Doctoral Dissertation
Doctoral Program in Architecture. History and Project (34th Cycle)

Looking to the past to design the future: the informal built environment in Colombia
Design Process Innovation through collective and collaborative knowledge

By

Mónica Alexandra Muñoz Veloza

* * * * * *

Supervisor(s):
Prof. Roberto Giordano, Supervisor
Prof. Paolo Mellano, Co-Supervisor

Doctoral Examination Committee:
Prof. Rosa Romano, Università degli Studi di Firenze, Italia (Referee)
Prof. Adolfo Baratta, Università Degli Studi Roma Tre, Italia (Referee)
Prof. Serena Baiani, Università di Roma Sapienza, Italia
Prof. Alessandro Rogora, Politecnico di Milano, Italia

Politecnico di Torino
2022

Declaration

I hereby declare that, the contents and organization of this dissertation constitute my own original work and does not compromise in any way the rights of third parties, including those relating to the security of personal data.

Mónica Alexandra Muñoz Veloza

2022

* This dissertation is presented in partial fulfillment of the requirements for the **Ph.D. degree** in the Graduate School of Politecnico di Torino (ScuDo).

Guardare al passato per progettare il futuro: l'ambiente costruito informale in Colombia

Innovazione del processo progettuale attraverso la conoscenza collettiva e collaborativa

Mirar al pasado para diseñar el futuro: el entorno construido informal en Colombia

Innovación del proceso de diseño a través del conocimiento colectivo y colaborativo

A mi familia,

a la de siempre y a la que con los años ha ido llegando.

A mi abuelita Francisca,

quien llegada del campo a la ciudad construyó su propia casa.

Acknowledgment

Abstract [EN]

In Europe, the discipline of architectural technology has a need/performance-based approach, an essential condition for the realization of innovative building projects that aim to achieve the Sustainable Development Goals. However, importing this methodology into other geographical and cultural contexts without critical analysis can lead to a dangerous and wrong imposition of a strange architectural model, distorting sustainability's true meaning. An example, in this sense, can be traced back to the informal settlements in the Global South, where the analytical and rational vision must assume a structure adaptable to all project spheres, open to different cultural models, and not only to the dominant ones.

The *favelas* in Brazil, *barrios de invasión* in Colombia, *villas miseria* in Argentina, *poblaciones callampas* in Chile, and *barriadas* in Peru are inhabited mainly by impoverished people forced to migrate from villages and rural communities. These urban areas are also characterized by precarious physical and environmental conditions that negatively affect the inhabitants' quality of life: water pollution, unstable soils, inadequate waste collection systems, and lack of facilities and infrastructure. Moreover, the challenging socio-economic problems experienced in these neighborhoods —such as poverty, unemployment, and inequality— make the residents' housing situation even more complex and largely condition their construction choices. These issues have impacted the practice of self-build housing, which was part of many of the "new" citizens' cultural baggage.

Informal self-building has become a matter of emergency that forced the inhabitants to improvise and progressively build their own houses according to their

availability of economic, material, and human resources. Additionally, the globalization of housing paradigms and building culture, based on a generalized — and often wrong— idea of progress, has further marginalized the subaltern knowledge present in spontaneous settlements. The typological and technological homogenization phenomenon has detached informal construction activities from vernacular/traditional archetypes. The latter considered the local environmental conditions and the inhabitants' needs as indispensable variables for a sustainable design.

Spontaneous urban construction is a broadly studied argument from different perspectives, both geographical and theoretical. However, given its vast nature, many aspects remain to be addressed. In the Latin American scenario, for instance, the requalification of the informal built environment continues to be a critical issue. Several local and foreign authorities and public and private actors currently promote urban and architectural projects to improve marginal neighborhoods.

Unfortunately, professional/academic conceptions remain the basis for many design practices, leaving aside the history, memory, and alternative knowledge proper to the communities that shaped these settlements. The main objective of this dissertation is not to criticize what others have done —or not— so far. Still, it is helpful to look at the past from a decolonial point of view to try to relink traditional and informal architecture through an alternative vision of the practice of self-building and a broader conception of the technological approach to design.

"Looking to the past to design the future: the informal built environment in Colombia" attempts to define a transdisciplinary, participatory, and inclusive methodological framework. The result is the formulation of a catalog of social and technical tools beneficial to the architect in research, teaching, and professional practice inside self-built urban contexts. This toolbox seeks to facilitate the relationship between popular and specialized knowledge to perform a more complete and adequate analysis of the housing conditions, the inhabitants' needs,

and the available local resources to generate collective and collaborative sustainable design and construction processes.

The dissertation explores a case study based on an academic experience developed with students and professors of the *Politecnico di Torino* and the *Pontificia Universidad Javeriana* of *Bogotá* for the Solar Decathlon Latin America and Caribbean 2019. *PEI Máquina Verde-El Arca* was a *Vivienda social* project conceived as an eco-compatible transformation/requalification initiative for the informal neighborhood of *El Pozón.* It is one of the poorest neighborhoods in *Cartagena de Indias*, a city with the highest degree of economic inequality in Colombia, the third-largest country in Latin America for wealth inequality.

The settlement was born illegally, as an informal invasion —understood as an abusive appropriation of public space— of the *La Virgen* swamp by marginalized people arriving in the city. Those migrations were mainly related to the country's armed violence, especially in the 1990s, and the lack of work and study opportunities in their places of origin. During the one-month competition held in Cali-Colombia, the team built a housing prototype representative of the urban proposal, using low-tech materials and systems, including vernacular ones revisited in a contemporary manner.

The physical and historical complexity of self-build neighborhoods of Latin-American cities makes it necessary to train professionals sensitive to the informality phenomenon: with qualitative and technical skills adequate to understand better the housing problems and, at the same time, to recognize the potential of informal practices. The toolbox proposed in this dissertation aims to enable the technological design process innovation in architecture by overcoming some limitations of current models and approaches to the project in informal contexts. Furthermore, the tools can contribute to resignifying the popular knowledge intrinsic to spontaneous architecture and rethinking the archetypes of reference to enrich the informal city's culture.

Abstract [IT]

La tecnologia dell'architettura è una disciplina che in Europa ha un approccio di tipo esigenziale-prestazionale, una condizione chiave per la realizzazione di progetti edilizi innovativi e mirati a raggiungere gli Obiettivi di Sviluppo Sostenibile. Tuttavia, importare tale metodologia in altri contesti geografici e culturali senza un'analisi critica, può portare ad una pericolosa ed errata imposizione di un modello di architettura estraneo, travisando così il vero significato della sostenibilità. Un esempio, in tal senso, è riconducibile agli insediamenti informali nel Sud Globale, complessi sistemi abitativi dove, per arrivare a risultati sodisfacenti, la visione analitica e razionale deve assumere una struttura adattabile a tutte le sfere del progetto e aperta ai diversi modelli culturali e non solo a quelli dominanti.

Le *favelas* in Brasile, *barrios de invasión* in Colombia, *villas miseria* in Argentina, *poblaciones callampas* in Cile o *barriadas* in Peru, sono abitate soprattutto da persone impoverite costrette a migrare dai villaggi e dalle comunità rurali. Queste aree urbane sono caratterizzate dalle precarie condizioni fisiche e ambientali che influiscono negativamente sulla qualità di vita degli abitanti: inquinamento dell'acqua, terreni instabili, assenza di sistemi di raccolta di rifiuti e mancanza di impianti e infrastrutture. Inoltre, le forti problematiche socioeconomiche vissute in questi quartieri —quali povertà, disoccupazione e disuguaglianza— rendono difficile ancora di più la situazione abitativa dei residenti e condizionano ampiamente le loro scelte costruttive. Questi problemi hanno condizionato la pratica dell'autocostruzione delle abitazioni, parte integrante del bagaglio culturale di molti "nuovi" cittadini.

L'autocostruzione informale è diventata una questione di emergenza nella quale gli abitanti sono costretti a realizzare in modo improvvisato e progressivo le proprie case secondo la loro disponibilità di risorse economiche, materiali e umane. D'altra parte, il processo di globalizzazione dei modelli abitativi e della cultura del costruire in base a un'idea generalizzata —e spesso errata— di progresso, ha emarginato ulteriormente i saperi subalterni presenti negli insediamenti spontanei. Il fenomeno di omologazione tipologica e tecnologica ha svincolato le attività costruttive informali dagli archetipi vernacolari/tradizionali che consideravano le condizioni ambientali locali e le necessità degli abitanti come variabili indispensabili del progetto sostenibile.

L'edilizia urbana spontanea è un argomento ampiamente studiato da diverse prospettive siano geografiche che teoriche. Tuttavia, vista la sua vastità, restano ancora molti aspetti da affrontare. Nello scenario latinoamericano, per esempio, la riqualificazione dell'ambiente costruito informale continua ad essere una criticità. Diverse autorità locali e internazionali così come attori pubblici e privati promuovono attualmente progetti di miglioramento urbano e architettonico di quartieri marginali.

Sfortunatamente, le concezioni professionali/accademiche continuano ad essere la base di molte di queste prassi progettuali, lasciando da parte la storia, la memoria e i saperi alternativi propri delle comunità che hanno dato forma a questi insediamenti. L'obiettivo principale di questa tesi non è criticare cosa è stato fatto —o non— finora. Tuttavia, considera utile guardare al passato da un punto di vista decoloniale per tentare di riformulare il legame tra architettura tradizionale e informale attraverso una visione alternativa della pratica dell'autocostruzione e una concezione più ampia dell'approccio tecnologico al progetto.

"Guardare al passato per progettare il futuro: l'ambiente costruito informale in Colombia" prova a definire un quadro metodologico transdisciplinare, partecipativo e inclusivo. Il risultato è la formulazione di un catalogo di strumenti sociali e tecnici, utile all'architetto nell'ambito della ricerca, della didattica e della

pratica professionale in contesti urbani autocostruiti. Questa cassetta degli attrezzi è finalizzata a facilitare il rapporto tra conoscenza popolare e specializzata al fine di eseguire un'analisi più completa e adeguata delle condizioni abitative, dei fabbisogni degli abitanti e delle risorse locali disponibili per generare processi collettivi e collaborativi di progettazione e di costruzione sostenibile.

La ricerca approfondisce un caso studio sulla base dell'esperienza accademica sviluppata insieme a studenti e professori del Politecnico di Torino e della *Pontificia Universidad Javeriana* di *Bogotá* in occasione del *Solar Decathlon Latin America and Caribbean 2019.* Il progetto di V*ivienda social PEI Máquina Verde-El Arca* è stato pensato come un intervento di trasformazione/riqualificazione eco-compatibile del quartiere informale *El Pozón.* Questo è uno dei quartieri più poveri di *Cartagena de Indias,* città con il più alto grado di disuguaglianza economica in Colombia, Paese che si pone al terzo posto in America Latina per disparità di ricchezza.

L'insediamento è nato illegalmente, come "un'invasione" informale —intesa come un'appropriazione abusiva dello spazio pubblico— della palude *La Virgen,* da parte di persone marginalizzate che arrivavano in città. Tali migrazioni erano legate principalmente alla violenza armata subita nel Paese soprattutto negli anni novanta del secolo scorso e alla mancanza di opportunità di lavoro e di studio nei luoghi di origine. Durante il concorso, durato un mese e svoltosi a Cali-Colombia, il gruppo interuniversitario ha costruito un prototipo abitativo rappresentativo della proposta urbana, utilizzando materiali e sistemi low-tech, compresi quelli vernacolari rivisitati in chiave contemporanea.

