natural disasters. However, it was considered more of an analytical document of the city than a plan and was therefore never legalized, for which Metro Plan 1975 continues to be the normative for Tegucigalpa.

d. Plan de Desarrollo Municipal con Enfoque en Ordenamiento Territorial (PDM-OT-MDC)

The Program for Land Administration of Honduras (PATH) focuses on solving property rights across the country through the modernization of policies and institutional strengthening, in a program for the next 18 years divided into 4 phases. Currently in the second phase, the PATH has collaborated with the private sector and national institutions for the development of the Municipal Development Plan with Focus on Land Use Planning (PDM-OT-MDC).

This plan works on the municipal level as a strategic tool for attending land regulation, risk management, resilience of the area, climate change adaptation, and social aspects such as gender issues, taking into account not only Tegucigalpa’s area but also the surrounding communities under the jurisdiction of the AMDC. The broader scheme of this particular plan allows for a more integral set of interventions, although specific projects will have to be further developed under the framework of the PDM-OT-MDC.

For its development, a diagnostic of the working area was done first through collaboration between citizens and planners. The workshops included citizens from the capital and surrounding areas that were invited to participate in a search for integrity within the planning process. Furthermore, one representative from each branch of the AMDC contributed, in order to work together as co-developers of the proposal. Ultimately, the resulting plan was taken through a process of socialization and the opinions of the public were integrated into the final stage, after which the document is already in the process of approval.

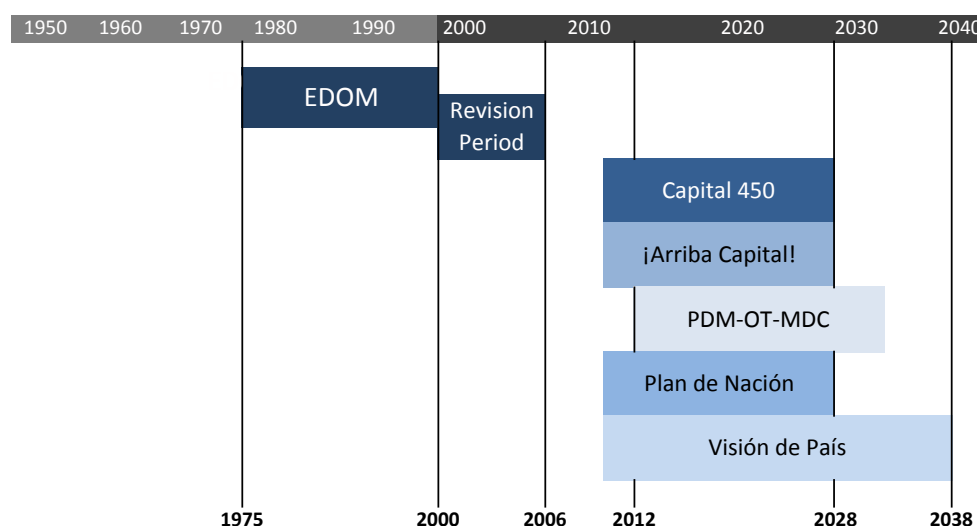


Figure 10. Chronology of development plans.
Source: AMDC (2014).

3.2.1. Potential for change

In summary, the city of Tegucigalpa now presents problems related to water and sanitation, vulnerability, security, transportation and mobility, land uses, and economic opportunities, among others. The city’s planning has not taken an integral point of view for the problems and the different scales at which they present themselves (city, municipal, or regional). However, new initiatives of

the past five years have started a process where planners and citizens can no longer overlook the problematic and are looking towards responses.

In addition, the topography began to limit urbanization due to its risks and altitudes. Likewise, the natural resources surrounding the city must be protected. Therefore, there is not much space left to grow and the city will have to change its past strategies and constrain the sprawl. Moreover, unsustainable consumption patterns must be resolved, by making proper use of the resources within the area e.g. land, water, waste, energy. And lastly, Tegucigalpa must be given back to its citizens, who are no longer identified with it or have a sense of belonging to their communities, due to its urban deterioration and insecurity.

As a result, planners and developers are now shifting towards the densification of the city to avoid further expansion; a revitalization of the existing urban areas must be done, instead of producing new developments while the former continues to deteriorate. As this movement is emerging, site-specific projects in the making are aimed at detonating other spatial interventions that could lead to a macro effect in the future years.

Among the ongoing projects², it is worth highlighting the intervention by the “Emerging and Sustainable Cities Initiative” of the IDB, which aims at recovering the Choluteca river basin and the historical center of Tegucigalpa through a process of densification and urban revitalization of this area. Furthermore, studies for the city are being produced in order to generate information of the city’s conditions; in this manner, the authorities can become aware of and understand the complex web of urban challenges the city faces.

Other projects that are gaining visibility are the development of parks by the *Fundación Convive Mejor*, and the development of the Juana Laínez Park by the *Fundación Ecológica de Tegucigalpa*. The former aims at constructing a park network throughout several municipalities that are affected by crime, poor urban conditions, and vulnerable populations; the first area to intervene is the capital city. The latter project targets the revitalization of the Juana Laínez hill in the center of the city, by converting it into a recreational area that provides green space and educational outdoors activities for the citizens.

As can be seen from these initiatives, there is strong support from the private sector through the ‘foundation’ mechanism, in which groups of private companies and organizations finance development projects in cities throughout the country. Furthermore, proposals such as the IDB scheme are being sustained by international organizations. The result is less dependency on the central and local government for responses, who do not present the capacity to resolve Tegucigalpa’s problems under their own resources.

² For the description of the listed projects refer to Appendix 1.

4. RESEARCH DESIGN AND METHODS

This chapter aims at describing the methods used for the development of the research from the collection of data and its analysis, to the limitations of the study throughout its progress. The research was done in three main stages: a preparation phase, the fieldwork, and the analysis phase. Regarding the fieldwork, it consisted of a one-month visit to the city of Tegucigalpa for the collection of data and a preliminary analysis of the situation.

4.1. Research character

This research is an exploration that aims at understanding the role UPA practices have over the urban environment in Tegucigalpa, and therefore its potential for impacting the city's planning system. Given the diversity of components that make up the two main themes of urban planning and urban agriculture, and the complex interrelations between them, this research consequently followed a qualitative approach.

Information from Honduras at a remote source (such as the Netherlands) is insufficient due to the country's scarce use of information technologies and distribution of knowledge, for which the research also had to follow an inductive attitude as it progressed. This fact restricted the development of a theoretical framework to be evaluated before and after the fieldwork, meaning the application of a more traditional model of research was limited.

Therefore, Charmaz's (2014) Grounded Theory methodology was selected, as the study could start from an initial research question, and would later "flow" through the data collection process and the analysis. Grounded theory may not be as linear as its methodology suggests, as findings have the capacity to reformulate the study along its progress. In addition, the process has openness towards using a mixed-method frame for collecting, managing, and analyzing qualitative data. With this in mind, grounded theory allowed to develop a "theory" (or notion) from the data collected to describe an occurring phenomenon in Tegucigalpa's planning scene and relate it to the findings regarding UPA activities.

4.2. Data collection and analysis

An initial literature review took place in order to explore the main subjects and prepare the fieldwork methodology, which consisted of interviews and observations in Tegucigalpa. Prior to the visit, institutions, organizations, and professionals were contacted to set up interviews and to find already existing UPA projects or similar initiatives throughout Tegucigalpa. The selection for the interviews was based on their relevance or contribution in the fields of planning and general agriculture in Honduras; the projects would be identified in the interviews and on the field. An open structure (refer to Appendix 3) was selected to allow the interviewee to provide as much details as possible on the topic; the answers were recorded and notes were taken.

A total of 11 interviews were conducted with representatives from 9 different institutions, organizations, and other possible stakeholders of UPA in Tegucigalpa. Site scouting and observation could be done for places that were visible (not fenced or walled) and accessible to the public. The information collected from the interviews and site observations was labeled as the primary data for the research.

Further on, secondary sources such as documentation collected at the study area and material provided by the participants, served to complement and corroborate the information from the

interviews. Document analysis completed the collection of data, where policy documents, project plans and summaries, studies, publications, census data, and graphics are among the main types of documentation used throughout the research. Local media e.g. newspapers and magazines, were not taken into account as their content may be biased due to the socio-political context in Honduras.

The final identification of projects was done based on the interviewee's testimonies, as they kept making reference to other organization's work or initiatives being developed in their same institution. In total, five formal projects and programs that develop UPA activities in Tegucigalpa were acknowledged; therefore, "project" became the unit of analysis for the research. A convenience sampling was done since their selection is based on their relevance to the main topics of the research, the availability of information from each project, and their multiplicity, the latter taken into account to explore complexities between the cases and broaden the reach of the study.

Hence, the research at hand further develops onto five case studies: two household garden projects, two school garden initiatives, and a mixed project that works with household, school, and community gardens. However, the community gardens were not taken into account as the research focuses on activity within urban areas and these do not fit the category. The result is a division between three household gardens and three school gardens projects. The diversity of each case study can be observed in features such as stakeholders and scale; refer to **Table 1** for the characterization. For example, the participants may include local authorities, an international or local NGO, citizens, or even academic institutions.

Table 1. Characterization of UPA in the case studies.

Characterization of Case Studies		
Who is involved?	The stakeholders involved (enablers, supporters, practitioners, and beneficiaries).	In relation to research question 2-A.
Where does it happen?	Description of the spatial model.	
What happens?	Characterization of the activity e.g. scale, production type, and outputs.	In relation to research question 2-B.
How does it happen?	Strategies, inputs or support, and distribution of responsibilities.	In relation to research question 2-C.
Why does it happen?	Drivers for its development.	

Lastly, all the data collected from three main sources: interviews, case studies, and the documentation, was coded and analyzed according to the methodology. Coding was based on the first key ideas provided by the research questions and the theoretical framework; and later based on the new concepts that kept repeating throughout the information, which indicating which had more weight for the stakeholders and thus becoming more relevant for the research. As a result, themes among the individual cases were identified, and the models were related to the research questions according to the following scheme (**Figure 11**).

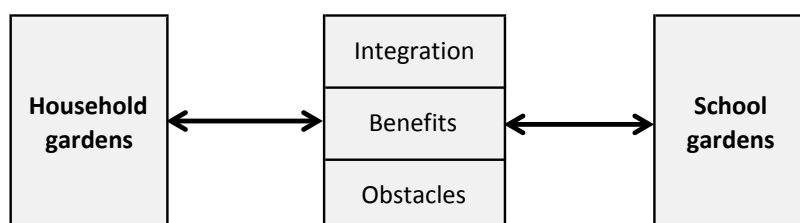


Figure 11. Analysis scheme for the UPA models.

4.3. Limitations

This study acknowledges several limitations regarding the data collection and the analysis process. First, the lack of documentation in public institutions and organizations leaves the research mostly depending on empirical data, with few scientific sources to validate the use of the collected information. In addition, the knowledge gap, mostly in the early stages of the study, delayed the progress as it became challenging to plan the research, contact professionals, collect documentation, and identify the projects.

Furthermore, the information provided by the interviewees is based on their experiences and memory, presenting a risk since some information may have been altered and missed in the meetings. Another limitation regarding the interviews is that some participants are employees of a governmental office or influential institution, which given the socio-political context of the country, may have resulted in biased opinions and lack of transparency from the interviewees.

However, the main challenge for executing the fieldwork was the security issue in the city of Tegucigalpa. Such topic did not allow for a complete scouting of the city and visits to the projects mentioned in this study, as the resources needed for visiting vulnerable areas were not contemplated within the scope of the research. Moreover, people are not responsive to strangers due to the lack of trust and fear to unknown people, which limited site observation and the amount of sources for the collection of information.

Visits to the sites were also limited by the season, for example, schools were ending the academic year and closing their activities, for which appointments could not be scheduled. Likewise, it becomes more difficult to approach people on the streets or scout for sites during the rainy season of the year. When it comes to information from government-related agencies, the country was in the first period of the current administration, meaning that plans and projects are initiating and there is not much documentation about them yet.

The small number of cases chosen for the research is not guaranteed to be representative of each category and the overall phenomenon in discussion (Seawright & Gerring, 2008), as they are highly dependent of the circumstances under which they were developed. Lastly, not following a more linear research process proved to be challenging, as ideas and connections were constantly reformulated. This does not contest the validity of the data, but illustrates the complexity of the unique context in Honduras and the link to theoretical concepts.

5. FINDINGS & DISCUSSION

This chapter describes existing UPA initiatives throughout Tegucigalpa, with an overview of each case study and their characterization, including the stakeholders involved in the projects, the drivers for their development, the implementation process, and the products obtained from the practice. Additionally, this section discusses the integration of UPA into the city's planning, by identifying the opportunities for improving its activities and the benefits over the urban environment and population, alongside the limitations that may be encountered by planners and developers during its development across the urban area.

5.1. Urban and peri-urban agriculture in Tegucigalpa

This section provides insights into the initiatives found during the field visit, based on information from the interviews, collected documentation, and observations done during the research. Even though the UPA movement appeared to be absent from Tegucigalpa's development scene at first, several formal projects were found throughout the city. Their collaborators, participants, and methodologies vary in origin, however, they present common characteristics and drivers, as can be seen in the following descriptions.

5.1.1. *"Proyecto Piloto AUP en Honduras" – Household gardens*

The UPA Pilot Project in Tegucigalpa is an initiative by the AMDC, who requested the support of the Food and Agriculture Organization of the United Nations (FAO) representation in Honduras, as a strategy for poverty reduction and food security in the city. It was initiated in 2010 and it targeted four vulnerable neighborhoods throughout the urban area; a selection based on population, poverty indicators, food insecurity, institutional presence, and land availability, among others. However, the fourth neighborhood project had to be cancelled due to insecurity issues and lack of organization from the participants.

Among the target population, more than half of the adults in these neighborhoods do not have formal employment, and their daily income from informal jobs can reach 6.00 USD. From the amount earned, an average of 3.50 USD is spent on food, which does not purchase a proper dietary intake (FAO, 2014). Therefore, the project's objective was to increase the daily consumption of fruits and vegetables per participant, establishing an initial 110g per capita, through the development of agricultural gardens in the neighborhoods' households.

The selected areas presented common characteristics. The neighborhoods of Nueva Suyapa and Villanueva (**Image 4a**) were both created to accommodate people who had been affected and displaced by natural disasters. With time these neighborhoods grew, as they also became a popular settlement for rural immigrants. However, the areas are heavily affected by insecurity and limited access to basic services. For the case of Los Pinos (**Image 4b**), it was initiated as part of a land recovery program, where displaced populations and rural-urban migration flows now influence it as well (FAO, 2012b).

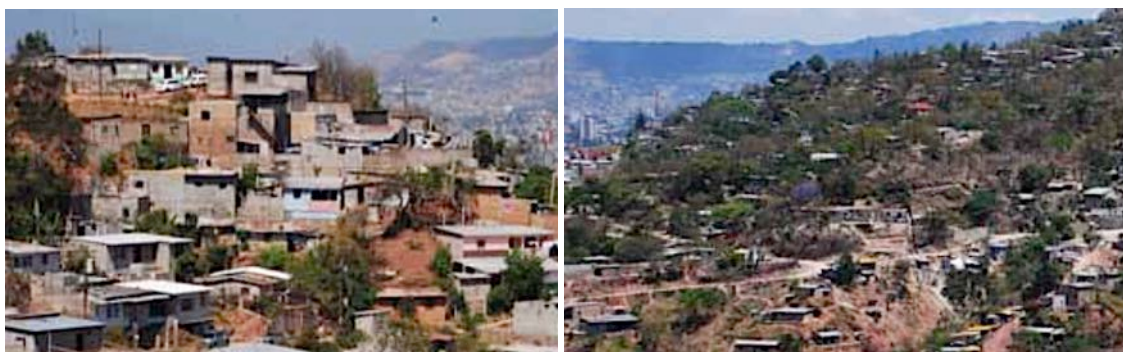


Image 4. Left (a): Colonia Villanueva. Right (b): Colonia Los Pinos.
Source: FAO (2012b).

In addition, the land in the selected areas is of very poor quality for cultivation, and in many cases households do not have enough space for their own garden. There is seldom access to water services, as provision happens once a month for a few hours, leaving households to store water in containers. For this purpose, the AMDC was in charge of providing water for the project by renting mobile containers for the delivery of water.

The plan focused on two main components. The first was the production and nutrition aspect, where the participants were instructed in training centers (CDCs, for their Spanish acronym) on cultivation techniques, in order to apply the most convenient system for their household production. Furthermore, instruction was given on the importance of nutrition and the diversification of foods in the daily diet, minimal nutritional requirements, and how to use the garden products to reach this goal. The second aspect was “healthy households”, which included activities to support the production, such as rainwater harvesting techniques, greywater filters, improved wood stoves, and waste recycling.

For the project’s execution the following structure was established: a general coordinator, a horticulture specialist, technicians, a nutritional expert, and a representative from the AMDC that would serve as liaison between the project and the municipality. Of the selected participants, an 88% were women, where 72% were the heads of the household and half of them owned their house; the average household these women attend is composed of 5.3 members. Also, a 69% of the families were not practicing any UPA activities before this project (FAO, 2012b).

An initial network had to be established for the project to begin. The first step was approaching the community. However, trust had to be gained, for which the AMDC became the link between the project and a leader from the community board or *patronato*. This person gathered the community for a preliminary socialization process, in order to organize the members and present the project to them. Through these meetings, planning and coordination was done in order to establish a working framework for the participants. Once initiated, three main steps were developed.

The first phase consisted of training in the CDCs established by the municipality, which were done in a weekly module, with 8 modules in total. Participants were able to learn gardening techniques through a “learn-by-doing” approach in the courses. Likewise, it is important to highlight the knowledge contribution from several of the trainees, as many came from rural areas and had some kind of experience in production. Simultaneously, cooking workshops were taken in order to learn how to use the harvested products in the most nutritional and efficient manner.

After the training stage, the second phase involved the development of the household gardens. The technicians were in charge of giving orientation to the families and supervising their work. Also, the visits helped to identify key actors involved in the gardens, and give further diffusion to the project

among the communities. Finally, the third phase consisted of delivering the inputs for the family gardens: seeds and barrels to store water. In this step, the communities were represented through a board, named *cajas urbanas*, to whom the participants had to give a percentage of the inputs in order to develop a community fund program that would later serve to multiply the inputs and as an auxiliary fund for the families.

The adoption of technologies was also necessary to support gardens being developed in small spaces and to reduce the environmental impacts of the activity, through technologies that were easy to implement, of low cost, and composed of local inputs. Considering the water and land limitations in Tegucigalpa, greywater was filtered in a recycled tire system (**Image 5**) and the land was moistened through a drip irrigation structure, water was stored in containers made of recycled tires as well, and cultivation was done in reused materials (e.g. bottles) when space was limited. Additionally, these measures aided the producers to become independent from the municipal water service for the garden production.



Image 5. Greywater filter adaptation. Source: (FAO, 2012a)

By the end of the project in 2011, a total of 1,222 people had participated in the program and 88% had developed their own gardens. Among the main products harvested were radishes, lettuce, coriander, carrots, celery, cucumber, yucca, and peppers. More than half of the vegetables consumed in the households came from the garden, with an intake increase of 110g to 260g per capita. The financial contribution of the garden to the household economy was between USD 20 - 36 a month, and the occasional surplus is sold or shared among the communities (FAO, 2012b).

Women were an important resource for the project since most of them are the heads of a mono-parental family. And even though they keep busy schedules to support the household, many of them find the time to do voluntary community work, generally with church groups or civil organizations. The main reason for them to participate is “people have needs” (FAO, 2014). UPA activity allowed them to become less dependent on other family members and better support their children. Additionally, the participation of family members in their household gardens contributed to strengthen family bonds.

Community building was also an important aspect, where women especially participated with the formation of community groups to support each other. Leaders and key actors were identified along the process, and many of them would continue to diffuse the project and encourage other people to join. The *cajas urbanas* system strengthens the community as trust is gained among the members, while serving as a financial support for the people in need. Regarding the CDCs, they continued to function as diffusion centers, where schools and other institutions joined to learn about UPA and the pilot project.

Lastly, the project’s impact is an estimated 6,110 indirect beneficiaries. Alliances were formed throughout the project with other institutions and organizations who supported the project with human resources and donations, such as the *Ministerio Cristiano de Mayordomía* of the Catholic Church, groups from the Evangelist Church, *Asociación Compartir*, and several schools. In addition, a final product of the project’s development was the elaboration of manuals and recipe books published and made available to the public, in order to provide information on the techniques used by the participants. Likewise, the FAO has encouraged the government to extend their rural sustainability program to urban areas in order to benefit the vulnerable population in major cities.

This program is part of the Secretary of Agriculture (SAG) from the national government, in the *Visión de País 2010-2038* plan, where the topics of food security and poverty are included (FAO, 2014).

5.1.2. “Proyecto Piloto de Huertos Urbanos” – Household gardens

The *Madre Tierra* association, a member of the *Plataforma Agraria* organization, developed a UPA pilot project as part of their “Cosechemos Justicia en el Campo” program. The objective was to contribute to improving urban food security in vulnerable neighborhoods of Tegucigalpa with the development of small initiatives that included household gardens and a few school gardens, for the producers’ self-consumption and commercialization of any surplus. Additionally, it is expected this project will have an effect on the local authorities by stating the need for food security programs that will attend the population, as well as strategic policy-making in urban areas (Plataforma Agraria, 2013).

Three neighborhoods with common characteristics were selected for the project: Nueva Australia, Nueva España, and Mary Flakes de Flores. The population distributed along these settlements has seldom access to basic services, meaning there are no sewage systems, health centers, public spaces, or police presence. Furthermore, access to these areas is limited due to the poor road conditions, and they are badly affected by the issue of urban violence.

A total of 100 families (an approximate 600 people) were selected, alongside three public primary schools with more than two thousand students. The participants were taken through a training process on agricultural techniques for the development of their gardens. Moreover, they received workshops for greywater management and filtering, and the fabrication of organic pest control. Besides, the recycling of wastes contributed in creating environmental awareness among those involved.

The household garden model consisted of any available space in the houses, and where such resource was a limitation, techniques had to be adapted e.g. vertical gardens made from recycled materials. As a result of the production, the participants improved their diets with the intake of fruits and vegetables produced in their own space. Also, *Madre Tierra* provided with recipes that are low-cost and based on the gardens’ produce, to illustrate the participants on how to use their harvest more efficiently.

Regarding the schools (**Image 6**), they are also vulnerable institutions within the city, due to the lack of public services, health care, and income for their sustenance. It is estimated that a total of 2,400 students benefited from the UPA initiative. The garden products are used for self-consumption in the School Meal Program³, in collaboration with the parents. In addition, the project has contributed in creating nutritional and environmental awareness among the students.



Image 6. Primary school in the Mary Flakes de Flores neighborhood. Source: Plataforma Agraria (2013).

As the target population is mostly lacking employment opportunities, most of their effort goes into food as part of their survival strategy. Through UPA they have been able to support their households, plus the surplus from the gardens is usually traded within the community

³ For a description of the School Meal Program refer to Appendix 1.

or sold in local markets and fairs. Neighborhood interaction has also created a greater sense of community in these areas, not only through trading, but also with the participants' diffusion of UPA practices by sharing their experiences with other households.