La complessità fisica e storica dei quartieri autocostruiti nelle città latinoamericane rende necessaria la formazione di figure professionali sensibili al fenomeno informale: con competenze qualitative e tecniche adeguate a comprendere meglio le problematiche abitative e al contempo riconoscere le potenzialità delle pratiche proprie dell'informalità. La cassetta degli attrezzi proposta in questa tesi prova a favorire l'innovazione del processo progettuale

tecnologico in architettura superando alcuni limiti degli attuali modelli ed approcci al progetto in contesti informali. Inoltre, gli strumenti possono contribuire a risignificare i saperi popolari intrinsechi dell'architettura spontanea e a ripensare gli archetipi di riferimento per l'arricchimento della cultura della città informale.

Parole chiave: cassetta degli attrezzi, architetto "informato", abitazioni informali, architettura popolare, autocostruzione.

Abstract [ES]

La tecnología de la arquitectura es una disciplina que en Europa se enfoca en las necesidades del usuario y el desempeño del edificio, condiciones clave para la realización de proyectos arquitectónicos innovadores destinados a alcanzar los Objetivos de Desarrollo Sostenible. Sin embargo, importar esta metodología a otros contextos geográficos y culturales sin un análisis crítico puede conducir a una imposición peligrosa y errónea de un modelo de arquitectura ajeno, tergiversando así el verdadero significado de la sostenibilidad. Un ejemplo de ello lo encontramos en los asentamientos informales del Sur Global, complejos sistemas en los que, para conseguir resultados satisfactorios, la visión analítica y racional debe asumir una estructura adaptable a todos los ámbitos del proyecto y abierta a diferentes modelos culturales y no sólo a los dominantes.

Las favelas en Brasil, los barrios de invasión en Colombia, las villas miseria en Argentina, las poblaciones callampas en Chile o las barriadas en Perú están habitadas principalmente por personas empobrecidas que se han visto obligadas a migrar desde pueblos y comunidades rurales. Estas zonas urbanas también se caracterizan por las precarias condiciones físicas y medioambientales que afectan negativamente la calidad de vida de sus habitantes: contaminación del agua, suelos inestables, sistemas inadecuados de recolección de residuos y falta de equipamientos e infraestructuras. Además, los desafiantes problemas socioeconómicos que se viven en estos barrios —como la pobreza, el desempleo y la desigualdad— hacen que la situación de vivienda de los residentes sea aún más compleja y condicionan en gran medida sus elecciones a la hora de construir. Estos

factores han repercutido en la práctica de la autoconstrucción de viviendas la cual formaba parte del bagaje cultural de muchos de los "nuevos" ciudadanos.

La autoconstrucción informal se ha convertido en una cuestión de emergencia que obliga a los habitantes a improvisar y construir progresivamente sus propias casas en función de su disponibilidad de recursos económicos, materiales y humanos. Adicionalmente, la globalización de los modelos de vivienda y de la cultura constructiva, basada en una idea generalizada —y a menudo errónea— de progreso, ha marginado aún más los conocimientos subalternos presentes en los asentamientos espontáneos. El fenómeno de homogeneización tipológica y tecnológica ha desvinculado las actividades constructivas informales de los arquetipos vernáculos/tradicionales que consideraban las condiciones ambientales locales y las necesidades de los habitantes como variables indispensables del diseño sostenible.

La construcción urbana espontánea es un argumento ampliamente estudiado desde diferentes perspectivas, tanto geográficas como teóricas. Sin embargo, dada su amplia naturaleza, aún quedan muchos aspectos por abordar. En el escenario latinoamericano, por ejemplo, el mejoramiento del entorno construido informal sigue siendo una cuestión crítica. Diversas autoridades locales y extranjeras, así como actores públicos y privados en la actualidad están promoviendo proyectos urbanísticos y arquitectónicos dirigidos a mejorar los barrios marginales.

Lamentablemente, las concepciones profesionales/académicas siguen siendo la base de muchas de las prácticas de diseño, dejando de lado la historia, la memoria y los conocimientos alternativos propios de las comunidades que dieron forma a estos asentamientos. El objetivo principal de esta tesis no es criticar lo que otros han hecho —o no— hasta ahora. Sin embargo, es útil mirar al pasado desde un punto de vista decolonial para intentar volver a vincular la arquitectura tradicional e informal a través de una visión alternativa de la práctica de la autoconstrucción y una concepción más amplia del enfoque tecnológico del diseño.

"Mirar al pasado para diseñar el futuro: el entorno construido informal en Colombia" intenta definir un marco metodológico transdisciplinar, participativo e inclusivo. El resultado es la formulación de un catálogo de instrumentos sociales y técnicos al servicio del arquitecto en la investigación, la docencia y la práctica profesional dentro de los contextos urbanos autoconstruidos. Esta caja de herramientas busca facilitar la relación entre el conocimiento popular y el especializado con el fin de realizar un análisis más completo y adecuado de las condiciones de la vivienda, las necesidades de los habitantes y los recursos locales disponibles para generar procesos colectivos y colaborativos de diseño y construcción sostenible.

La tesis explora un caso de estudio a partir de una experiencia académica desarrollada junto con estudiantes y profesores del *Politecnico di Torino* y de la Pontificia Universidad Javeriana de Bogotá en el marco del *Solar Decathlon Latin America and Caribbean 2019*. El proyecto de vivienda social PEI Máquina Verde-El Arca fue concebido como una iniciativa de transformación/mejoramiento eco-compatible destinada al barrio informal El Pozón. Este es uno de los barrios más pobres de Cartagena de Indias, la ciudad con mayor grado de desigualdad económica en Colombia, país que ocupa el tercer lugar en América Latina en cuanto a inequidad de la riqueza.

El asentamiento nació de forma ilegal, como una invasión informal —entendida como una apropiación abusiva del espacio público— de la ciénaga de La Virgen por parte de personas marginadas que llegaron a la ciudad. Estas migraciones estaban relacionadas principalmente con la violencia armada del país, sobre todo en los años 90, y con la falta de oportunidades de trabajo y estudio en sus lugares de origen. Durante el mes de concurso llevado a cabo en Cali-Colombia, el equipo construyó un prototipo de vivienda representativo de la propuesta urbana, utilizando materiales y sistemas de baja tecnología, entre ellos algunos vernáculos reinterpretados de forma contemporánea.

La complejidad física e histórica de los barrios de autoconstrucción de las ciudades latinoamericanas hace necesaria la formación de profesionales sensibles al fenómeno de la informalidad: con competencias cualitativas y técnicas adecuadas para comprender mejor la problemática habitacional y, al mismo tiempo, para reconocer el potencial de las prácticas informales. La caja de herramientas que se propone en esta tesis pretende posibilitar la innovación del proceso de diseño tecnológico en la arquitectura, tratando de superar algunas limitaciones de los modelos y enfoques actuales hacia el proyecto en contextos informales. Asimismo, las herramientas pueden contribuir a resignificar el conocimiento popular intrínseco a la arquitectura espontánea y a repensar los arquetipos de referencia con el fin de enriquecer la cultura de la ciudad informal.

Palabras clave: caja de herramientas, arquitecto "informado", vivienda informal, arquitectura popular, autoconstrucción.

Contents

List of Figures

Where not specified, figures in the text are by the author.

List of Tables

Where not specified, tables in the text are by the author.

Introduction

> Adapting what originated in a previous era to today's needs and foreshadowing new scenarios represent an attempt to regain a sense of the past and the need for the future by reaffirming the present.

> (Losasso, 1991)

In the Anthropocene [1], the significant increase in urban population and the uncontrolled growth of many cities, especially in emerging countries[2], has led to the formation of chaotic and fragmented metropolises. Furthermore, in the last decades, more attention has been paid to *formal* building projects —those designed and built by professionals— as a factor of economic development rather than a way to improve the citizens' quality of life according to spatial and architectural principles.

In large and medium-sized cities in the Global South, the predominance of this urban progress model has resulted in a scarce and inadequate formal offer of *Vivienda social*[3] as this does not represent a dynamic real estate commodity. In Latin America, social housing projects that have characterized the scene since the last decades of the 20th century have responded primarily to practical and economic interests. Built by governments or by public/private entities, they are often

---

[1] In the 1980s, scientist Stoermer E.F. defined this geological era as one in which human beings have been able to generate changes in the earth system and its geological processes.

[2] Emerging countries have both a growing economy and population. According to the European Commission, developing economies and emerging markets will continue to grow at relatively high rates, given their increasing labor force and the potential for expansion of their markets. In recent years, new terms have emerged to describe the larger developing countries. One such term is CIVETS, which groups together six emerging countries with similar characteristics and challenges: Colombia, Indonesia, Vietnam, Egypt, Turkey, and South Africa.

[3] Meaning a type of social housing. See chapters 3 and 4.

insufficient or do not adapt to the needs and lifestyles of the population[4]. This myopic view of social housing has segregated low-income people from the housing market. It has also led self-building to become the primary solution for impoverished citizens to own their own houses.

Today, this construction process is an unquestionable and inevitable feature of many cities and largely determines their growth. Moreover, it is an essential part of the *informal*[5] culture. However, it is not a new concept since it is part of the cultural heritage of many people who come from villages or rural areas to live in degraded urban settlements. Vernacular self-construction represents a sustainable way of relating to the environment. It considers the characteristics of the context in which it is positioned, uses local resources, and is based on ancestral knowledge. Unfortunately, the transition from the inherent tradition of the rural contexts to the need and hardship that characterizes spontaneous urban settlements has affected the quality of self-construction. Such difficulties have led informal inhabitants to improvise and progressively build their own houses according to their spatial requests and especially their availability of economic, material, and human resources (Anzellini, 2015; 2016). Furthermore, the processes of globalization of housing models and building cultures have exacerbated this "involution of popular architecture" (González, 2006) based on a generalized —and often erroneous— idea of progress.

Consequently, informal self-construction is seen as a problematic response to the quantitative housing deficit. Moreover, its general lack of environmental and social sustainability[6] and the lack of appropriate architectural and structural projects generate an equally qualitative severe housing deficit. In 2020, the COVID-19 pandemic made even more visible and profound the vulnerability of millions of people living in informal neighborhoods and dwellings with poor sanitation conditions (Organization for Economic Co-operation and Development [OECD], 2020, p. 1): inadequate ventilation, use of flammable or toxic materials, lack of water supply and drinking water, overcrowding and lack of space to isolate infected

---

[4] The inhabitants' needs can change over time —during daily cycles or the lifecycle of the dwelling— and refer not only to the residential buildings but also to their relationship with the surrounding environment and the city.

[5] Informal in the sense of spontaneous. It can be illegal or legal, depending on its nature and development. For further discussion, see Grupo de Investigación "Procesos Urbanos en Hábitat, Vivienda e Informalidad," 2007 and Torres Tovar, 2009.

[6] According to Lanzavecchia, social sustainability escapes any system of quantification since it is based on the qualitative concept of well-being in the broadest sense (2000, p. 10).

persons, among others[7]. It also revealed the fragility of these settlements to face this type of phenomenon: lack of sanitary services, social infrastructures, and green areas. It is not surprising, therefore, that the direct and indirect effects of the global emergency due to the virus affected the inhabitants of informal neighborhoods the most (International Labor Organization [ILO], 2020; Inter-American Development Bank [IDB], 2021).

Figure 1. Rural social housing promoted by the government. Toluviejo, Sucre (Colombia) - Tropical savanna climate.
Source: *Programa de Vivienda de Interés Social Rural, Banco Agrario de Colombia and Ministerio de Agricultura y Desarrollo Rural,* https://colaboracion.dnp.gov.co/CDT/Consejo%20Nacional%20de%20Planeacin/Vivienda%20Rural.pdf. Accessed on May 19, 2022.