Conclusively, this experience aims to illustrate to the State, specifically the Secretary of Education and the Secretary of Agriculture, that UPA is an important food security strategy for responding to the needs of urban areas (Plataforma Agraria, 2013). More importantly, it is a response to rural immigrants who have been affected by the lack of opportunities in cities, and who are most susceptible to the hunger and poverty phenomenon. The challenge is to now replicate this model onto other vulnerable neighborhoods of Tegucigalpa and other cities of the country, such as San Pedro Sula in the North.

5.1.3. "Agricultura Familiar por una Vida Mejor" – Household gardens & school gardens

The urban farming project is an initiative executed by the Secretary of Development and Social Inclusion (SEDIS), through their "Generación de Oportunidades" Program, in accordance to the vision of the current government administration. It aims at tackling food insecurity by improving the diets of children and adults, who are in vulnerable conditions across the country, targeting people under the national poverty line and extreme poverty indicator. The target populations are families, pre-elementary and primary public schools, and communities across the country.

Generally, government technicians start by doing an initial scouting of the intervention sites, in order to determine the conditions of the land and begin its preparation. Inputs are delivered to the participants for the development of their corresponding gardening model, and the garden is adapted accordingly to the available conditions, determining whether it would be a vertical garden or cultivation in containers, for example. The drip irrigation system delivered by the program makes it possible to use water from any available resource thanks to its filtering mechanism.

Simultaneous to the installation, training is given on production techniques; government technicians are in charge of installing the irrigation systems and orienting the people on how to prepare the land. The main products obtained from this activity are carrots, radishes, beets, beans, and corn. Workshops are given by nutritionists on how to prepare these foods to improve the diet of the members. However, the crops are adapted to the type of land, to see which type could be more profitable in each environment.

Also, the First Lady Office supports the program as a part of the "Vida Mejor" development strategy, collaborating with SEDIS to organize a family guides network. It consists in assigning local family guides throughout the country, which are trained on the topic of household agriculture and are responsible for monitoring and orienting the participating families.

In order to approach the families, the government contacts the municipalities to identify the population in the local registry. The family guides support the initial contact by confirming the information of the poor households and integrating them into the initiative. An estimated 50 m² are needed for the development of a household garden to serve the purpose of self-consumption. The program makes delivery of a drip irrigation kit, high performance seeds (e.g. corn, vegetables, and beans), fertilizers, and a tool for working in the garden.

In the case of the school gardens, the program has a strong educational component and aims to recover agricultural traditions; lost several years ago from the country's educational system, when schools were required to have a vegetable garden for didactic purposes in the topics of nutrition and environment. Public schools are only integrated into the program if they have a 200 m² space for

gardening and irrigation activities, and access to the public water provision services (**Image 7a & Image 7b**).

Five crop seeds are delivered to each institute, and like in the household gardens, the program also provides an irrigation kit and enough fertilizer for this garden size, but no tools. Furthermore, an active involvement from the parents, teachers, and students is necessary for the management and maintenance of the gardens and their products. To this day, there are 55 schools involved in the Central District municipality, and thousands more throughout the country.

In addition, the project provides with multiple benefits to the educational centers, such as improving and diversifying the diets of children. The garden products are included in the School Meal Program (**Image 7c**) of the institutions, contributing with the provision of vegetables that are not included yet in this program. Indirect benefits in improving nutrition and agriculture among children include less dropouts, health awareness, recovery of traditions, social interaction, and environmental awareness. For the latter, there are cases where deteriorated and abandoned land surrounding the schools is available, for which the school becomes responsible for cleaning and conditioning it for agricultural purposes, and teaching the importance of productive land in urban areas.



Image 7. Left(a): initiating school garden. Center(b): School garden harvesting. Right(c): Parents collaborating with the School Meal.

Source: SEDIS.

The greatest obstacle for the project's progress is the scarce human resources to support a national-level initiative (for example, only five technicians), besides poor communication between them and the lack of interest from some of the selected participants. Additionally, the project's reception is challenged by the people's education level, as some cannot grasp the program's purpose and its importance to improve livelihoods. Others are reluctant in adopting the project due to ideological positions, since the program is an initiative from the national government. And finally, security issues in urban areas affect the gardens' integrity.

Even though social limitations may constrain the program, its developers agree that financial support could become an even greater constraint, considering its legal status. The gardening project is still in the legalization process, meaning it is not contemplated yet in policies and strategies but only in the government's programs, diminishing its potential for support, funding, and its continuation in future administrations. In the case of schools, this limitation does not allow for agriculture activities to be officially integrated into the curriculum. Therefore, children need to invest extracurricular time in this activity, making it less attractive.

Moreover, the conditions of Tegucigalpa make it the most complicated area for developing the program, especially due to the state of the water services, where many schools do not even have access to them. Also, schools in the capital have very little space for garden practices; for some cases it would mean removing the playground, which authorities and school administrations are not willing to do. Continuity to the gardens cannot be given in the vacations period, when the staff and students are gone and the facilities are closed, therefore the garden must be restarted at the beginning of each academic year.

Lastly, the development of the program in urban areas has been limited by the participants' knowledge of agricultural practices. Even though a large portion of the vulnerable population is a product of a rural-urban migration, the techniques in urban areas vary greatly from those in their places of origin. This means that training must start from the most elemental level, resulting in a longer implementation process.

5.1.4. *"Escuela Cerro Grande" – School garden*

The Cerro Grande neighborhood school is a public primary-education institution with a capacity for an average of 900 students a year, and a staff of more than 40 teachers. In the year 2004, they initiated a small academic entrepreneurship project that has grown to five school enterprises in which the children participate as part of their educational program. The activities range from food production and processing to the fabrication of household tools and decorations. By 2010, their agricultural enterprise (AGROPEC) decided to implement a school garden project, in order to educate the children in cultivation practices and their values (Fletes Ramos, 2012).

Initially, the interest came from a teacher's attention towards the FAO project previously mentioned. From here on, the school staff requested the support from FAO for the development of a school gardening program in their institution. The result was that not only did the NGO provide with technical assistance and gardening inputs, but also with the provision of one irrigation system based on rainwater collection and the infrastructure to fully develop the farming project (FAO, 2013).

Training was given to the teachers on gardening techniques and the importance of UPA, so they could later apply it in the school's educational activities, passing this knowledge onto the students. A garden composed of 400 tires for the cultivation of crops was developed, and it makes use of organic farming practices. Among the main products are radishes, lettuce, spinach, onions, peppers, tomatoes, beets, and different herbs. The produce is later used in the elaboration of the School Meal (**Image 8a**) and in practices for another one of their school enterprises (DACE).



Image 8. Left(a): Elaboration of the School Meal with garden produce.

Right(b): Students selling the products in a school fair.

Source: Fletes Ramos (2012).

Besides teaching gardening methods to the children, they are also instructed in food processing activities through DACE, where the students work to make pickled goods, jams, breads, *tortillas mejoradas*, sweets, and the food's respective packaging. The products are then sold to the parents and the community, and two fairs are held in the school grounds each year for a bigger commercialization of the products (**Image 8b**). The income is later used to support the enterprises themselves.

Moreover, an important characteristic of the initiative is its particular irrigation system. Since the school receives water for only six hours during the day and twice a week through the municipal system, then the crops could not be dependent on this service. The school had to seek its own sustainability. Private companies also contributed to this system with the donation of materials and financial support for its construction. The system is composed by a rainwater collection system, a storage tank, and distribution infrastructure (Fletes Ramos, 2012). The children were included in the design as the water is pumped by the playground's games (**Image 9**) and distributed along the school grounds when irrigation of the crops is needed.



Image 9. See-saw game connected to the water pump. Source: Fletes Ramos (2012).

Today, the school has a vegetable garden, a water storage tank, a greenhouse for producing aromatic herbs, and a small food processing enterprise (**Image 10**). Awards have been won for being an environmentally friendly institution and for its small enterprises, investing the prizes in sustaining the program. Such educational center is an example to others for its characteristics on the topics of entrepreneurship and sustainability, and the importance of these types of activities in the students' curriculum. Furthermore, the school is a strong case for the alliances these types of projects can form in order to promote more sustainable development.



Image 10. Vegetable garden and the greenhouse. Source: Fletes Ramos (2012).

When it comes to the involvement of stakeholders, the teachers' initiative has been key to the school's development, and the elaboration of the project plan that would bring together the collaborating organizations and institutions. The support from NGOs and the private sector has also contributed to the improvement of the project, as the school depends on the government for resources. Furthermore, the parents are involved in the school's activities by providing assistance and financial resources.

It is expected that this case can be later replicated in other educational institutions of the country. Agreements have been signed between NGOs and government representatives to promote the incorporation of school gardens in the educational system, with the goal of tackling hunger and unsustainable practices (FAO, 2013). In the meantime, it is forecasted that by teaching the value of gardening to children, they can later practice it in their own households and integrate other family and community members into these practices, having a “domino” effect on small areas of the population.

5.1.5. *“Huerto Familiar Autosostenible” – School garden*

The agricultural university of ZAMORANO is located in the outskirts of Tegucigalpa, and as a part of their social responsibility program, the university works on aiding small populations in need from the peri-urban areas of the city. The children’s home REMAR was chosen for a farming pilot project, as it is in the vicinity of the university and for previous collaborations between both institutions. Furthermore, it is an initiative from a student association in the university who participates in social responsibility activities with REMAR.

The denominated “self-sustainable family garden” is a project that aims at providing technical assistance in agricultural and environmental activities, for institutions such as the children’s home to be able to produce their own food for self-consumption and commercialization of any surplus. The project is being developed in an area of 700 m² of land that surrounds the home, and its production is estimated to provide for 50 people.

The students of ZAMORANO are in charge of training the home’s guests and staff on agricultural practices, through their gained academic knowledge on the production of vegetables and grains, and the care of poultry and dairy cattle. Schooling is done on a weekly basis, where the topics range from the preparation of the land to harvesting the products. The final goal is to develop a peri-urban farm that includes a vegetable garden, an area for chickens, a small grain production, and a fruit orchard. Sustainable practices are included in the training to ensure the home’s farm can maintain itself in the future. Solid waste management is an important point for the development of the project as this topic includes the construction of compost bins and waste recycling. Moreover, the practices are part of the environmental orientation given by the students to avoid further impact of the small farm on the surrounding areas.

At the time of the research, the plan was in its initial stage. The university’s professors were becoming involved for the growth of the project, and arrangements were being made in order to obtain more resources for the farm’s development such as financial support, infrastructure donations, and agricultural inputs for the production. Furthermore, collaboration with government institutions such as SEDIS is being sought to acquire an irrigation system, since the university does not have the resources for providing it. However, some resources already obtained include the materials for the development of a well and tools to work on the garden.

After completion, it is expected that lessons can be learned from this specific project to improve the initiative. For example, to have an effect on the children’s food security and nutrition, which can be evaluated and enriched by the university’s Laboratory for Human Nutrition. Further on, this experience may be later replicated in the nearby communities and other centers in need in peri-urban areas of the capital city.

5.1.6. Informal UPA across the city

Aside from the five projects mentioned beforehand, a small number of informal UPA activities were found across the city. They are labeled as “informal” as they receive no external support and are implemented by their own participants solely. They present common characteristics such as their spontaneous origin and the purposes for their practice. However, their nature also affects their development and degree of resilience, and possibilities for expansion. The locations of the projects are represented in the following image (**Image 11**).

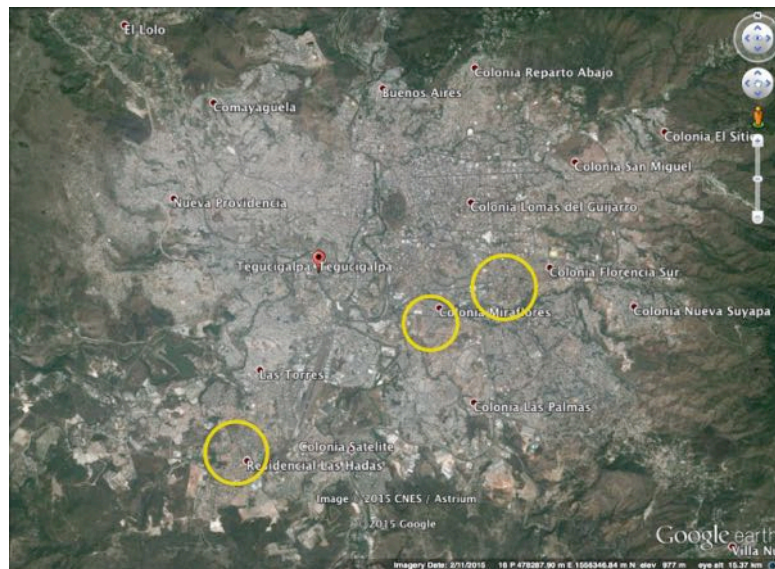


Image 11. Locations of informal activities.

Source: Google Earth.

a. Preschool Amilcar Rivera Calderón

The first enterprise consists of small UPA activities practiced in a public preschool in the Luis Landa neighborhood. The institution has a positive reputation for the success of its School Meal program, where the parents and teachers have organized themselves for providing a daily school meal for 50 students. Due to the achievements accomplished through this program, the institution is now moving towards improving its academic curriculum. Field activities are being integrated into the courses to not limit the children’s education to the classroom, and motivate them to replicate such practices outside the school. The teachings include a program composed of small UPA activities where the students get in contact with domestic animals and exercise cultivation.

Within the program, an aviculture project is taking place with the development of a henhouse in the school’s backyard (**Image 12a**), where the parents gathered the materials for its construction and the animals. Besides its educational purposes, the produced eggs are sold to the community and the families, providing a small income to the school. Fruit trees (**Image 12b**) and a corn garden also take part in the project, of which the produce is included in the School Meal and the surplus (if any) is sold to the community as well.



Image 12. Right(a): henhouse in the school's backyard.
Right(b): banana and mango trees in the school grounds.

These activities contribute to the School Meal's purpose of educating children on the importance of nutrition. In addition, they teach the students on the values and benefits of growing and processing their own food. However, the school is limited by space to further develop their practices since an expansion would mean using a part of the playground, which holds the risk of demotivating the children.

b. Interim use of land

Even though Tegucigalpa continues to expand its urban area, it is still common to find empty lots throughout the city. The observed sites correspond to residential neighborhoods that can be labeled as "recent" urban developments, and in which there are still unoccupied lots to be found. According to the inquiries, they are private property, as can be also deduced from the presence of fences (**Image 13**). The owners have not built in their plots yet for unknown reasons.



Image 13. Left: Cultivation in a private lot, North of the city.
Right: Cultivation in an unoccupied site, South of the city.

Furthermore, the gardeners involved in this activity are usually the neighborhood guards or laborers working nearby. The producers generally ask for permission from the owners to start cultivating, and if granted, a garden of corn or beans is developed (**Image 14**). The products are usually used in the gardener's household or for commercialization in their own communities. Lastly, an important characteristic of these gardens is their temporal nature since they are subject to the plot owners' decisions, and the gardeners develop them in their spare time. The result is dispersed cultivation sites across residential neighborhoods that tend to just last a few months.



Image 14. Left: corn production. Right: bean production.

5.2. Integration of UPA in Tegucigalpa

The topic of food security is highly related to the phenomenon of urban poverty. When people cannot fully develop their skills due to food insecurity and other factors in earlier stages of their lives, they are later exposed to losing employment opportunities, consequently reducing the possibilities for social mobility. The result is a continuous cycle within the social strata, with the potential of translating itself onto the next generations (Plataforma Agraria, 2013).

In the case of Honduras, a high amount of the rural and urban population has limited access to the monthly basic food basket (*canasta básica*), as it is now rising to an approximate Lps. 7,750 (USD 370), and the average minimum wage of Lps. 7,200 (USD 340) only covers a 93% of its total value (La Prensa, 2015). Moreover, the urban poor are able to earn an estimated Lps. 4,717 (USD 225), which fluctuates on a frequent basis due to the informal nature of their income sources (FAO, 2012b). Thus, increasing the risk to limited food access and nutrition in vulnerable populations.

In spite of this pressing need, UPA is still not included in the authorities' agenda. The *Visión de País 2010-2038* plan contemplates the problems of poverty and health, the generation of employment, and the need for sustainable development, and even though these goals have been stated for the country, a plan for tackling these problems simultaneously has not yet been developed. Furthermore, international NGOs have already set the framework for improving food security alongside the problem of urban poverty, as can be seen in the FAO's work and the involvement of the World Food Programme (WFP) in the distribution of the School Meal provisions; meaning the national and local governments should consider such strategies as part of their development plans.

On the other hand, as the population's needs have increased throughout the years, alternatives are being sought by such agencies and local organizations to alleviate the problematic. UPA has presented itself as the alternative for improving livelihoods and social cohesion among the urban population, giving rise to the pilot projects presented beforehand. The main driver that can be observed from the case studies is the theme of food security and more specifically, the issue of health. Another common characteristic is the need for self-sustainability, as most of the targets were dependent on other sources of income for their own maintenance before engaging in UPA.

Likewise, these subjects go in hand with the topic of empowering the population, as through knowledge gain and skill building they are able to improve their situation; UPA becomes a form of occupation, income, nourishment, self-esteem improvement, and social change within marginalized groups. Additionally, empowerment is also related to the appropriation of the urban environment since people add value to their work and the benefits they gain from it, producing in them a will to

overcome their situation by improving their context (van Veenhuizen, 2006: 6). Therefore, UPA has shown potential to simultaneously address urban issues through spatial production and increase the degree of resilience of Tegucigalpa's inhabitants, and on a future-larger scale, the city itself.

Yet, the case studies reflect the difficulties of expanding and improving the practice when the official channels do not support it. There is awareness that a legalization of practices cannot be easily achieved, but measures that recognize UPA and encourage the population to practice it may begin from the simplest strategy at the bottom of the hierarchy in order to help this activity. Moreover, this process is initiated through a demand by the population, for which an emergence of bottom-up initiatives would be key to compose a food movement.

For the latter point, the strongest example is the participating schools, where UPA has been integrated in educational activities to motivate children and their families to take part in this movement. Even though it is not required from the official academic curriculum, teachers and other institutional stakeholders have been able to illustrate the benefits of UPA and motivate children and their families to integrate into the projects. Most importantly for these cases, the development of UPA has been successful through good community organization (school, families, and neighbors) when it comes to its socialization process and application, further indicating the potentials of an empowered population.

Likewise, as agencies and citizens themselves have demonstrated a need for solutions, a point that has made UPA possible is the spatial resource. In most case studies, such as the schools, space has become the most valuable resource to promote self-improvement through UPA. It can be observed that land, or space, is also a pre-condition for agencies to provide aid to the target groups. Similarly, informal activities have also taken advantage of any available land within the city for practicing UPA, illustrating the entrepreneurial attitude of the population towards improving the current urban conditions.

The productivity of the land is also an important concern for planners and developers of Tegucigalpa who are now searching for new alternatives for the city, which include a sustainable development orientation. Organisms such as the IDB and local foundations have stated the need for integral solutions in the city that simultaneously address the social, economic, and environmental pillars of SD. The occurring shift towards new land use plans and urban interventions may serve as the instrument to integrate UPA into the city's planning, serving as an innovative strategy for addressing urban issues, even when its contribution to planning has not yet been tested in the context of Tegucigalpa.

Consequently, with the preparation of simultaneous urban interventions in Tegucigalpa, UPA may be included as a network of more specific contributions to the development of the city. Even though its practice may be on smaller scales, the sum of the initiatives can later generate a big impact for the society and the urban environment. Additionally, its scale may serve as an advantage since fewer resources are needed for its development and for perceiving its effects, demonstrating that other alternatives are possible for solving the urban problematic of Tegucigalpa.

5.2.1. Windows of opportunity

With the overall need for integration of UPA in Tegucigalpa stated, this section describes the conditions and aspects to take advantage of when applying UPA as a strategy for sustainable development in the city, based on the knowledge provided by the interviewees and the exploration of the documentation. The first aspect to observe, and one of the most repetitive points throughout

the information, is the possibility of inter-institutional collaboration and alliances among the stakeholders of UPA.

As established by the theoretical framework of the research, UPA is best achieved through a multi-stakeholder process that adds a dynamic character to the planning process, so the system is able to adapt as the city evolves and expands itself (van Veenhuizen, 2006: 2). A few examples of possible stakeholders (**Table 2**) include government agencies and municipalities, international and local NGOs, the private sector, educational centers, and the citizens themselves.

Table 2. Potential stakeholders for UPA.

Potential stakeholders of UPA in Tegucigalpa	
Government	Offices such as SEDIS, SAG, Ministry of Education, and the municipality.
NGOs	International organizations such as FAO, WFP, UNDP. Local agencies such as Asociación Compartir, the Rotary Club, and religious groups.
Private sector	Foundations from companies, social responsibility offices, urban development firms, supermarkets, food distributors, restaurants, and organisms such as the BCIE and the IDB.
Academic and vocational centers	Universities (especially of agricultural education), public and private schools, special schools, rehabilitation centers, and training centers such as INFOP.
Community organizations	<i>Patronatos</i> , neighborhood groups, clubs, and volunteering programs.

A participative process may help implement UPA by improving the quality of decision-making, through the understanding of the needs and priorities of the different stakeholders involved. In addition, a continuous exchange of information, or the involvement of institutions with high credibility, will elevate the level of trust of the participants and increase the outreach of the initiative. Further on, this process may enable building a sense of community among the population to further collaborate between them, by building community organizations and *patronatos* that aim at common goals.

Consequently, there is better likelihood for implementation of UPA practices with the coordination of different mechanisms, and an effective use of human, financial, and environmental capital. An example is the cooperation between stakeholders to complement each other for resources, as in the UPA Pilot Project where the FAO provided the technical tools and the AMDC contributed with the financial means for the program. Institutions or other fellow stakeholders can facilitate the resources for the practice contributing to the empowering of the citizens, in order to encourage a spatial construction of the city by the inhabitants themselves.

Likewise, the already existing initiatives serve as an additional opportunity for the integration of UPA in Tegucigalpa, as they serve as a starting point for UPA's development. According to the interviewees, it is difficult to implement programs in the socio-political context of Tegucigalpa without a previous reference or exploration of the issue at hand. Therefore, the case studies represent pilot projects of which lessons can be learned from in order to take future action for improving or reformulate strategy building in the city.

Besides serving as a reference, these programs can be further expanded to increase their reach and effects on the urban population. The initiatives demonstrate the potential of integrating UPA into an already existing program such as the School Meal, where the schools incorporated the products from their gardens into the elaboration of the meals to diversify the diet and improve the daily intake of the children. Considering that all public schools participate in the School Meal program, this poses a strong advantage for the integration of UPA into an already existing initiative.

Furthermore, the case studies show there is strong motivation and interest from the participants in becoming involved in UPA activities, meaning there is a general positive acceptance towards the

practice to take advantage of. An example of the participants' motivation is the teachers who played a role as initiators of UPA in their respective institutions, as can be seen in the Escuela Cerro Grande and the preschool Amilcar Rivera Calderón. However, this phase can only be achieved through a socialization process that spreads the potential of UPA and knowledge for its development.

Knowledge plays an important part as it defines the application methods and the resources needed for gardening, which empowers the citizens to exercise UPA. An example of the importance of knowledge is the general perspective that UPA is a "time consuming process"; however, the methodologies used in the case studies have demonstrated how this statement is dependent on the applied techniques. In addition, the documentation shows that UPA is an activity that can be undertaken by any person who already holds the prerequisite of knowledge. Thus, UPA can target at children, adults and the elderly. In the case of children, the interviewees agree that they are usually a target population as they are likely to have an eagerness to learn and since they adapt more easily to their context.