Although several urban and architectural improvement projects for marginal neighborhoods try to respond to quantitative and qualitative deficits, the rehabilitation of informal settlements continues to be a critical issue (Adler, Vera, Wainer, Roquero, Poskus, Valenzuela, Letelier, Olivares, Treimun, Gamboa, Canales, Guajardo, Libertun de Duren, Davis, Donovan, Claramunt Torche, and Silva, 2018). One of the shortcomings of these projects is that they are based primarily on professional/academic perceptions and do not consider the history, memory, and alternative knowledge proper to the communities that shaped these complex urban systems (Perriccioli, 2017). Another oversight when working in informal neighborhoods in the Global South is the uncritical imposition of foreign

---

[7] An interesting article on the subject can be found at https://uniandes.edu.co/es/noticias/gobierno-y-politica/cuando-la-vivienda-no-logra-ser-un-refugio?fbclid=IwAR1AdqajVHQIpSis-kTOeciWwgRULiJ46uVxL2RikjKbXiec5yd-or8mM1t0.

models or the implementation of only analytical and rational strategies. According to Attaianese and Acierno, "quantitative research concerning indicators able to explain the reality is producing standards, guidelines and norms falling into a new reductionism (2017, p. 77). The need/performance-based approach, for instance, characteristic of the architectural technology discipline in the European context (Daglio and Gambaro, 2017), allows the development of highly constructive quality projects[8]. However, it is insufficient to trigger real change in spontaneous urban settlements[9]. The latter need to be analyzed from holistic points of view that consider all the project spheres —environmental, social, economic, and cultural— (Marseglia, 2018) and are open to different design models and not just the dominant ones.

Albert Einstein once explained that today's world is the result of our thinking up to today. Thus, its problems cannot be solved by thinking the same way we thought was right when we created them (Schmidheiny, 1992, as cited in Lanzavecchia, 2000, p. 38). The modern development model that dominates the formal urban scenario has still not recognized its limitations in understanding the dynamics of the communities that settle in informal areas and has not been able to give satisfactory answers. For instance, eradicating informal neighborhoods —an idea already used in some countries such as Venezuela— has been shown to be useless and counterproductive. Therefore, the answer should not be based on a *tabula rasa* but should mean "make the best use of available resources, human and material" (p. 38).

As social practices, architecture and technological design cannot be self-referential since they must be related to other realities and disciplines (Giuffrè, 2014; Katoppo and Sudradjat, 2015), especially regarding grafting formal strategies into informal dynamics. Therefore, it is imperative to redefine the architect's role and adapt it to contexts in which the inhabitants are the ones who build their homes. The dissertation "Looking to the past to design the future: the informal built environment in Colombia. Design Process Innovation through collective and collaborative knowledge" is oriented precisely to overcome the superficial and inadequate projects that trivialize the complexity of spontaneous urban architecture.

---

[8] e.g., the use of Life Cycle Design (LCD) and Life Cycle Assessment (LCA) tools.

[9] In the sustainability protocols, for instance, "the involvement of the actors is virtually absent, with the exception of the credit attributed to office buildings" (Attaianese and Acierno, 2017, p. 81).

The design process innovation starts with the transformation of the theoretical and conceptual framework on which the failed attempts to improve the habitability of informal settlements and the quality of their dwellings have been based (Baratta, Calcagnini, Finucci, Magarò, and Minella, 2016b). It considers a decolonial conception of the technological approach to the project to rediscover the strategic role of the informal context —physical, social, and cultural— in the design process and the multiple dimensions of lived space in spontaneous settlements. In other words, it explores the concept of informal place, understood as *topos* and as *chôra*[10] (Grosso, 2004, pp. 34-39), bearing in mind the notion of living without uprooting from the condition of the human being's belonging to the environment (Vattimo, 1982, p. 49).

This analysis reconsiders the informal practice of self-building as a paradigm and an opportunity for innovation and creativity based on its past and roots, revealing other ways of understanding architecture and the territory. A study conducted by Baratta et al. in an informal settlement in the department of Boyacá - Colombia concluded that the building techniques used by the inhabitants were not related to the construction place. Instead, they were based on the 'builder's homeland's techniques and connected to their memories and knowledge (2016b, p. 365). The hypothesis presented here is linked to this statement and the possibility of reformulating the relationship between traditional and informal architecture. Likewise, it relies on the idea that the relationship between the popular knowledge of informal communities and the specialized expertise of the architects can be the basis for developing sustainable technologies for the eco-compatible upgrading of informal dwellings.

The result is a catalog of technical, experimental, and social tools useful for the architect's research, training, and professional practice in self-built urban contexts. This toolbox contributes to a more comprehensive analysis of the inhabitants' collective and individual needs, the socio-cultural values and backgrounds of the communities, and the natural and local resources. It seeks to generate collaborative design and construction processes, taking into account popular construction archetypes repurposed in a contemporary manner through the integration of a

---

[10] *Topos*: Site space, physically defined and measurable (function).
Chôra: incommensurable space, linked to the built object and to the relationships with the subject (individual and collective) who conceived, built and uses it (value).

transdisciplinary (**Figure 2**), participatory and inclusive methodological framework.
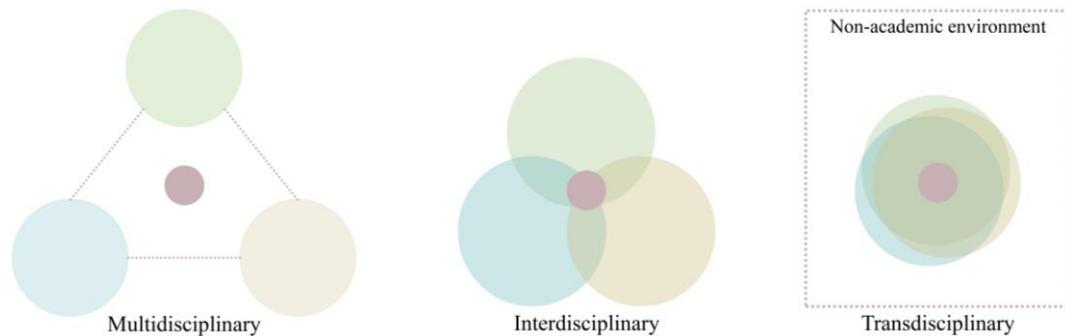
Figure 2. The difference in the use of the prefixes multi, inter, and trans in the case of disciplines.

Through concise descriptions, the toolbox resulting from this thesis presents both quantitative and qualitative instruments from different disciplines that interrelate and mutually enrich each other (Marseglia, 2018). Moreover, combining the academic "language" of professional architecture and the popular one of spontaneous neighborhood builders, the toolbox facilitates the analysis of traditional building methods and the development of new ways to apply or replicate them.

Unfortunately, due to the travel restrictions imposed during the Covid-19 pandemic, it was only possible to partially test the approach in the selected case study in Colombia: the informal neighborhood of *El Pozón*. It was chosen following the academic project of Vivienda social *PEI Máquina Verde-El Arca* developed between the *Politecnico di Torino* and the *Pontificia Universidad Javeriana* of *Bogotá* (*PUJ*) for the Solar Decathlon Latin America and Caribbean 2019 competition (SDLA&C 2019).

El Pozón illegally originated as an invasion of the *La Virgen* swamp area by poor people arriving in the city for reasons mainly related to armed violence and lack of employment and educational opportunities in their homelands. In this context, PEI Máquina Verde-El Arca was conceived as a strategy for mitigation and adaptation to climate change (United Nations [UN], 2015b). An intervention to define the edge of the swamp that, on the one hand, contributes to stopping the illegal expansion of the neighborhood and, on the other hand, catalyzes beneficial socio-ecological relationships between the community and the body of water.

The toolbox is thought to be flexible and adaptable to communities in other Latin American informal contexts. Consequently, the different combinations of tools can lead to alternative design paths, "revisiting all the specificities of a site, its culture, and history" (Mellano, 2018a, p. 31). This dissertation is, therefore, a synthesis from which to start talking about the inform(ed)al project in architecture.

Figure 3. Collage based upon the painting "*La Mujer en la Ventana*" by Fernando Botero (1995) and a picture of Medellín's library (P. Mellano, 2018).
Source: Mellano, 2018a, p. 45.

First part: The three little pigs and the myth of progress

> The "fable" is thus a word full of meaning, but what it says "implicitly" becomes "explicit" only through scholarly exegesis.

> (Certeau, 1984, p. 160)

> Quality is another casualty of innovation and progress.

> (Mignolo, 2011, p. 178)

Many communities with different cosmovisions, traditions, rituals, and habits coexist worldwide. However, the predominant model of what we know as progress in Western[11] culture has brought changes in individual and collective thoughts and interests. In the city, the westernization phenomenon has altered lifestyles, changed dwelling forms and practices, and even erased traditional knowledge.

Moreover, it has accentuated rural migrations to cities and the resulting housing emergencies. But what is the imagery of progress that leads to this? Is it more than socio-economic progress, or is it just related to quantitative growth measured by Gross domestic product (GDP)? It is thus essential to analyze this term and understand what it means for the community with which you want to work. According to the United Nations:

> There is a sense in which rapid economic progress is impossible without painful adjustments. Ancient philosophies have to be scrapped; old social institutions have to disintegrate; bonds of caste, creed, and race have to burst;

---

[11] As explained by Lanzavecchia, the West tends to take on ideological significance; thus, its geographical extent increasingly takes on the contours of an imaginary space (2000, p. 5).

and large numbers of persons who cannot keep up with progress have to have their expectations of a comfortable life frustrated. Very few communities are willing to pay the full price of economic progress. (United Nations, Department of Social and Economic Affairs 1951, 15, as cited in Escobar, 2018, p. 6)

This statement, made more than 70 years ago by an organization representing the majority of humankind, shows that progress has been presented as the necessary sacrifice of some in favor of others' wealth. On the one hand, this has been celebrated by those who benefit, using positive connotations such as improvement, growth, acquisition, well-being, advancement, and modernity. On the other, this concept has been widely criticized for being a colonial matrix of power and being linked to cultural Imperialism, "a term indicating what happens when the dominance of industrialized nations determines economic and social progress and cultural values worldwide" (Riach, 2017, p. 81). As Lanzavecchia declared at the beginning of the 21st century, progress continues today under the more shameful name of development. However, legitimizing development based on the promise of the emancipation of all humanity has become impossible. This promise has not been kept, not because it has been forgotten, but because development itself makes it impossible to maintain. It is no longer possible to what contributes to illiteracy, unemployment, and impoverishment in South and Third World countries. Likewise, development does not mean strengthening the prejudices spread by the mass media and the idea that what is good is efficient (p. 11).

In colonial times "improvement was a political strategy to persuade the indigenous elite to "attach" themselves to the colonial regime" (Guha, 1997, p. 33). The contradiction of progress is, therefore, to think that the first face can solve the problems generated by the second: land expropriation, "poverty, misery, inequities, injustices, corruption, commodification, and dispensability of human life" (Mignolo, 2011, preface) and in the case of architecture, quality. A clear contemporary example of the latter is what happens when the government steps in to rebuild homes in a rural community affected by a natural disaster. Although the original building materials in this community are predominantly natural —such as wood or bamboo— most homes are rebuilt with "modern" materials like concrete. This choice "in favor of progress" may not be entirely coherent with the context — if we consider, for instance, that this community is located in a desert area— but it can completely alter the dynamics and the spatial and architectural logic of the place.

Another example of the hegemonic imagery of progress can be found in one of the best-known fables in the world: the story of "The Three Little Pigs." Beyond the traditional meaning of the fable, the first two houses, built with natural materials, take on a negative connotation compared to the one made of concrete. It is ignored in the fable that technology should be based on specific objectives and the balanced use of available resources and according (Losasso, 1991). Therefore, if the little pigs lived in the same community as in the previous example, the first two would undoubtedly have a much more appropriate house for the context, even saving on the electricity bill. It is necessary to understand that traditional knowledge and materials have value and that making them part of our ways of living and dwelling does not mean taking a step backward from that idea of progress. On the contrary, it means advancing toward true progress, multicultural, intercultural, and transcultural progress (**Figure 4**).

Multiculturality   Interculturality   Transculturality
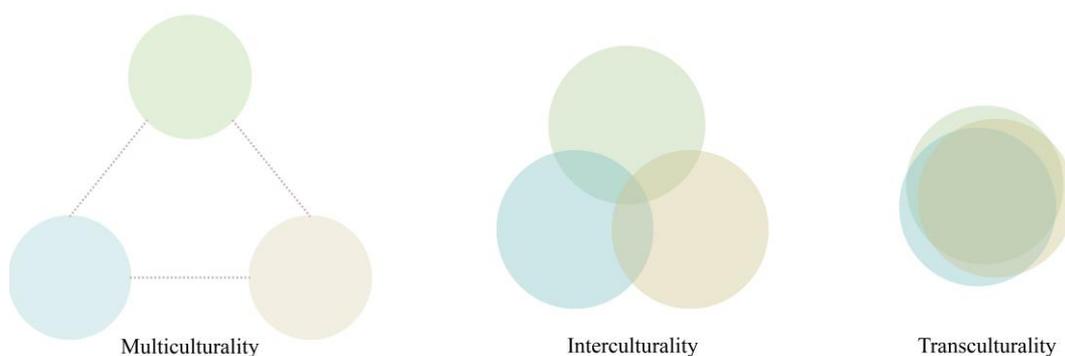
Figure 4. The difference in the use of the prefixes multi, inter, and trans in the case of culture.

One last example in this regard —where this dissertation concentrates— is what happens in the informal neighborhoods that have increased in the marginalized areas of Latin American cities in recent decades. Many people living in these settlements are low-income people who arrived from rural areas or small towns where some local and traditional architecture is still preserved. However, moving to the city and all it entails has caused the loss or oblivion of vernacular construction techniques. Losasso (2017) explains this by quoting anthropologist and sociologist Gregory Bateson:

> The globalized individual society caused the crisis which is considered a pathological condition of human personality resulting from the dissolution of primary social ties. Unlimited growth, gradual dissolution of diversity, metropolitan hypertrophy and urban forms, in which proximity relations are

denied, induce the settlement model of contemporary metropolis as "one of the main causes of unsustainable environmental, social and cultural development." (p. 8)

This situation exacerbates by the exposure to the image of progress that the city presents, thanks to which "all inhabitants of the planet feel 'a little more at home' before the same things" (Lanzavecchia, p. 61). In fact, as soon as people have the resources to renovate their homes, they decide to use modern materials. Although this may help to improve the structural characteristics of the houses, on the other hand, it may result in higher economic and environmental costs. Moreover, it may not ensure the satisfaction of the needs that arise.

The first part of the thesis explores topics of different disciplinary natures — anthropology, sociology, ethnology, and philosophy— with the specific purpose of strengthening the methodological proposal. An attempt will be made to see the horizon beyond the current dominant idea of progress and development based on the concept *not yet* present in some geographical contexts of the so-called Third World. According to De Sousa Santos in his book "*Descolonizar el saber, reinventar el poder* [Decolonizing knowledge, reinventing power],": "objectively, the not yet is, on the one hand, capacity (potency) and, on the other, possibility (potentiality)" (2010, p. 25). Max-Neef, Elizalde, and Hopenhayn also offered an alternative view on needs:

> To conceive of needs only as a deficiency implies restricting their spectrum to the purely physiological, which is precisely the area in which a need assumes with greater force and clarity the sensation of "lacking something." However, since needs engage, motivate and mobilize people, they are also potentiality and, even more, they can become resources. The need for participation is a potential for participation, just as the need for affection is a potential for affection. (1986, p. 34, as cited in Pradilla, 2010, vol. 1, p. 9)

If progress is thought to be the only possible future scenario, this dissertation's hypothesis could qualify as a romantic throwback or utopia. However, as Certeau said, "melancholy is not enough" (1984/1980 p. 27). The thesis tries to remind us of the condition of possibility enclosed in the concept of progress to prevent its distorted imagery from continuing to homogenize the informal urban habitat.
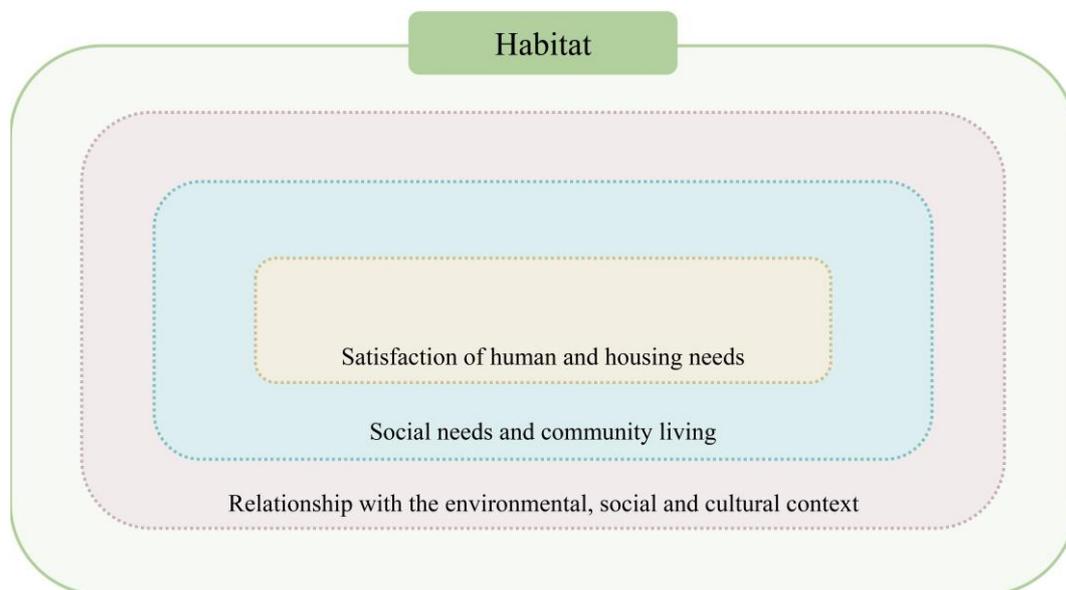
Figure 5. Essential aspects related to housing as an integral habitat.
Source: Elaborated by the author based on a figure presented in Pérez-Pérez, 2016, p. 70.

Chapter 1: Joint Research Project "The culture of the city"

> (…) there is a need for a new ecological episteme, one in which sustainability becomes the horizon for purposive living based on a dialogue of knowledges and cultures.
>
> (Escobar, 2018, p. 124)

> (…) there is also a fifth dimension of space: the culture of the city, of the landscape. This dimension is hard to measure and quantify, but perhaps it is the one that most belongs to humankind since it is a matter of memory, history and stratification.
>
> (Mellano, 2018a, p. 31)

[EN] This chapter describes the organization of the dissertation, the reason why this subject was chosen, the structure of the research process, and the results the study intends to obtain.

[IT] Questo capitolo descrive l'organizzazione della tesi, le motivazioni per cui è stato scelto l'argomento, la struttura del processo di ricerca e i risultati che lo studio intende ottenere.

[ES] En este capítulo se describe la organización de la tesis, el porqué de la elección del argumento, la estructura del proceso de investigación y los resultados que el estudio pretende obtener.

This dissertation is part of the Joint Research Project called "The Culture of the City"[12] between Politecnico di Torino's Department of Architecture and Design and the Pontificia Universidad Javeriana of Bogotá's Department of architecture. It is an international program in which activities are carried out with the contribution of doctoral students from both universities. The research project aims to examine the transformations of city landscapes to propose appropriate and contextualized answers for architectural and urban upgrading.

Figure 6. Researches and Dialogues on Architecture and the Culture of the City, 2017-2021. The exhibition "TIME SPACE EXISTENCE" was organized in parallel with the Venice Architecture Biennale 2021 and displayed the developed research activities. Source: https://poliflash.polito.it/in_ateneo/politecnico_e_pontificia_universidad_javeri-ana_de_bogota_alla_biennale_di_venezia. Accessed on May 15th, 2022.

"The Culture of the City" tries to understand the contemporary city and its cultural heritage as a process of stratified historical events, physical changes, and political and social phenomena already finished and/or in progress. Moreover, it seeks to identify the interconnected architectural and urban elements that integrate and define the city —buildings, public spaces, systems, structures, and emergencies. It also attempts to outline an interpretative analysis framework and a program of intervention that contemplates both public and private needs and possibilities. Mellano, one of the authors of the book resulting from the cooperation between the universities, explains it as follows:

> "The Culture of the City" is a research project that was conceived to restore a central role to an architect who is perhaps less "modern" than the superstars. He will reflect on historical values, on the memory of humankind

---

[12] See Dameri et al., 2018, the book resulting from this collaboration.

and its needs in the contemporary setting of the age we are living in. He will recognize and collect valuable aspects that must be preserved, valued, re-semantized and regenerated from the past for new uses and functions, distinguishing such traits from that which can, instead, be substituted, replaced and reinvented. (2018b, p. 385)

But what exactly is city culture? What does it refer to? The word culture comes from the Greek language. It is rooted in the term *Παιδεία* (*Paideia*), which means education and training, referring not only to the education of children and youth but of citizens in general for their ethical and spiritual development. Furthermore, the term culture has a broad meaning derived from the Latin verb *colere* whose main meanings are to inhabit, reside, dwell, cultivate, adore, adorn, and care. According to Niglio (2020), culture is the body of knowledge that each individual acquires during his/her life through physical and intellectual experiences and that uses to create his/her own habitat. However, according to the same author, "this knowledge must be reworked through personal thought and converted into moral and ethical actions useful to the community." The ontological and etymological dimension of the word culture makes us understand that it is closely linked to the community, the transformations of the human being, and the actions he/she performs daily. In other words, "man lives a truly human life thanks to culture" (Pope John Paul II, UNESCO, Paris, June 2, 1980).

However, our current cultural model is still connected above all to the dominant model of consumerism, which does not consider immeasurable dimensions such as values, traditions, needs, beliefs, lifestyles, etc. (Marseglia, 2018, p. 9). This connection leads to two of the most significant problems of urban life today. On the one hand, we favored monoculturalism; on the other hand, we forgot that culture is related to the environment where it is expressed and, consequently, to nature. To overcome these issues, Escobar points out that "it is imperative to engage with (or perhaps contribute to creating) worlds where it is impossible to speak of nature and culture as separate" (Escobar, 2018, p. 103). In his 2015 Encyclical Letter Laudato SI, Pope Francis spoke about cultural ecology. He stated that culture needs to be understood not only "as the monuments of the past, but especially in its living, dynamic and participatory sense, that cannot be excluded when rethinking the relationship of human beings with the environment" (n.143). Considering that "the forms of society are the substance of culture" (Geertz, 2003, p. 38) and that the culture is "contained in a place and/or tied to a particular group" (Ortner, 1999, p. 7), it is impossible to make a universal law about culture or study it as an exact

science. However, it is possible to analyze it as "an interpretive science in search of meanings" (Geertz, p. 23).