On the other hand, recent health movements throughout the city are inculcating the importance of food and physical activity in Tegucigalpa's population. The city's society has been generally characterized by unhealthy habits over the past years, caused by the globalization of food chains and branding throughout the country (Schortman, 2010) and the population's discouragement towards outdoor activities due to the insecurity problem. With the rise in events such as health campaigns, *recreovías*, and marathons, people are being stimulated to improve their lifestyles, serving as another opportunity to encourage UPA practices in the urban culture for its health and recreational values.

More importantly, recent investments in development point towards addressing the social problematic of the urban and peri-urban area through the revitalization of parks and community spaces, as can be seen in the proposals from Fundación Convive Mejor, which aim at building a sense of community and improving urban security. Consequently, common areas are becoming a medium for communities to converge and interact and for the appropriation of their urban environment in the search for community development. Hence, public or communal space is a mechanism for UPA to take part in initiatives that focus on the renewal of the urban area and that allow for UPA to be a visible practice in communities.

Likewise, the emerging SD discourses in spatial planning aim at simultaneously attending social, economic, and environmental issues through a more integral point of view, aspects in which UPA holds potential. Moreover, these interventions aim at detonating sets of similar initiatives across the urban area. Thus, the temporal character of UPA, and its mobility and adaptability to its context, can secure the productivity of the land in the meantime and enhance the effects of the interventions.

5.3. Effects of UPA practices over the city

Although the wide range of literature on the effects of UPA over urban areas lists aspects that range from specific points, such as the promotion of biodiversity, to large interventions, like the development of green belts around cities (Deelstra & Girardet, 2000; Smit & Nasr, 1992), this section focuses on the impact over Tegucigalpa. For the case of the Honduran capital, the application of UPA practices would influence the city's urban social, economic, and environmental setting. The following section illustrates the main themes around which UPA would have an effect, including benefits, according to the analysis from the explored documentation, case studies, and statements provided by the interviewees. Furthermore, it showcases the issues as perceived by the city's socio-political context and the immediate expectations over the implementation of a UPA program.

a. Social and economical aspects

“Urban agriculture by its nature is a low-capital high-labour industry and attracts small low-income entrepreneurs and employs part-time and temporary low-skilled workers.”
(Smit & Nasr, 1992)

Empowerment. Firstly, is the topic of empowerment of the population, where training and skill building of families, adults, and children in techniques of UPA makes for a knowledgeable crowd, that can appropriate and build the context to improve their situation and come out of under-development.

This issue concerns more to lower-income households, who are highly exposed to missing job opportunities and who are in most need for them. Furthermore, a highly vulnerable group is women, who are usually the home managers and must provide for the family, in which is common to find a single parent household. As can be seen in the cases of household farming, women have an important role to play in the projects as UPA has served as a form of occupation for them, besides being a medium that provides with nourishment and reduces household expenses.

Community building. Likewise, UPA has shown to have an effect on community building and improving social relations throughout the case studies. The strongest example has been the collaboration between stakeholders for the cases of school gardens, where the children, parents, and teachers are brought together and organized for the implementation of UPA in the schoolyards and the processing of produce. This cooperation has been key for the maintenance of the gardens, the inclusion of the harvest in the School Meal, and the commercialization of surplus and food products, as in the example of the Escuela Cerro Grande enterprises.

Food security & nutrition. More importantly, UPA tackles urban food insecurity and malnutrition, taking into account this point is the main driver of the practice. In the case Tegucigalpa, the major problem of food is the access (purchasing power), and not necessarily food supply, especially for the urban poor. As could be observed, the application of UPA has the topic of food security as its priority with the goal of producing for self-consumption and sustainability, whether in households or schools. The result is an improvement of consumption habits and the level of nutrition of the participants through the diversification of their diets. An example is the UPA Pilot Project of FAO (2012b), where the producers increased their daily intake of fruits and vegetables from 110g to 260g by the end of the project.

Social change. With the points mentioned beforehand, the result is a strategy that helps the target population improve their current status. By enabling a form of occupation in vulnerable groups, social change can be initiated and with a gain of benefits on the long-term. Further on, it is expected that by improving livelihoods, citizens will be less exposed to the issue of violence, which is so latent in the city in recent years. Therefore, a transition into an improved quality of life for the city's inhabitants may be achieved with the social, economic, and urban environmental benefits of UPA.

Economical aspects. On the other hand, practicing UPA will allow recovering agricultural practices and traditions that have been lost, considering that Honduras is still a country where 37.8% of its economically active population depends on activities related to agriculture and food chains (Consejo Económico y Social, 2005). At the economic level, UPA becomes a form of employment for vulnerable groups. Its financial contribution to practitioners is illustrated with the savings in food purchasing and the commercialization of any surplus or food products. According to the FAO (2012b), a household's garden impact may be an estimated USD 20 a month, which is equal to 13%-25% of the value the participating families assigned to food expenses.

Moreover, the economic impact of UPA is translated into the healthcare and productivity sector, a phenomenon labeled as “the cost of hunger” (Martínez & Fernández, 2007). Through the improvement in people’s nutrition and personal development, they are less prone to disease, which results in reduced expenses for the public healthcare system. Also, they may build the capacities needed to obtain employment opportunities, becoming a productive asset to the economic sector of the country.

Investment in the future. When it comes to the subject of children participating in UPA as seen in the school cases, their eagerness to learn helps in diffusing the practices, since children easily absorb the information and later replicate the activity in their household. Aside from the benefits of knowledge gain, it contributes to improving children’s nutrition and their personal development, having an effect on skill building and academic performance and improving their prospects for the upcoming years. For the interviewees, training and teaching the value of UPA to children is an investment in future generations that will have a long-term effect on the urban society.

b. Environmental aspects

Climate change affects the performance of agricultural yields, impacting the use of arable land and its overall food production. Consequently, food prices may change, which affects the ability of the urban households to purchase sustenance. Moreover, climate change influences water availability and quality that could increase a society’s health and sanitation problems, and produces extreme weather events such as floods. For the latter, this increases the risk of exposure of the most vulnerable urban households (WFP, 2014).

Therefore, UPA holds the potential to become a strategy for climate change adaptation in the urban environment. And although urban agriculture makes use of resources (e.g. land and water) for its development, whether as inputs or space for crop cultivation, it can also be deemed as an opportunity for the conservation of such capital when viewed from a different perspective (Smit & Nasr, 1992).

Land management. As UPA gardens are developed over open land across the city, the urban environment is enriched with the greening of space. Such areas are regarded as instruments for landscaping and enhancing urban aesthetics, which have a general positive acknowledgment from the population. Open green areas additionally contribute to the improvement of the city’s microclimate and its surroundings with the presence of vegetation.

Consequently, green areas further have an effect on the land and water inputs needed for UPA. Vegetation helps protect the surfaces against erosion and its consequent nutrient loss, resulting in a revitalization of the soil conditions. Likewise, as Tegucigalpa is a city prone to landslide risk, green coverage may help in reducing this threat during the rainy seasons of the year by improving the ground’s stability (JICA, 2002). Lastly, green space allows for permeable surfaces throughout the city, which serve to recharge the water cycle by allowing the filtration of rainwater into the ground.

Water management. Tegucigalpa’s most problematic resource is water, as expressed in UNICEF (1990), A. Brand and Bradford (1991), The World Bank (2012), and the interviewees. As the region is subject to a dry season during the year, the urban area is faced with water shortages and limited distribution in the absence of the resource. In addition, there is failure of the hydrological sources to recharge due to the impacts the urbanization process continues to have over them. Therefore, water for irrigation in UPA is less likely to become available, and independence from the water supply system must be sought to provide cultivation of one of its main inputs.

Freshwater can be substituted with greywater for irrigation purposes, as seen in the example of APU Pilot Project by FAO, especially in vulnerable neighborhoods where water services (if existent) are not in optimal conditions and with seldom provision. Also, rainwater can be harvested for irrigation purposes as well, considering the duration and the rainfall of the wet season. In addition, adaptation of technologies for water harvesting and distribution methods (**Image 15**) is needed for their implementation as illustrated by the case study of the Escuela Cerro Grande.



Image 15. Left: Drip irrigation system adaptation. Source: FAO (2012a).
Right: Distribution system by gravity. Source: Fletes Ramos (2012).

However, careful monitoring is necessary of such initiatives, as they may prove harmful to human health if not managed properly. Furthermore, the AMDC is not responsible for the water services in the city, as the *Servicio Autónomo Nacional de Acueductos y Alcantarillados* (SANAA) national utility is in charge of its management (The World Bank, 2012). Inter-institutional collaboration and coordination between both stakeholders, and other related agencies, would be needed for a water management program that includes harvesting, storage, filtration, and irrigation for UPA purposes.

Solid waste management. Another important concern in Tegucigalpa is solid waste management, of which there is no formal research still, and for which a solid administration program has not yet been implemented. Only an estimated 44.3% (2001) of the capital's neighborhoods classified by Metroplan have access to waste collection services (González & Andersson, 2006). The waste originated in households, buildings, and public spaces is collected by a common system and transported to a large landfill in the outskirts of the city, without any system for its final disposal, and for protecting the surrounding environment and nearby communities.

Therefore, UPA could contribute to processing solid waste from the city by utilizing such capital in two categories: organic and inorganic waste. Organic waste may be used for composting, a widely accepted beneficial activity and of which its use in farming is expanding (Smit & Nasr, 1992). The latter serves for recycling waste into construction materials for the gardens, as can be seen in the adaptations of tires, bottles, wood and other means for planting crops in the case studies (**Image 16**), specially when the soil conditions of the city are not ideal for cultivation.



Image 16. Left: Planting in recycled tires. Right: Cultivation in plastic bottles.
Source: FAO (2012a)

Peri-urban & rural production. Regarding the effects over the surroundings, production in cities may slightly reduce pressure over the rural production areas. However, its strongest point is the urban population's ability to demand and change the agricultural market in accordance to their needs. If the needs for specific vegetables and fruits (such as lettuce, carrots, radishes, and herbs) are satisfied through UPA, the market may switch towards producing commonly imported goods or specializing and improving the current production of foods e.g. grains, that cannot be cultivated in urban areas (Smit & Nasr, 1992). Additionally, it is important to recall that UPA will not replace rural production, but may affect the demand of specific produce and farming methods, for example, a demand of organic products for the urban market.

5.4. Obstacles of UPA in Tegucigalpa

As the research focuses on the applications of UPA in the city of Tegucigalpa, it is important to also consider the limitations of implementing such activity, in order to learn lessons from past experiences and improving its future progress. Regarding the area of spatial planning, addressing the obstacles of UPA would mean to identify the conditions of the urban context that could limit the application of such practice. The following section illustrates the obstacles of applying UPA in Tegucigalpa, as perceived by the interviewees and as illustrated in the studied documentation of the research.

5.4.1. Administrative and social aspects of UPA

a. Political context

The absence of UPA in the political agenda affects its implementation in several ways. Firstly, without a demand for such activities, gathering resources to support it is not done through the appropriate channels. Assets and human capital are not allocated to improve the projects, as can be seen in the case of the SEDIS program, where one entity drives the projects and further resources are still needed to expand the program. Additionally, support by NGOs and private foundations becomes challenging without a solid demand or development scheme, and for the achievement of inter-institutional collaboration.

Furthermore, the issue of continuation affects the development of UPA, since there is few interest and political will to reinforce already existing initiatives or commence new ones. Projects are generally interrupted across administrations, which have a 4-year duration, without gaining the benefits of a long-term period of operation. An example is the UPA Pilot Project, which was not given continuation after the change in municipal administration and agenda, leaving an information gap in the results of the program.