Culture is thus a public and collective matter. Although it is a collection of ideas and knowledge, it does not exist only in someone's imagination or abstraction: "although it is not physical, it is not a hidden entity" (Geertz, p. 24). The physical realization of this world of ideas is one of the most important features of the concept of culture itself. This construction, however, does not mean the reification[13] of culture but rather the manifestation of culture through the collective behaviors, physical spaces, rituals, symbols, and traditions of a community. According to Certeau, "the approach to culture begins when the ordinary man *becomes* the narrator, when it is he who defines the (common) place of discourse and the (anonymous) space of its development" (1984/1980, p. 5, italics in the original). As described earlier, this does not mean culture is an aesthetic object. Still, it is the "field of action and the stakes, with real outcomes in the real world and powerful representations in literature, theater, and art" (Ortner, 1999, p. 10). To these, it is imperative to add architecture. According to Fonseca Martínez:

> "The temporal dimension of culture is manifested in memory, the spatial dimension in the territory. Thus, culture results from humankind's action, which, thanks to the accumulated memory, acts in a specific territory. From this approach, culture is a concept that encompasses all aspects of human activity". (Saldarriaga and Carrascal, 2006, p. 46)

In fact, every city has a cultural identity, which is partly manifested in its architecture —traditional or not. Giordano (2018) states that "(…) the culture of the city is expressed through the design of the urban and architectural space (…)." He adds that "the quality of a location is conditional upon multiple physical elements, not least the urban materials, which are real tools through which to express the culture of the city, previously historic, now contemporary and smart" (p. 67). It is, therefore, essential to understand and interpret it to correctly answer the contemporary city's problems. Unfortunately, in the recent past, this has not been the case. In their 1996 book "Ecological Design," Van der Ryn and Cowan argued that

---

[13] According to the Cambridge Dictionary it is "the act of changing something abstract (existing as a thought or idea) into something real." See https://dictionary.cambridge.org/it/dizionario/in-glese/reification.

In many ways, the environmental crisis is a design crisis. It is a conse-quence of how things are made, buildings are constructed, and landscapes are used. Design manifests culture, and culture rests firmly on the foundation of what believe to be true about the world. (pp. 24-25, as cited in García García, 2017, pp. 2-3)

Another author who points out this "deviation in the system" (Mellano, 2018b, p. 384) and the importance of cultural identity is Losasso, who, in his 2017 article, pointed out the problem of reducing the tension between the architectural project culture and social issues, being the latter "at the basis of the city" (Rossi, 1966, as cited in Faroldi, 2017b, p. 12):

Negative implications arise from the shifting of the interest of part of contemporary architecture on the side of market, expression, language, fascination in architecture, aesthetic effect of technique or algorithmic reliability in solving the multiple problems of living. Nevertheless, the worsening of various housing emergencies, shortages of services, multiplicity of figurative or real *migrations*, and the progressive growth of imbalance forms, informal phenomena or unconventional mobility, offer today renewed attention to the social topic, declined in its many visions and interactions with the economic, environmental and cultural spheres. Therefore, one of the central topics of contemporary disciplinary debate is the development of an effective interaction between architectural design and social aspects. (Losasso, 2017, p. 6, italics in the original)

If it is true that we realize culture in the set of "moral and ethical actions useful to the community" (Niglio, 2020), the contemporary city is also the scene of a monoculture (De Sousa Santos, 2010). It means that "everything that the canon does not legitimize or recognize is declared non-existent" (p. 22). This monoculture is particularly evident in the widespread distinction between formal and informal cities, with which the former delegitimizes the latter[14]. An example in this sense is a common idea that informal housing is not architecture. However, as Aaron Betsky, former director of the "*Biennale di Venezia XI Mostra Internazionale di Architettura 2006*", explained:

Architecture is not "the building activity." Buildings are objects, and the act of building produces the object-buildings, but architecture is something else. It is the way of thinking and talking about buildings. It is the way of

---

[14] In other words, it is a classification into class A citizens and class B citizens, where A has many more rights than the B.

representing them, of making them. In concrete terms, **architecture is what can make us feel "at home" in the world**. (Potenza, 2017, p. 124, bold in the original)

According to Geertz, the anthropological identification with what for us is "exotic" is actually a ploy to conceal our lack of ability to relate to what is mysterious to us and others (2003/1973, p. 27). In this case, this artifice can be perfectly applied to the term "informal." However, it does not mean that there is no culture in the informal city. What it does mean is that the knowledge, expertise, and actions that reside there are being ignored and progressively hegemonized by the predominant model of the formal city. A model that often instrumentalizes culture with economic purposes.

This complex dichotomy has been well analyzed in the 17 goals of the 2030 Agenda signed in 2015 by all member countries of the United Nations. They define the main issues that must be addressed to discuss environmental, social, and economic sustainability based on "(…) a new cultural attitude which places the essence of the real at the center of every idea (…)" (Faroldi, 2017b, p. 12). A type of sustainability that leaves behind a "one-size-fits-all approach to the design of architecture and urban space" (Giordano, 2018, pp. 72-73, 78) and instead adopts a "systemic, experiential and adaptive approach. (Attaianese and Acierno, 2017, p. 78). A true sustainability that, like the *Paideia*, is for everyone.

1.1 Problem definition and Research Questions

In Latin America, the unstoppable migration flows from the countryside to the cities have generated an uncontrolled expansion of the urbs. As a result, the line that divided these two worlds —the rural and the urban— has become increasingly blurred.

This is evident in the poor emerging suburbs, also known as informal or spontaneous cities. These are marginalized areas characterized by physical and social problems —unstable soils, flood hazards, disconnection from the urban transport network, lack of infrastructures and public services, scarce green areas, etc. It is there that impoverished people generally settle in the cities after leaving their places of origin out of necessity or obligation.

One of the most important features of the informal city is the practice of housing self-building. Due to the absence of a formal housing solution by the State, many new citizens find themselves forced to build their houses wherever and however

they can, without the time to plan and the economic, material, and sometimes human resources to build appropriately. Usually, self-building is already present in the cultural background of people coming from the countryside. In fact, self-construction in rural contexts is still an essential part of the identity and tradition of peasant communities. Moreover, it responds to the inhabitants' needs by adapting to the local environment.

However, the emergency conditions related to informality, together with the "diffusion of previously unknown lifestyles and consumption models unrelated to local culture" (Lanzavecchia, 2000, p. 30), have led to the typological and technological homologation of self-construction techniques. In this globalized world[15] , characteristics such as climate zone, local material resources, ancestral knowledge, and traditional architecture have become negligible to the dominant cultural model of Latin-American informal cities (**Figure 7**). Hence, the search for a balance between socio-economic and ecological-environmental factors must be one of the commitments of architectural research on informal housing.
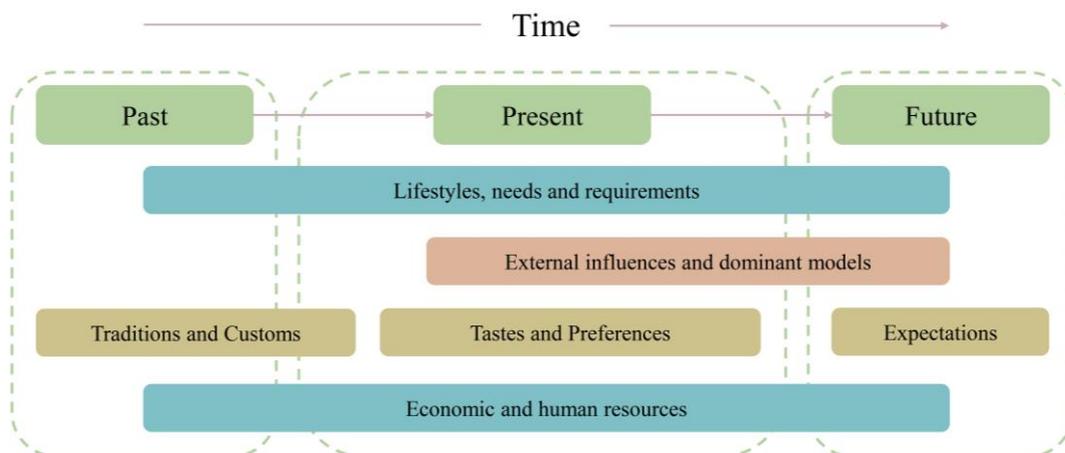
Figure 7. How the dominant models have displaced traditions.
Source: Elaborated by the author based on a figure presented in Pérez-Pérez, 2016, p. 70.

While social, economic, and urban disciplines have studied informal settlements, many results focus on the quantitative deficit of low-cost housing. However, the available data show that the big problem is the qualitative deficit of

---

[15] According to Lanzavecchia, "the result of this macro-transformation is that the whole world has become a kind of hyperoffer supermarket, for the use mainly of entrepreneurs and financiers" (2000, p. 19).

existing housing. A recent study by the Housing and Urban Development Division of the Inter-American Development Bank (IDB) explains it as follows:

> Today an important topic we must address is not only how to increase the amount of housing available but how to remedy the large number of units that need improvements in quality. (…) the quantitative housing deficit represents just 6% of the total deficit in urban areas while the greatest deficit is related to the coverage and quality of services, housing tenure and other qualitative aspects. One interesting fact is that while the aggregate qualitative deficit represents 94% of the total deficit, 90% of housing solutions involve the construction and delivery of new units. In other words, housing policies are not addressing the need to improve the quality of existing stock and habitats. (Adler et al., 2018, pp. 11-12)

Table 1. Quantitative urban housing deficit: measure households in inadequate conditions and damaged beyond repair - 2009 (latest published data).
Source: Inter-American Development Bank 2012. *Un espacio para el desarrollo: Los mercados de vivienda en América Latina y el Caribe*/César Patricio Bouillon, editor, as cited in Adler et al., 2018, pp. 72-73, 288.

Argentina	5%	Dominican Republic	3%	Nicaragua	12%
Bolivia	30%	Ecuador	10%	Panama	8%
Brazil	6%	El Salvador	8%	Paraguay	3%
Chile	3%	Guatemala	11%	Peru	14%
Colombia	9%	Honduras	2%	Uruguay	0%
Costa Rica	2%	Mexico	2%	Venezuela	8%

This is especially true in countries with emerging economies [16] with accelerating demographic growth. In these regions, most social housing programs focus on increasing the number of housing units available to impoverished populations, neglecting initiatives to improve the quality of current, more precarious informal housing. The data presented in **Table 1** and **Table 2** confirms

---

[16] See endnote No. 2.

that in many Latin American countries, the quality housing deficit is greater than the quantitative one. Moreover, it supports what Adler et al. have pointed out about the need to "change the paradigm and begin to consider housing's contribution to the quality of the urban fabric (…) to building better cities" (2018, p. 20).

Table 2. Qualitative urban housing deficit refers to dwellings with insecure tenure: walls are built with waste materials, dirt floors, no potable water or adequate sanitation, and inhabitants suffer from overcrowding - 2009 (latest published data).
Source: Inter-American Development Bank 2012. *Un espacio para el desarrollo: Los mercados de vivienda en América Latina y el Caribe*/César Patricio Bouillon, editor, as cited in Adler et al., 2018, pp. 76-77, 288.