In the case of schools, the gardens are interrupted between academic years when maintenance cannot be given; however, the temporary character of UPA makes it able to restart the task in another period of time when there is willingness to continue with the project. The fragility of UPA in schools is further expressed with the absence of educational authorities in its operation, such as the Ministry of Education, resulting in a school garden program that cannot be guaranteed to work on the long-term and that is subject to the interest and willingness of the stakeholders for its development.

b. Knowledge & diffusion

It is worth highlighting the aspect of knowledge and diffusion of information as the most repetitive topic throughout the information. For this research, it is considered as the strongest limitation for the development of a food movement in the setting of Tegucigalpa, both for existing projects and the launching of new ones. As expressed by one interviewee: “people cannot apply it if they don’t know it”, therefore, the case studies depict the importance of knowledge for target groups to start practicing UPA.

Understanding the potential of UPA for changing their livelihoods will empower people to exercise it, regardless of the social group and context. Likewise, the type and level of knowledge will determine the kind of practice, such as farming techniques (organic or inorganic) and management of resources (water, land, and waste), as well as the opportunities for further enterprising and expanding the activity. Moreover, knowledge defines the consumer culture of different social groups, through which the demands that shape the urban setting are established.

However, the social stratum is embodied in the purposes for undertaking UPA, as it may vary from its development for household sustenance in the most vulnerable groups, to UPA for recreational purposes in the more privileged clusters of society. Furthermore, social status represents the level of opportunities for people to acquire knowledge on UPA and its practices, for which it is therefore important to address in development agencies the issue of diffusion among the different society groups.

Even though the case studies exhibit success stories on UPA, the interviewees agree that a diffusion phase is still necessary to showcase such positive results and enable more people to practice it. Therefore, a dispersal of information regarding benefits, technical knowledge, and other good practices would be beneficial for bottom-up food movements to emerge across the city with knowledge as their most valuable empowering tool.

c. Cultural context

Tegucigalpa’s culture is shaped by different factors that include political ideologies, religion, economic positions, and social status. Such points of view should be taken into account by developers when forecasting the acceptance of UPA activities in different social groups. An example of people’s position towards the practice is illustrated through the SEDIS project in schools, where some teachers have difficulties in embracing the program as their political perspectives contrast the current government administration. Therefore, the approach for implementing UPA may depend on the attitude from target groups and the enabler for its development.

Similarly, urban culture tends to be less sensible to problems in comparison to rural communities. A more individualist form of thinking dominates the city’s population, becoming an obstacle for community building and citizen empowerment. Consequently, individualism has added to other issues such as urban insecurity, which could present limitations for UPA as well. Insecurity heavily affects people’s reception towards outdoor activities, and it could affect the maintenance of gardens. Moreover, the society’s response to insecurity has been to enforce the privatization of

property (through walls, fences and other enclosures as seen in **Image 17**) reducing the interest in community interaction and intensifying urban individualism.



Image 17. Right: fence in lot with crops. Left: gated communities in the city.

Likewise, the absence of a food movement in Tegucigalpa presents an obstacle for the development of UPA. Although there are a few recorded activities regarding urban gardens and the need to change the consumption patterns of the people, they are still pointing towards more privileged groups of society. A bottom-up development from the most vulnerable populations is still missing, to demand improvement of the urban environment and to establish alternative solutions for the problematic. A citizen-driven food movement would be needed to start generating an interest in the population towards UPA and for a rupture of the cultural limitations stated beforehand.

5.4.2. Urban environmental aspects

a. Spatial planning setting

The lack of solid spatial planning in Tegucigalpa throughout the years has led to a series of urban problems that continue to build up today. This issue does not only affect the development of UPA, but the overall development of the city. Moreover, the city's planning system continues to be based on past development discourses, which are no longer able to respond to the modern problematic. Hence, UPA still does not take part in urban development activities, meaning it is not a permitted land use in the urban area.

As space is the first resource on which UPA depends on, the allocation of plots and other spatial possibilities must take place to enable the population to practice UPA. Likewise, land tenure is a common problem in the urban area due to illegal occupations and ownership insecurity, as could be seen in the examples of informal gardens. A clarification of land property and enabling the availability of space would have to take place in order to further enable UPA initiatives across the urban area.

However, achieving the stage of formalizing UPA in development plans requires time and work, for which the population must initiate the appropriation of space. The city's planners, therefore, have the opportunity to contribute as the "enablers" or "mediators" in the process (Mubvami et al., 2006), by guiding such activity in the form of small initiatives where the citizens drive the activity, along with the contributions from the local government and developers as observed in the case studies.

Furthermore, the spatial planning setting also affects other resources needed for the evolution of UPA, such as water and solid waste management. Thus, UPA is dependent on the circumstances of each specific intervention: available resources and their conditions. Planning, then, must moderate the usage of such resources, particularly the spatial resource, in order to ensure a sustainable development of UPA and the revitalization of the city's urban environment.

b. Inputs of UPA

Another observation derived from the case studies is the participants' dependence on other entities for the provision of UPA inputs such as seeds, tools, construction materials, or water. Sustainability in the practice must be achieved to develop it independently from institutions or charities, and to ensure its continuation throughout several seasons. Mechanisms such as the *cajas urbanas* in the UPA Pilot Project of FAO are a good example of methods that aid to ensure the resilience of projects and an empowering population, in case external or internal support is missing.

In contrast to the opportunities, inputs such as land and water may also become a limitation for UPA when viewed from a different perspective. Regarding the topic of water, it involves addressing one of the biggest urban issues of Tegucigalpa, which could represent a constraint for practicing UPA as its progress depends on the availability and condition of this resource. Consequently, UPA may also become dependent on the adaptation of technologies to harvest and reuse the water input.

Lastly, when it comes to the land, Tegucigalpa does not necessarily present the soil conditions for crop cultivation. When available space within the urban area is available, it may not be suited for UPA due to the soil type or exposure to contaminating activities, such as the presence of roads or industries. Thus, once again, adaptation of other methodologies would have to take place in order to develop urban gardens when the space or the right conditions are not present.

6. CONCLUSIONS AND RECOMMENDATIONS

Authors consider UPA as a strategy for achieving food security in the Global South. Furthermore, the literature has related the potential of UPA to many aspects of urban society, such as personal well-being, economic progress, and the sustainability of the environment. Unlike cities in industrialized countries where it is inclined towards social action, it is an activity focused on food production and as an instrument for the most vulnerable populations to face adversity (Duchemin et al., 2008). For the city of Tegucigalpa, UPA has developed under a very specific context due to the socio-political conditions and the overall urban development of the capital over the years.

Spatial planning in Tegucigalpa has been driven by past ideologies until now, as it is no longer able to overlook the urban problematic and must seek alternative solutions. A set of interventions focused on social cohesion and urban security are now in the making. Likewise, international support agencies e.g. FAO, WFP, and the IDB, are setting the framework for working towards the population's sustainability, among which UPA can be included as a development strategy. Therefore, a rupture of the more traditional top-down approach has commenced with the increasing participation of numerous stakeholders and inter-institutional collaboration in the transition towards a better capital.

However, the topic of active citizenship, or bottom-up development, appears to be hesitant under this context. The case studies outline a type of UPA movement in Tegucigalpa where most examples showcase a willingness from the local government, NGOs, and other types of "top-downers" to improve the conditions of the urban area, through development programs based on the production of food for aiding the inhabitants' livelihoods. Thus, the population has a certain level of dependence on support from external actors, leading to a passive demand from the population, instead of the expected spatial appropriation illustrated by the theory.

Nevertheless, the five case studies have shown the potential of UPA for contributing to the citizens' quality of life. Although UPA is not expected to become a medium for absolute household sustainability, it has certainly provided the target groups with more benefits than setbacks, which include the contributions to nutritional intake, skill building and empowerment, monetary savings, and social cohesion, among others. Moreover, as food is the largest component of household expenditure in the poorest homes, any contributions to reducing expenses is translated into liberating portions of income for the non-food expenses.

The household gardens have also demonstrated to be a channel for impacting the topic of equity, since women were the outstanding participants throughout the cases, even though the gender issue does not necessarily hold the strongest stance among the examples. In addition, there is a strong interest by several stakeholders in the instruction of UPA activities to children. By inculcating values and skills, and providing a better personal development, the stakeholders are investing in the forthcoming urban society. Qualifying the future human capital has a long-term benefit by securing a positive social change for the city and for escalating from under-development.

Still, UPA is not the sole solution to the urban problematic. When seen from the social point of view, UPA demonstrates to be fundamental as a livelihood strategy by the account of its human accomplishments; likewise, from the planning perspective, it may serve as a mechanism for urban environmental management. Yet, Tegucigalpa's conditions present multiple challenges regarding the availability of inputs (such as land and water) for practicing agriculture in urban areas. Effort must be placed on this issue considering the social assets of UPA could compensate for the unfavorable access to resources in the city. Therefore, it must be complemented by other programs or initiatives that aim at managing and providing the resources needed for developing urban gardens, considering

that several windows of opportunity for strategic development and inclusion of UPA have been identified throughout the research.

Nonetheless, a different challenge for UPA stakeholders in the Honduran capital further arises. As the historic evolution of the planning system shows, Tegucigalpa does not present the ideal scenario for continuing a top-down development of UPA programs as the case studies have suggested. In order to achieve a degree of self-sustainability in the population and to establish a bottom-up demand for UPA, it appears that the first issue to address is the topic of knowledge and diffusion of the practice. Knowledge is the tool through which people may become their own managers and instructors among themselves, acting as a driver for empowerment, social contact and exchange.

Further on, collective action will strengthen the people's identity, and their sense of self-determination in the face of hardship (Smit et al., 2006). The examples display how separate programs interact to create an urban agriculture regime that favors specific groups of the population, and shapes the involvement of stakeholders and the impact over their daily conditions. Hence, UPA represents both an end (the production of food) and a channel for strategically achieving community goals.

Lastly, the application of UPA is not a matter of tackling the increasing urbanization, but improving the quality of life of the characters that have been affected by this phenomenon throughout the years. By improving the social, economic, and environmental features around them in a sustainable manner, a degree of resilience is embedded in the population in order to ensure their adaptation against the constantly changing urban conditions of Tegucigalpa.

6.1. Recommendations for further research

In the research process, several topics became apparent that could not be fully addressed with the literature review and the produced information. As they are beyond the scope of this investigation, they would be of interest to researchers or other professionals involved in the subject of UPA as well. Therefore, this study acknowledges the need for further exploration into the specifics of the UPA scene in Tegucigalpa, by expanding the examination of case studies and identifying other initiatives in urban areas across the country.

Firstly, this research was based on successful stories of UPA in the city that have been developed with the support of large or influential stakeholders, such as the government, international NGOs, and private sector foundations formed. However, there is little information on minor initiatives formulated by groups, small businesses and individuals, or people that would like to start practicing urban agriculture. Through a larger sample of cases, it would be possible to look at the factors contributing to development or form of UPA.

Regarding the projects enlisted as case studies, an evaluation of the impact of UPA activities over their target population appears to be absent, probably due to the early progress of some initiatives or the lack of continuation by its developers. A more thorough understanding of the effects of implementing UPA over the social, economic, and environmental aspects of the urban area is needed to grasp the full potential of multiplying UPA activities, and encourage possible stakeholders to participate. In addition, back casting on the already established projects will help formulate the next steps for continuing the development of the case study programs.

In the case of a capital city that holds such a predominant informal economy, the topic of spontaneous UPA is still pending. A tracking of informal activities, such as the ones illustrated in the findings (Section 5.1.6), could provide with an overview of the magnitude of this type of UPA activity

across the urban area. Moreover, the drivers, characteristics, and stakeholders involved in informal gardens of the city remain unclear. More importantly, an understanding of spontaneous urban gardening might unlock the foundations for the emergence of a bottom-up food movement in Tegucigalpa.

Furthermore, analyzing the spatial potential of the city for practicing urban gardening would set the context for increasing the emergence of UPA enterprises. Such information could include the availability of land in the urban area, a characterization of potential sites, possible food desserts throughout the communities, and prospective social groups, to name a few. Likewise, a revision of the policy framework is crucial for understanding the role actors and instruments have for enabling or constraining the development of UPA, along with an overview of whether it should be placed in the agenda and later included in the planning system as a formal land use, as is the case of examples in the Global North.

Finally, the list of topics provided in the research aim to illustrate planners and developers with an initial guide to the unexplored phenomenon of UPA in Tegucigalpa. As interest in urban agriculture continues to grow globally, it remains to be seen whether a demand in Tegucigalpa's scenario is to be met; and in that case, how would planners and authorities respond to making the activity available, and where would the trade-offs of its application be encountered. Besides, the study aims to motivate leaders and professionals participating in the city's development to seek for alternative solutions for the urban problematic, by providing information on an emerging phenomenon in the Honduran capital.

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APPENDIX 1: DESCRIPTIONS

In order to understand the wide network of interrelated agencies and topics in Tegucigalpa's urban development, a description of programs being planned for the city is given ahead. Although they do not necessarily hold a role within the UPA theme, they add to the broader framework of the capital's planning scene since they have an effect on the system, particular stakeholders, or specific urban issues. Therefore, an overview of the types of cooperation and institutional support, goals of the stakeholders, and urban priorities can be observed throughout the following cases.

a. School Meal Program

The School Meal Program (*Merienda Escolar*) is a government plan founded in 1999 that aims at improving children's health and their academic performance; it currently attends to an approximate 1.4 million children in six thousand schools across the country. It is an initiative from the "Vida Mejor" plan and a broader program labeled "Healthy Schools" by the Secretary of Development and Social Inclusion (SEDIS), which works on three other areas as well: health, community care, and comprehensive care to the public. Furthermore, the School Meal has been integrated into the framework of "Hunger-Free Latin America and the Caribbean - 2025" in cooperation with the Government of Brazil and the Food and Agriculture Organization of the United Nations (FAO), aiming at improving the children's nourishment and eradicating hunger within the next generations.

The School Meal is delivered to all public pre-schools and primary schools in Honduras from rural and urban areas, along with some exceptions regarding schools funded by NGOs and religious associations. The World Food Programme (WFP) works in cooperation with SEDIS for the provision of goods, where the Honduran government provides with the funding and the WFP is in charge of buying and distributing the food (**Image 18**). Further on, the government supervises the delivery process and the elaboration of the meals inside the schools. In addition, support has been given by the private sector, charities, agencies such as the Embassy of Taiwan, and cooperation programs from the Netherlands, United States, and Japan, to name a few.



Image 18. Left: Distribution operations for the School Meal. Right: Children enjoying the meal.

Source: SEDIS.

Among the foods delivered by the School Meal program are rice, beans, soy, eggs, milk, vegetable oil, corn, and a banana puree. The amount delivered is based on the number of children registered in the educational center, which may vary from dozens to thousands of students depending on the institution; allocation of the goods is done approximately every three months. Additionally, there are cases where the harvest from school gardens, implemented by the "Generación de Oportunidades" program, has been used to complement the students' meal.

In the process, school “promoters” are assigned to the institutions, which are responsible for teaching the school staff and families the importance of nutrition and the preparation of the food. The educational centers must organize themselves and the parents to collaborate in the elaboration of the meals, and its distribution to the children. Later on, the promoters will pay occasional visits to the institutions to ensure the provision of food to the students.

The impacts of providing the school meals are visible in the academic performance of students. By improving a child’s nutrition and the conditions for education, he or she will continue attending and be more dedicated to academic responsibilities. The capacity for concentration and assimilation of knowledge is improved, adding to a child’s personal development. Moreover, the School Meal aims to impact on the number of school dropouts across the country, which may be due to economic and social conditions of their families. Conclusively, the location, community, and other contextual factors will affect the program’s success differently in each school.

Additionally, the School Meal has an effect on the economic situation of the households, as the most vulnerable populations have difficulties to nourish the children and encourage them to attend school. Such groups are also given aid by other government programs, such as the *Bono 10 Mil* (an allowance) and the *Eco-Fogones* (stoves for poor households).

However, the program has its limitations. Setbacks in the School Meal may occur by social issues, such as the people’s acceptance to such programs, as it is more challenging to implement community-related initiatives in urban areas where a more individualist form of thinking is present. Likewise, administrative issues such as the delivery of funds to the WFP may delay the distribution of goods to the schools, which may result in deprivation of the meals in some schools as they wait for the following allowance. Such examples illustrate the need for legalizing the program, in order to ensure a proper and efficient operation.

Lastly, the program is now growing and switching to a different kind of meal, as eggs and puree contribute to a more complete diet in the daily intake of the children, making the transition from the current “snack” to full meals. In the future, it is expected that the program will grow in a project that aims at the children’s’ nutrition, by assisting in their personal development from birth to their youth. In order to achieve this and overcome the limitations the program is having, the legalization of the School Meal program is currently in effect to ensure its long-term effects on the Honduran population.

b. Emerging and Sustainable Cities Initiative

The Emerging and Sustainable Cities (ESCI) initiative by the Inter-American Development Bank (IDB) is a development program that aims at responding to urban challenges in 40 intermediate cities in the Latin America and the Caribbean (LAC) region. The program provides technical assistance by identifying and prioritizing projects that will improve the urban, environmental, and fiscal conditions of the targeted urban areas. Moreover, the initiative is driven by concepts of sustainability, integral development, fiscal sustainability, and good governance, in order to provide with the tools for further development of the cities.

Conceptually, emerging cities are those that range between 100 thousand to 2 million inhabitants, among which the city of Tegucigalpa is included from the year 2014. These cities are secondary urban areas that drive a region’s development, not necessarily capitals, and which usually have difficulties in obtaining funding from the central government due to their size or political relevance.

The overall program works under three main steps, however, its implementation in Tegucigalpa is currently in its early stage. Firstly, studies are being held in the city for the production of knowledge and to diagnose the current urban conditions. Secondly, a list of 16 indicators that illustrate the city's issues is stated, factors that will later determine the priority social, economic, or urban areas for intervention. The final step consists on the production of a development scheme and specific solutions that will guide city planners and authorities through the interventions. It is currently estimated that the development plan for Tegucigalpa will be delivered by mid-2015.

Each development plan for the different cities aims at achieving a long-term sustainable urban development (SD), alongside a punctual urban intervention to impulse this process. In the case of Tegucigalpa, a project for the Choluteca River basin (**Image 19**) is in the making. As the local government lacks the resources to separately address the issues of Tegucigalpa, cooperation between the IDB, ESCI, the AMDC, and the central government has been agreed for a “Multi-sectorial Strategic Intervention” in the historic centers of the cities of Tegucigalpa and Comayagüela, in order to simultaneously respond to multiple challenges. The proposed development axis along the river will impact the city in terms of climate change adaptation and socio-economic development of the area.



Image 19. Choluteca River basin between Tegucigalpa and Comayagüela.
Source: ESCI.

More specifically, the proposal includes the production of a linear park, grey and green infrastructure for sanitation and flood control, the revitalization of the historic architecture, and the improvement of mobility in the area (**Image 20**). The expected impact of such intervention is to become a model for integral solutions across the territory, both for Honduras and the IDB. However, a challenge to encounter is the long-term perspective of the intervention and upcoming plans, due to past experiences regarding the lack of continuity of projects across government administrations.



Image 20. Proposal scheme for the river intervention.
Source: ESCI.

c. Fundación Convive Mejor

The Convive Mejor foundation is an association of private companies who cooperate with the central government for the development of community parks in vulnerable neighborhoods across the country. The program aims at the recovery of public spaces in communities with high indicators of urban violence and youth at risk. Among the foundation's participants are infrastructure firms, banks, and major corporations that are in charge of the funding, design, construction, and maintenance of 20 projected parks.

By creating public spaces that enable community interaction, people can re-appropriate their context and build a sense of community that reduces the crime rates and brings a better quality of life to the residents. Ten parks are already being planned for the interventions, which include recreational, cultural, sports, and green areas, each depending on the space available and the priorities of the community.

The selection of sites is based on the indicators provided by the government's security agencies: areas that are constantly affected by violence and poverty. Another requirement is that the unoccupied lot is property of the government or other collaborator to avoid conflicts with other stakeholders and ensure the recreational land use. Furthermore, the government provides with public services (e.g. water, lighting, and electricity), and security for the intervened area, as well as guaranteeing that the sites will not be developed for alternative land uses besides from the recreational type.

Additionally, a process of socialization with the community takes place in order to receive feedback from the residents and encourage them to collaborate in the process. Agencies such as USAID and the National Prevention Network participate in the interaction by providing with the communication

tools and information regarding each community. Through the socialization process, leaders are identified and committees are formed to delineate rules and procedures for the maintenance of the parks. Cooperation is also taking place between the foundation and local groups, such as artistic and educational youth clubs, of which their initiatives are also included in the parks' facilities.

The first park is in the neighborhood of San José de La Vega in Tegucigalpa (**Image 21**), which was inaugurated in December 2014, with an extension of 6 thousand squared meters. Other locations in the plan include the neighborhoods of Nueva Suyapa and Campo Cielo in Tegucigalpa, the Rivera Hernández in the city of San Pedro Sula, and parks in the cities of Danlí, Choluteca and Comayagüa, among others. For the time being, the foundation is working on the production of new parks, aiming to assign resources for the revitalization of existing ones in the future.



Image 21. Completed park in San José de la Vega.

Source: El Heraldo.

Lastly, it is estimated that the project will be executed in a period of two years, during which the overall goals of the program will progress into other aspects besides security, such as recovery of values and traditional games, better academic performance in the local schools, outdoors interaction, and social cohesion in the selected neighborhoods. Likewise, it is expected that the sites will evolve and adapt to the communities' needs in a second phase with the addition of infrastructure such as libraries and educational centers, to multiply the types of activities in the intervention sites.

APPENDIX 2. OPERATIONALIZATION OF MAIN CONCEPTS

Research question	Categoriza- tion	Concepts	Guiding statements	Notes
What is the current position of the planning system in the municipality of the Distrito Central?				
1-A	Past		- Description of how the planning system has evolved over the years.	Setting the context for UPA.
1-B	Present		- What is happening right now in the city's planning?	
	Future	Targets	- What goals for the city does planning currently have?	
1-C	Present	Stakeholders	- Who participates in the formulation of these goals? - Who supports or has an effect on the city's planning?	
How can UPA be applied in the city of Tegucigalpa to address spatial planning issues?				
2-A	Characteristics	Stakeholders	- Who is involved in the existing practices? (Enablers, supporters, practitioners, or beneficiaries.)	Characterization from case studies & documentation.
		Locations	- Where does the practice take place? - What is the model for practicing UPA? (Household, school, or community gardens)	
2-B		Development	- What is happening with the practices? - What resources were required for the practice? - What is obtained from the practice? (Products, or outputs and benefits.)	
2-C		Implementation	- What is the framework for developing the activity? - How are the responsibilities distributed?	
		Drivers	- Why did the activity happen?	
2-D		Integration	Opportunities	- Reasons or drivers for UPA implementation. - What circumstances or aspects could be taken advantage of? - What can be implemented or improved through UPA?
	Media		- What are the instruments to integrate UPA in the city's planning?	
What are the effects of UPA's application in the city of Tegucigalpa?				
3-A	Benefits	Social	- What social benefits may be obtained from UPA practices?	
		Environmental	- What environmental benefits may be obtained from UPA practices?	
		Economic	- What economic or financial benefits may be obtained from UPA practices?	
3-B	Obstacles	Social	- What are the limitations of the socio-political context in the city?	
		Environmental	- What limitations does the urban environment present for applying UPA?	
		Economic	- What limitations does the economic context set for UPA?	