Argentina	27%	Dominican Republic	32%	Nicaragua	58%
Bolivia	34%	Ecuador	31%	Panama	29%
Brazil	25%	El Salvador	41%	Paraguay	36%
Chile	16%	Guatemala	46%	Peru	46%
Colombia	19%	Honduras	1%	Uruguay	25%
Costa Rica	10%	Mexico	26%	Venezuela	20%

Concerning the environmental dimension of sustainability, there are different certification protocols and analysis tools that represent an essential step towards the goal of achieving cities and communities in better balance with nature: BREEAM, LEED, CASBEE, SBTool, GreenStar, DGNB Label, GBC Home, ITACA, Athena LCA Software, Tally, eTool LCD, Regenerate, EURECA[17], among others. This practice, however, "in the current complex activity of managing the multidimensionality and conflicting process of architectural design, is slipping into a functional and performance reductionism, even though it is opening to progressive adaptations" (Attaianese and Acierno, 2017, pp. 77-78). In informal settlements, a decolonized perspective of knowledge represents a suitable complement to avoid falling into a practical reductionism. Moreover, it can facilitate innovative,

---

[17] See section 6.4.

participatory, and social interaction processes based on "multiple interpretations of reality, expressing the ability to adapt to the complexity" (pp. 77-78).

The lack of a decolonial approach to architecture has caused architecture to lose its importance gradually. This weakening of our profession is evident in "self-referential images, devoid of both content and soul" (Mellano, 2018a, p. 31) of many formal architecture projects. In informality, the situation is far less encouraging since the architect's role has not only lost its value, but in many cases, the difficult conditions have not even allowed the co-participation of the designer. It is in this second scenario that the following research questions are articulated, as have partially done some of the results presented in the "International Architecture Exhibitions of the Venice Biennale" in the decade 2006-2016[18]. Potenza explained it as follows:

> Today, these places deserve attention, not for their *non-ordinary* nature, which is unusual to our forms of observation and understanding of the city and territories, but because of their resilience, spirit of adaptation, and unique form of *resilience* (...). The question is, what role does architecture play in contexts like these? (...). Questioning what we can really do with Architecture (solving problems, stimulating unseen relationships, shaping settlements), starting with the idea that we have to reinvent the ways of our profession and, I would add, of its training as well. (…) A question that has found a partial hearing in the various editions of one of the most qualified institutions of international architectural culture, the Venice Biennale. Starting with the Silver Lion of the 10th International Architecture Exhibition for promising young architects to Alejandro Aravena (Chilean group Elemental) for the *Quinta Monroy* [italics added]. This project has landed in the 15th edition with "Reporting from the Front," entrusted to the same architect (precisely ten years after his award-winning debut in Venice). (2017, p. 122, italics in the original)

---

[18] 2006 VENICE BIENNALE - X INTERNATIONAL ARCHITECTURE EXHIBITION "City. Architecture and society" Director: Richard Burdett; 2008 VENICE BIENNALE – XI INTERNATIONAL ARCHITECTURE EXHIBITION "Out There: Architecture Beyond Building" Director: Aaron BETSKY; 2010 VENICE BIENNALE - XII INTERNATIONAL ARCHITECTURE EXHIBITION "People meet in architecture" Director: Kazuyo Sejima; 2012 VENICE BIENNALE – XIII INTERNATIONAL ARCHITECTURE EXHIBITION "Common Ground" Director: David Chipperfield; 2014 VENICE BIENNALE – XIV INTERNATIONAL ARCHITECTURE EXHIBITION "Elements of Architecture" Director: Rem KOOLHAAS; 2016 VENICE BIENNALE – XV INTERNATIONAL ARCHITECTURE EXHIBITION "Reporting from the front" Director: Alejandro Aravena.

As Lucas (2016) states, "research begins and ends with having good questions to ask (...) the answers are often partial and contingent, context-dependent rather than absolute, and that is more than OK" (p. 188). This dissertation poses a series of interrogations that aim to trigger the beginning of a conversation about an informal technological culture (**Figure 8**). The first is the main research question, from which three further questions originate, each of which opens up a debate that the study itself tries to unify to answer the general one:
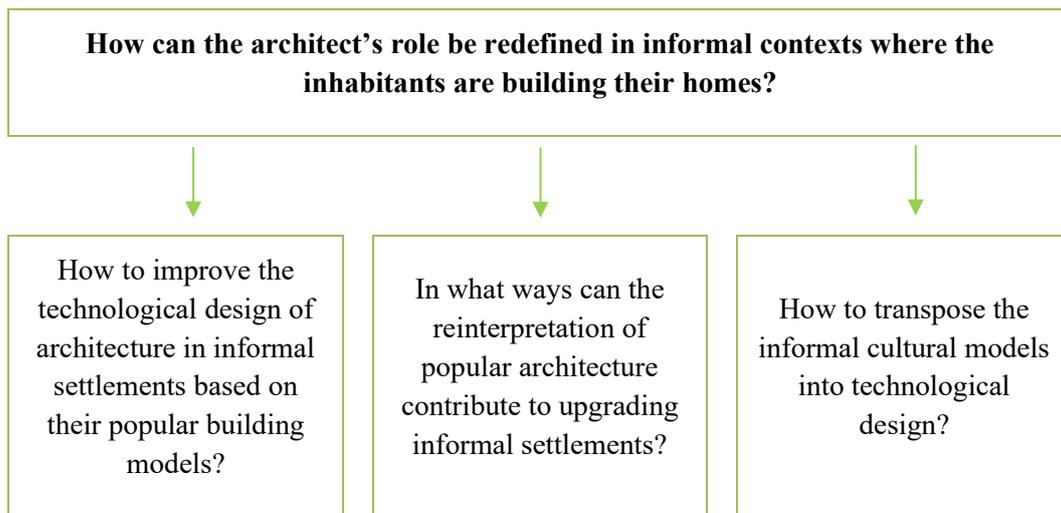
Figure 8. Research questions.

1.2 Purpose and objectives

This dissertation intends to call attention to today's role of architects in the construction of informal areas and the current limitations of the conventional methods used for tackling unsustainability in these contexts.

The research aims to contribute to the enrichment of the informal city's architectural culture and the training of architecture professionals and students interested in this urban phenomenon. Through an innovative, integrative and collective-based approach to technological design, the study tries to integrate the architects' specialized knowledge and the popular intelligence that spontaneous architecture offers. Although several studies have consolidated participatory processes in architecture in recent years, the thesis has fundamental theoretical premises that differentiate it from other approaches. The dissertation's originality lies in developing a flexible methodological framework for technological design processes that can better adapt to urban self-constructed neighborhoods' complex and unexpected character.

General Objective

This dissertation aims to shape a toolbox containing a set of conceptual, practical, digital, and methodological instruments to reformulate the work of architecture professionals and students in informal contexts.

It is based on the adaptive principles, technological potential, collective capacity, and creative force that characterize popular architecture and self-building practices. According to theoretical analysis and fieldwork, the result provides concise descriptions for each tool to offer resources for a broader and more complete understanding of the informal phenomenon. It is thought to be used by the designers/architects engaged in actions to upgrade spontaneous urban housing and improve the well-being of communities that self-manage their settlements in the Latin American context.

The main objective is not the definitive establishment of an "informal" methodology —an obvious oxymoron— but rather to make visible in the scientific debate the need to overcome some limitations of current models and approaches to the technological design of informal contexts. It is expected that the toolbox can provide clues for a design that is more attentive to the social dimension of informal spaces and, on the other hand, useful to enhance environmental comfort conditions. The latter, through adaptation and mitigation solutions, aimed at improving the microclimate of urban areas, especially dwellings.

Specific objectives

The thesis identified eight specific objectives helpful in answering the research questions and achieving the proposed general objective. These objectives combine scales —geographical and physical— disciplines —social and technical—and spheres of the sustainable project —social, environmental, and cultural.

1. Define the research study's core concepts and relevant arguments through bibliographic analysis.

2. Broaden the conceptual and theoretical framework on which design in informal contexts is based today by incorporating a transdisciplinary perspective.

3. Analyze the literature regarding two modes of popular architecture: traditional regional architecture and informal urban architecture in the

Latin American context, particularly in Colombia, to identify their weaknesses, strengths, and common points.

4. Develop a methodological framework based on the above conceptual development, the selected context, and the study of some best practices.

5. Assemble the toolbox using the information collected, classified according to the dimension(s) to which each instrument belongs and its nature: theoretical-analytical, participative-collaborative, software-digital, and practical-material.

6. Use the toolbox to characterize the case study's local context based on the area's socio-cultural and environmental aspects.

7. Use the toolbox to investigate the combination and integration between technical elements and industrial technologies available in the market, along with traditional and vernacular ones, through participation in the Solar Decathlon Latin America and Caribbean 2019 competition.

8. Based on the implementation of the tools in the case study, report the conclusions, challenges encountered, and future research opportunities to complement what has been achieved during the doctoral period.

1.3 Research phases and dissertation structure

The thesis' structure is built on the premise that architecture is a social action and a participatory practice and, therefore, must be contextualized and socialized. The following paragraphs provide a detailed organization to orient the reader and help him/her navigate the document's contents.

The thesis has a theoretical component and a practical one. The theoretical component is the information gathering and bibliographic analysis —identifying and collecting already available data (secondary data). The practical part is the fieldwork, carried out in three different cities in Colombia: in Cali with the participation in the international competition Solar Decathlon Latin America and Caribbean 2019, in Bogotá working with professors and students of the Pontificia Universidad Javeriana of Bogotá and in *Cartagena de Indias* in several visits to El Pozón neighborhood, chosen as the case study —field data collection (primary data). **Table 3** summarizes the phases of the work done within the study.

Table 3. Research phases.

Phases	Tools	Goals	Results
Theoretical information gathering	Literature review (secondary data)	Research orientation: • Questions • Hypothesis • Scope • Objectives	First report
Case study research	Collaboration in workshop "New territories" (Pontificia Universidad Javeriana)	• Data collection • State-of-the-art description • Bibliography definition	Second report
	Participation in the Solar Decathlon Latin America and Caribbean 2019	• Prototype design • Prototype construction • Prototype monitoring	PEI Máquina Verde-El Arca Project
	Fieldwork to El Pozón	• Relationship with the community	Field data collection (primary data)
Theoretical framework definition	Data collection Analysis of primary and secondary data	• Index definition and bibliography organization	Third report
Theoretical framework update		• Initial stage of each chapter	Fourth report
Development of the collective-based methodological framework	Analysis of texts and discussions	• Abstract definition • Chapter development	Fifth report
Toolbox definition		• Thesis draft • Definition of tools	Sixth Report
Results and dissemination	- Analysis of gathered information - Graphic organization of information	• Thesis writing • Characterization of tools • Organization of tools	Doctoral dissertation

Based on the information collected during the research period, the content of the dissertation is divided into three parts that follow each other (**Figure 9**):

1. Recognition and valorization of popular knowledge in self-build architecture: Part I "The three little pigs and the myth of progress."

2. Alternative reading of informal architecture on the basis of its relationship with vernacular architecture: Part II "The ugly duckling and the myth of homogeneity."

3. Design process innovation in a typological case study: Part III "The 'informed' design toolbox."

The first part defines the identified problem, the research questions, the scope and objectives (Chapter 1), and the theoretical framework of reference (Chapter 2). The second part shows the social and geographical context in which the thesis operates (Chapters 3 and 4). Finally, the third part presents the design approach and its methodological framework (Chapter 5), the selected case study (Chapter 6), and the conclusions, as well as some proposals for further steps (Chapter 7). This last chapter also presents the outcome of the dissertation: the toolbox.

A general timeline of the work performed is presented in **Table 4**. This timeline has been subject to changes due to mobility restrictions because of the COVID-19 pandemic. This unique and unprecedented situation and the travel limitations resulting from the national strike in Colombia in the first half of 2021 changed the research objectives, making the theoretical component more relevant to the study's outcome.
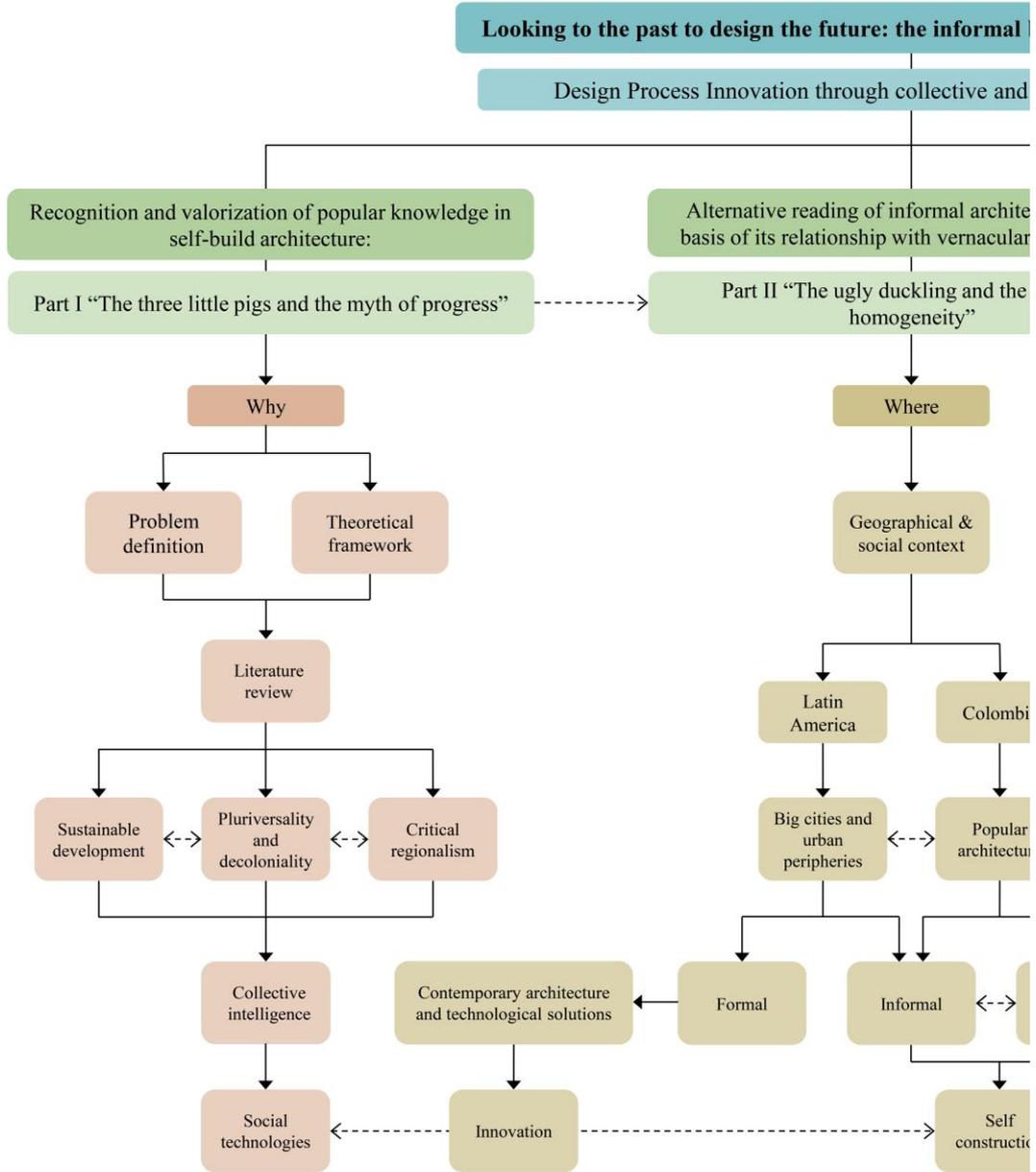
Figure 9. Dissertation structure.

built environment in Colombia

collaborative knowledge

cture on the
architecture

myth of

Design process innovation in a typological case study

Part III "The informed design toolbox"

Who

What

How

Professionals

Community

a

Participatory design
(Best practices)

re

"Informed"
architect

Integrative
approach

"Informed"
design toolbox

Social
tools

Technical
tools

Collective-based
methodological
framework

Case study

Cartagena – El Pozón

Solar Decathlon

Fieldwork

Traditional /
vernacular

Emerging
heritage

Conclusions

on

Table 4. Schedule.

Ph.D. activities and mobility periods	2018 Nov-Dic	2019 Jan-May	2019 Jun	2019 Jul-Aug	2019 Sep	2019 Oct	2019 Nov-Dic	2020 Jan	2020 Feb	2020 Mar	2020 Apr	2020 May-Sep	2020 Oct	2020 Nov	2020 Dic	2021 Jan-Mar	2021 Apr	2021 May-Oct	2021 Nov	2021 Dic	2022 Jan-Oct
1. Theoretical information gathering	It	It	It	Co	Co	It	Co	It	It	It	It	It	It	It	It	Co	Co	Co	Co	It	
2. Research orientation (questions and objectives)	It	It	It										It	It		Co					
3. First report			It																		
4. Fieldwork: SDL&C 2019				Co	Co		Co														
5. Bibliography definition				Co	It	It		Co	Co	It											
6. Second report					Co																
7. Fieldwork: *El Pozón*								Co	Co												
8. Third report											It										
9. Analysis of texts and discussions	It	It	It			It					It	It	It	It	It	It	Co	It		It	It
10. Fourth report													It								
11. Index definition and bibliography organization											It	It				It	Co	It			
12. Fifth report																	Co				
13. Chapter development																	Co	Co			
14. Sixth Report																			Co		
15. Graphic organization of information																				It	It
16. Dissertation writing and evaluation																					It

Legend: It = In Italy · Co = In Colombia

Chapter 2: The mantra of development

Why should development be the only option?

(Mignolo, 2011, p. 309)

Architects don't invent anything. They transform reality.

(Alvaro Siza)

[EN] This chapter addresses concepts related to development alternatives as well as alternatives to development. The latter has gained significant strength in Latin America in recent decades through popular and grassroots movements. This social innovation is more inclusive of local communities regarding knowledge, processes, and outcomes. In other words, they are community-driven solutions for sustainability (Smith, 2013).

[IT] Questo capitolo affronta i concetti relativi allo sviluppo alternativo così come alle alternative allo sviluppo. Queste ultime hanno acquisito grande forza in America Latina negli ultimi decenni attraverso movimenti popolari e di base. Questo tipo di innovazione sociale è più inclusivo nei confronti delle comunità locali rispetto ai saperi, ai processi e ai risultati. In altre parole, si tratta di soluzioni guidate dalla comunità per la sostenibilità (Smith, 2013).

[ES] En este capítulo se abordan conceptos relacionados con las alternativas de desarrollo, así como con las alternativas al desarrollo. Estas últimas han cobrado gran fuerza en América Latina en las últimas décadas a través de los movimientos populares y de base. Este tipo de innovación social es más inclusiva con las comunidades locales en cuanto a conocimientos, procesos y resultados. En otras palabras, son soluciones impulsadas por la comunidad para la sostenibilidad (Smith, 2013).

In the last few decades, economic development has primarily determined how cities are built and how the technological design of architecture is conceived. This has resulted in a progressive loss of quality of constructive practices and, therefore, of the urban built environment. Marini defines this scenario as one "designed by air conditioning systems that are offered today as a new architectural language" (2017, p. 48).

This myopic development idea mainly considers tangible and quantifiable aspects, such as Gross Domestic Product (GDP), the number of goods and services available, productivity, economic growth, and the increase of available urban and building land. Issues such as culture, ethics, diversity, expectations, old and new habits, and lifestyles, among others, are often overlooked (Lanzavecchia, 2000). However, this is not a recent problem. As early as the 18th century, the increasing human influence on the natural environment and the possible domination of technology were recurrent concerns of several scientists and artists, among them John Ruskin and William Morris, renowned members of the Arts and Crafts movement. (Marseglia, 2018, p. 16).

It is necessary to recall one of the most important studies of the last century on the dangers of inexhaustible development: "The Limits of Growth," published in 1972 and conducted by the MIT research group, including Donella and Dennis Meadows. Unfortunately, at the time —and even now— it was received with skepticism and was even rejected by many who considered it dramatic. The same year was also the beginning of the first important United Nations Conference on the Human Environment in Stockholm. Here the concept of eco-development —later sustainable development— was defined along with the founding of the United Nations Environment Program (UNEP) (Marseglia, 2018). Following this, in the 1980s, the political discourse about development began to be more questioned, and an alternative definition emerged called *development on a human scale* which considered people as the central subjects of development.

Furthermore, at the beginning of the 21st century, the United Nations, in its United Nations Development Program (UNDP), coined the expression *human development* in which development "is not the increase of wealth, but wealth is one of the means by which human beings can lead full lives. Therefore, true development is the increase in the quantity and quality of choices that the

inhabitants of a country have" (2003, p. 100)[19]. Max-Neef et al. (1986) also defined it as follows:

> Such development is concentrated and sustained in the satisfaction of basic human needs, in the generation of increasing levels of self-sufficiency, and in the organic articulation of human beings with nature and technology, of global processes with local behaviors, of the personal with the social, of planning with autonomy, and of civil society with the state. (p. 14)

Although human development is a broader, more collective, and sustainable vision of development, it continues to be linked to the imposition of a monoculture. This is because it ignores and invisibilizes some subaltern knowledges. Vandana Shiva uses the term *monoculture of the mind* to describe the hegemony of Western knowledge and its epistemically undemocratic monopolization[20]. According to Latouche: "the West is a nebula that, like Pascal's universe, has its center everywhere and its circumference nowhere. It has become a vast social machine that has its hooks in our heads" (Latouche, 1989, as cited in Lanzavecchia, 2000, p. 5).

The native peoples in what is now known as the American continent have used various terms throughout history to refer to alternatives to development. For instance, the Andean concept of *Buen Vivir*, which means "to live in harmony," is a life project delinked from competition and success (Mignolo, 2011, p. 255). This *Abya Yala* paradigm[21] (Mora, Oviedo Freire, Avella, Vega Sillo, Campuzano Rodríguez, Simbaña Pillajo, Sánchez, Plaza Zuñiga, Giraldo, Lora and Solano Salinas, 2020, p. 34) moves away from the anthropocentric vision of life - common in the capitalist and socialist paradigms - in favor of harmonious coexistence with the universe (p. 35). De Sousa Santos, likewise, explained that one of the modes of production of absence or non-existence is the *monoculture of linear time* or the non-contemporaneity of the contemporary,[22] that is:

---

[19] For further discussion, see Castillo Ospina, 2007, pp. 50-53; Organización para la Cooperación y el Desarrollo Económicos [OCDE] et al., 2019.

[20] Shiva, *The Monocultures of the mind*. An interview on the topic can be found in Shiva, "Monocultures of the Mind," as cited in Mignolo, 2011, p. 140.

[21] Used since pre-Columbian times by the indigenous Guna people, it means "land in its full maturity" or "land of vital blood." Today Abya Yala is still defended by many indigenous communities in opposition to the colonizing name "New World" or "America" (Carrera Maldonado and Ruiz Romero, 2016).