APPENDIX 3. INTERVIEW QUESTIONS



INTERVIEW QUESTIONS (Unstructured Interview Scheme)

Date:

Time:

Place:

Name & position:

For planning and development professionals:

1. What are the greatest urban problems/challenges faced today in Tegucigalpa?
2. What are positive and negative aspects of today's planning scheme in the city?
3. Is the planning system undergoing any reform? If not, are changes needed, and in what aspects?
4. Are there initiatives or plans for switching to sustainable urban development?
If so, what are they?
5. Where should priorities for urban development be placed?
6. In your opinion, what would be the greatest impact (positive or negative) of applying urban agriculture in Tegucigalpa?
7. How would UPA impact the urban environment of the city?
8. How do you think UPA could affect the current planning system?
9. What area, and under what objectives, would you consider is a good starting point for UPA?
10. To what populations should it be directed?
11. What would be needed (social context, resources or reforms) for UPA to start in Tegucigalpa?

For representatives of FAO:

Related to the project:

1. By whom, or where, did the project initiative come from?
What is the driver of the project?
2. How were the roles for the project's development divided between the Municipality and FAO?
3. What objectives are pursued with the application of UPA?
4. What were the criteria for the selection of the neighborhoods?
5. How were the stakeholders identified?
6. How were the communities approached?
7. What were the obstacles you were expecting to face in the field? And which of these were encountered, and how were they dealt with?
8. Did other organizations or community groups become involved in the project?
9. What indirect impacts has the project had on other people, areas, environment, etc.?
10. Having the results from this project, what is the next step?
11. What are the policy reforms that FAO is now suggesting to the local governments?

General questions:

12. What would be needed (social context, resources or reforms) to start the application of UPA in Tegucigalpa?
13. In your opinion, what would be the effect of adopting UPA in the city?
14. What leaders (political or community) should be informed, and furthermore, involved in the development of such projects?
15. How could the population be informed of these practices?
16. In what other areas would you be interested in replicating the project?
17. What is FAO's vision for UPA in the city, or the country?

For representatives of Zamorano/Casa Hogar Remar:

Related to UPA/household gardens:

1. Are there initiatives or existing projects regarding UPA or household gardens in the country?
2. Description of the project with casa Hogar Remar (objectives, population, process, results).
3. What would be a good starting point for UPA?
4. To what populations or groups should UPA be directed?
5. What practices or trainings are needed for exercising UPA?
6. Given the city's conditions, what types of cultivation or practices should be used?
7. What crops can be produced in the urban areas of the central country?
8. What are the benefits or impacts of practicing UPA (on the person, household, or general level)?

Regarding Tegucigalpa's urban environment:

1. What are the greatest urban problems/challenges faced today in Tegucigalpa?
2. Where should priorities for urban development be placed?
3. Are there initiatives or plans for switching to sustainable urban development?
If so, what are they?
4. Are there initiatives or plans for switching to sustainable urban development?
If so, what are they?
5. What urban resources would be needed for a UPA program in Tegucigalpa?

Regarding agricultural production for Tegucigalpa:

1. What areas/production zones provide for the city, and with what products?
2. What types of producers participate in this food chain?
3. Is the supply enough for the city?
4. What impacts does the production have over the environment (resources, context, infrastructure, etc.)?
5. Is there any recorder or observed production (UPA) in the city already?
6. Would UPA in Tegucigalpa have an impact over the rural production areas? Positive or negative.

For environment & agriculture professionals:

Regarding Tegucigalpa's urban environment:

1. What are the greatest urban problems/challenges faced today in Tegucigalpa?
2. Are there initiatives or plans for switching to sustainable urban development? If so, what are they?
3. What impact would UPA have over Tegucigalpa's urban environment? Positive or negative.
4. Is there any recorder or observed production (UPA) in the city already?
5. What could be a good starting point for UPA in the city?

6. To what populations or groups should it be directed?
7. What practices or trainings are needed for exercising UPA?
8. What would be needed (social context, resources or reforms) for UPA to start in Tegucigalpa?
9. What are the benefits or impacts of practicing UPA (on the person, household, or general level)?

Regarding agricultural production:

1. What areas/production zones provide for the city, and with what products?
2. What types of producers participate in this food chain?
3. Is the supply enough for the city?
4. What impacts does the production have over the environment (resources, context, infrastructure, etc.)?
5. What would be the impact of starting a UPA program in the city?
6. Would UPA in Tegucigalpa have an impact over the rural production areas?
7. Is there any recorder or observed production (UPA) in the city already?
8. Who should be involved in UPA activities, for management, practice, and maintenance?
9. What resources are needed for the implementation of UPA?

For representatives of the School Meal & School Gardens:

Professionals of the School Meal Program:

1. What is the purpose, or driver, of the program?
2. To what social or economic groups is it directed?
3. Is the program implemented in cities? If so, which ones and what schools participate?
4. In what types of schools is the program implemented (public, FHIS, primary, etc.)? And what are the criteria for selecting the schools?
5. What are the steps of the program?
6. What inputs and resources (tools, human resources, etc.) are provided through the program?
7. Do parents, families, or the communities participate?
8. To what other government (or other) programs is the School Meal linked to?
9. Is it linked to the school gardens, if so, how does this alliance work?
10. What is the social, economic, or educational impact of the School Meal?
11. What other institutions, private sector, or community groups are involved in the initiative?
12. Where does the financing or resources come from? Are there any alliances with other stakeholders for the managing and gathering of resources?
13. Is the program going through a new direction, modification, or new goals for the future?

Teachers participating in the School Meal:

1. From whom or where does the initiative of the School Meal come from?
2. How is the School meal organized inside the school?
3. What inputs are provided for the elaboration of the meals?
4. Are these provisions sufficient? How many meals, or mealtimes, are satisfied with the provisions?
5. Which children are benefited with the program?
6. Are there any obstacles for making the meals, because of resources or internal organization?
7. Are other foods needed for the program?
8. Do the parents, families, or the community participate in the elaboration of the School Meal?
9. What other type of aid (materials, training, human resource) is provided by the program?

10. Is there any other organization or community group that gives support?
11. Have you thought of other projects or activities that would support the program and make it more self-sustainable? An example, school gardens.
12. Have you heard of the School Garden program?
13. What advantages and disadvantages would come from starting a school garden in your institution?

Professionals involved in the School Gardens:

1. What is the purpose, or driver, of the program?
2. To what social or economic groups is it directed?
3. Is the program implemented in cities? If so, which ones and what schools participate?
4. In what types of schools is the program implemented (public, FHIS, primary, etc.)?
 - a. What are the criteria for selecting the schools?
 - b. Is there space for implementing the gardens?
 - c. Whose space is it?
5. What inputs and resources (tools, human resources, etc.) are provided through the program?
6. What challenges (space, knowledge, inputs, other resources) are encountered in the development of the program?
7. What is the greatest limitation of the initiative?
8. What crops are produced, and to what ends?
9. Do parents, families, or the communities participate?
10. To what other government (or other) programs are the School Gardens linked with?
11. What is the social, economic, or educational impact expected?
12. What resources are needed to expand or improve its implementation in urban areas? What other institutions, private sector, or community groups are involved in the initiative?
13. Where does the financing or resources come from? Are there any alliances with other stakeholders for the managing and gathering of resources?
14. Is the program going through a new direction, modification, or new goals for the future?
15. What effects could the expansion of UPA have over the city? For example, over the urban environment and use of resources in urban areas.

APPENDIX 4. ANALYSIS OF MAIN TOPICS AND ISSUES.

The following tables provide with an overview of the main topics discovered throughout the research. A grouping of the emerging issues was done based in themes and the concepts extracted from the research questions. Furthermore, the amounts represent the frequency in which these topics were described in the information, and their overall relevance to the stakeholders.

		Topics	Integration	Effects	Opportunities	Limitations
Main Themes	Specific Themes	Urban and peri-urban agriculture (UPA)				
Administrative aspects	Socio-political context	Continuation of initiatives (changes in government administrations, academic calendars, etc.).				4
		Little demand from government, UPA missing in the agenda, political will, strategy and policy-making.	2			6
		Legalization of practices.	1			
		Human resources for implementing projects.				1
	Knowledge & diffusion	Information, diffusion of projects, education, technical knowledge, consumer culture.				16
		Starting point in pilot projects.	1			
		Existing programs for UPA activities (government, NGOs, private sector), or expansion of them.	3			
	Alliances	Involve private sector (social responsibility).			1	
		Involve vocational training centers and institutes.	1			
		NGOs goals for improving food security and nutrition, and technical resources.	2		1	
		Inter-institutional collaboration (NGOs, government, private sector, foundations, cultural & academic centers).	6			
		Projects being executed only by one entity.				3
		Consider restaurants & supermarkets.	2			
Social aspects	Empowerment	Training and skill-building (women, families, children).		3		
		Knowledge for enterprising.				2
		Empowerment of vulnerable populations (urban poor, women).		2		
		Practice and knowledge depend on social class so far.				2
		UPA can be practiced by anyone, does not need much time.			1	
	Cultural context	Political ideologies of society.				1
		Interest of participants.			2	
		Security issues of the urban area.				1
	Community building	Community participation and involvement.		2		
		Urban culture is less sensible to problems, less sense of community.				1
	Food security & nutrition	Improvement in nutrition, consumption habits, diet diversity.		6		
		Improve food access and security.		6		
		Absence of a food movement.				2
		Recent health movements, campaigns, etc.			2	
	Social change	Tackling urban poverty & violence, a strategy for social change.		1		
		Recovery of practices & traditions.		1		
		Degree of self-sustainability of the population.		3		

		Topics	Integration	Effects	Opportunities	Limitations
Urban environmental aspects	Locations	Recent investments on public space, communities, and peri-urban areas.			6	
		Application in parks & public spaces.			1	
		Gardens do not need to be permanent.			1	
		Lack of proper land use planning.				1
		New spatial planning initiatives & projects, interventions that detonate changes across the city.			4	
	Media	Adaptation of technologies				1
	Effects	Environmental impact.			1	
		Demand a healthier production.			4	
		The sum of small initiatives creates a big impact.	1			
		Population and city resilience.		1		
		UPA is a strategy for climate change adaptation.		1		
		Greening space, landscaping, microclimate, permeable surfaces, aesthetics.		5		
		Reduce pressure over rural production.		2		
Resources needed	General resources	Access to inputs, or dependence on others for them.				4
	Water	Availability and conditions of water resources.				5
		Water management practices (greywater recycling, rainwater harvesting, recharge of the water cycle).		9		
	Solid waste	Solid waste management practices (composting, recycling).		3		
	Land	Productivity of the land.	4			
		Protect the land against erosion, nutrient loss.		2		
		Conditions of the land.				3
		Land ownership.				2
Economic aspects	Effects	Form of employment.		2		
		Commercialization of surplus.		4		
	For implementation	Financing of projects.				3
		Topics	Integration	Effects	Opportunities	Limitations
Main Themes	Specific Themes	About UPA in Schools				
Administrative aspects	Context	Schools already applying UPA.			5	
		Existing alliances between government and World Food Programme (WFP) for School Meal program.			2	
		Initiatives from teachers to diversify the academic curriculum.			2	
		Collaboration between parents and teachers.			2	
	Academics	UPA in the academic curriculum.	3			
		No involvement from the Ministry of Education yet.				1
Social aspects	Empowerment	Children take knowledge to their home.		1		
		Children are more enthusiastic and adapt more easily.			1	
		Investment in future generations through training and teaching values.		5		
	Food security & nutrition	Improvement of children's nutrition & development, and academic performance.		3		
		Diversify the foods of the School Meal program.			4	