[22] According to the same author, the monoculture of knowledge produces the ignorant, the monoculture of linear time produces the backward, that of the naturalization of differences produces

(…) the idea that history has a unique and known meaning and direction. This meaning and direction have been formulated in various ways over the last 200 years: progress, revolution, modernization, development, growth, and globalization. Common to all these formulations is the idea that time is linear, that the central countries of the world system are at the head of time and, together with them, the knowledge, institutions and forms of sociability that dominate them. This logic produces non-existence by declaring backward everything that, according to the temporal norm, is asymmetrical in relation to what is stated as advanced. (2010, p. 22)

This is why the mantra of development —even human development— reproduced by the current capitalist system has begun to lose its force as the main option for eliminating poverty worldwide in recent decades. Instead, concepts that seek dignity and prosperity rather than growth and wealth have begun to be used. Some alternatives to development are "degrowth and post-development (Latouche, 2004, 2006 e 2007), qualitative growth (Capra, Henderson, 2013), and economics of happiness (Kahneman, 2005), where the quantitative approach shifts toward qualitative concepts and theories" (Marseglia, 2018, p. 9). These concepts reflect what the indigenous communities were already expressing through acts such as *sumak kawsay*, the Quechua word for Buen Vivir, and that:

(…) is precisely the harmonious coexistence, which is the strength, energy, power, intelligence, and conscience of the entire *cosmunidad*[23]. (…) The sumak kawsay is the cosmoconsciousness of life or, better, the *vida consciente* or *conciencia de la vida* or *crianza de la vida*; or the *vida querida*, the *vida sabrosa*[24], the *vida dulce*, which is the good coexistence, is the life in community, in collective, in communality. (Mora et al., 2020, pp. 48-50)

Lanzavecchia (2000) reminded us of Latouche's words (1993), which are still relevant in our days: "development today may mean fighting against growth, because the big society can keep its promises only by destroying its own

---

the inferior, the monoculture of the dominant scale produces the local or particular and the monoculture of productivity criteria produces the sterile.

[23] Coined by Atawallpa Oviedo Freire, Cosmunidad "is a way of expanding the concept of community; it refers to the integration into this community of non-human species, flora, and fauna, which would have rights like other members of the community." (Mora et al., 2020, p. 32).

[24] Vivir Sabroso is a term used by the communities of the Colombian Pacific, particularly in the department of Chocó. This concept refers to a paradigm of "spiritual, social, economic, political and cultural organization in harmony with the environment, with nature and with people (...) it is more than the art of resistance in defense of life and of geographic and existential territories" (Meneses Copete and Mena Lozano, 2019, p. 50-53). For further discussion, see Quiceno Toro, 2016.

foundations, particularly on the ecological level" (as cited in p. 11). In 2009, the journal *América Latina en Movimiento* of the *Agencia Latinoamericana de Información* has published the volume 445 entitled *"La agonía de un mito: ¿cómo reformular el desarrollo?"* (The agony of a myth: how to reformulate development?) in which this model is criticized (Table. 5), and possible futures or alternative scenarios are proposed. In this publication, Tortosa used the term *maldevelopment* as a metaphor for this problem (**Table 5**). According to him, "living beings suffer from maldevelopment when their organs do not follow the code, become unbalanced, malformed" (2009, p. 18).

Table 5. Maldevelopment as the unsatisfaction of basic human needs.
Source: Tortosa, 2009, p. 21.[25]

	State/Local	**Ecosystem**	**Global system**
Welfare	Inequality Poverty Economic stagnation	Global warming Depletion of non-renewable resources Environmental pollution	Polarization Peripheralization Exploitation
Liberty	Limited democracy Repression Marginalization	Dependence on Nature, without "partnership"	Dependence Repression Marginalization
Identity	Internal colonization Nationalism Fundamentalism	Alienation from Nature, loss of roots	Coloniality Homogenization "Identity" reactions
Security	Violence Civil war Terrorism	Human-induced catastrophes	War between states Transnational terrorism Nuclearization

---

[25] According to Tortosa:

Its use in social sciences seems to have started with the 1968 paper of Sugata Dasgupta ("Peacelessness and Maldevelopment"), it continues with the book of René Dumont and Marie-France Mottien (Le maldéveloppment en Amérique Latine) of 1981, that of Laurence R. Alschuler (Multinationals and Maldevelopment) of 1988, although probably the classic reference in the use of this concept is the work of Samir Amin (Maldevelopment. Anatomy of a Global Failure) in 1990, without forgetting the Insights into Maldevelopment edited by Jan Danecki in 1994 with broad intercontinental participation. In the latter ones in particular, we find the idea of the failure of the initial project, a failure that is situated on a global scale and not only on the scale of individual states or particular localities. (2009, pp. 18)

The danger of the predominant idea of development nowadays is not only perceived in Latin American cities. In fact, it has crossed geographical borders and spread throughout the Global South as well as the North. According to Escobar:

> For decades, development discourses and strategies have kept in place the idea that much of Africa, Asia, and Latin America is underdeveloped and that it is the duty of well-intentioned governments and institutions to help them develop and modernize. That this dream turned into a nightmare for many has been sufficiently shown. (2018, p. 59)

Unfortunately, the academy continues to be biased against non-dominant models. This is even more alarming if we consider the Boston MIT research group's update on their 1972 study "The Limits to Growth," published in 2004. The 30-Year Update confirms the theories planted in the 1970s, which puts us as humanity at a temporary disadvantage and makes a change of direction even more urgent. **Figure 10** shows that the current development model has not been able to reduce the vulnerability of nations to different global risks and that, on the contrary, it has increased social instability in the regions mentioned by Escobar.
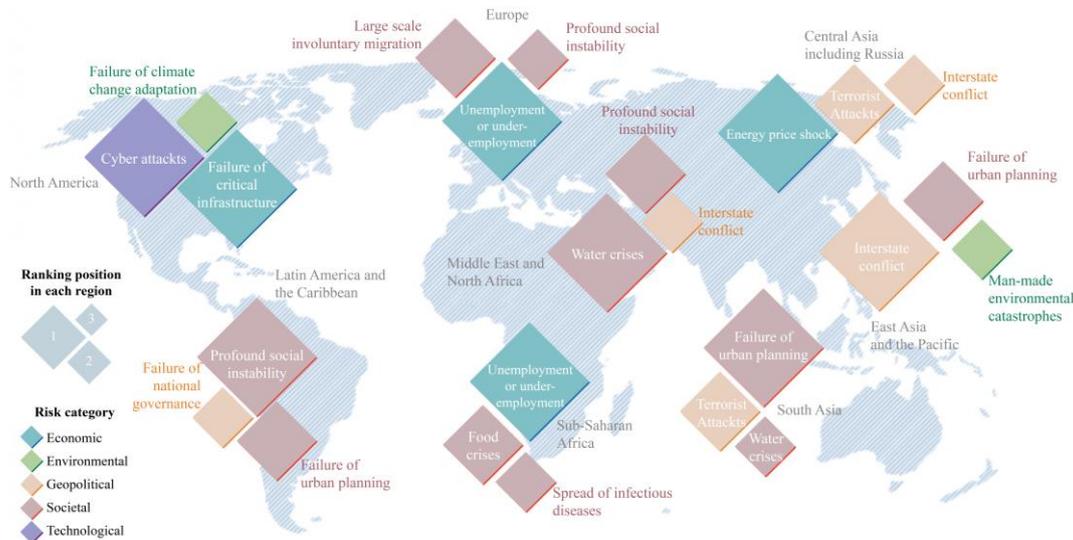
Figure 10. For which global risks is your region least prepared?
Source: Elaborated by the author based on a figure presented in https://reports.weforum.org/global-risks-2015/top-10-infographics/. Accessed on May 15th, 2022.

In Europe, new economic models have emerged based on concepts such as innovation, efficiency, knowledge, and cohesion. For instance, the Circular Economy (Webster, 2015) and the Blue Economy (Pauli, 2009) were born to

improve the planet's environmental conditions through less impacting production systems. They are also aiming at a more responsible consumption model by adopting unified environmental and social certifications for products. Lastly, bottom-up movements that point to holistic sustainability have gained strength and popularity recently (Marseglia, 2018). It is in these where the present dissertation stands.

As García García explains in his doctoral dissertation: "a conceptual metamorphosis is essential" because "language, including scientific and technical ones, is always alive. Its own evolution has allowed it to adapt to different contexts and societies over the centuries, shaping the substratum of its culture" (2017, vo. II, p. 1). This metamorphosis could contribute to reorientating the approaches to technological design in informal architecture Through new scenarios that enrich the project culture, generate a virtuous circle (Lanzavecchia, 2000), and articulate of popular and specialized knowledge.

2.1 From development to sustainable development: the 2030 Agenda

In 1986, the United Nations (UN) presented the "Declaration on the Right to Development," which stipulated that "development is an inalienable human right"[26] and agreed on the obligations of States to achieve this goal. A year later, the UN's Report of the World Commission on Environment and Development: Our Common Future —also known as The Brundtland Report (1987)— used and defined the concept of sustainable development [27] for the first time. This development alternative tried to go beyond the positivist slogan "order and progress" (De Sousa Santos, 2010, p. 30). For Attaianese and Acierno (2017), "this is the context where global certification protocols were developed. Even if strongly tailored to the measure of ecological footprint, they have the merit of putting the life cycle of buildings among the priorities of the agenda of sustainability" (p. 80).

However, many intellectuals have criticized the concept of "sustainable development" as an oxymoron. According to them, while recognizing the poor

---

[26] Declaration on the Right to Development, Article 1.

[27] According to Lanzavecchia:

> Its main innovation, compared to any other kind of growth or development, is to express itself in qualitative as well as quantitative terms. Alongside economic parameters and ecosystem impacts, Sustainable Development takes into account the quality of life understood as health, education levels, and social well-being of the population rather than production growth or income per capita. (2000, p. 39)

environmental conditions, sustainable development continued to ignore the idea of limits while searching a "constant material and economic growth, which is one of the major causes of unsustainability" (Marseglia, p. 23). The fact that people from different communities can use the same products worldwide thanks to globalization and the free market is not enough to erase or reduce the existing cultural gaps, in line with the notion of sustainability (Lanzavecchia, 2000, p. 5).

Sustainability was also the focus of the United Nations Conference on Environment and Development (UNCED) held in *Rio de Janeiro* in June 1992. On that occasion, the "Declaration on Environment and Development" was approved, namely Agenda 21, which, through 27 principles, described what should be done in the 21st century to manage and conserve forests. In addition, the World Commission on Sustainable Development was established, which each year monitors countries' efforts to comply with Agenda 21. However, it is no secret that many of these laudable initiatives did not have the necessary reception to generate real changes and improvements at the global level. As Giordano explains, the difficult task of transforming these documents and guidelines into concrete action has resulted in the following:

> (…) limited effects since many States have always preferred to delay, or renegotiate, the goals for reducing the greenhouse effect so as not to miss out on opportunities for economic growth based upon exploiting mainly fossil resources. Therefore, if the capacity to implement a sustainable revolution through international and national policies is lacking, solutions developed locally with objectives of global improvement (think globally and act locally) become crucial. (2018, p. 75)

In September 2015, the UN published another document, this time called "The 2030 Agenda for Sustainable Development" [28], containing 17 Sustainable Development Goals (SDGs) (**Figure 11**) and 169 targets. The SDGs are based on

---

[28] Resolution adopted by the General Assembly on 25 September 2015. According to this document, the 2030 Agenda for Sustainable Development is based on:

> (…) the outcomes of all major United Nations conferences and summits which have laid a solid foundation for sustainable development and have helped to shape the new Agenda. These include the Rio Declaration on Environment and Development, the World Summit on Sustainable Development, the World Summit for Social Development, the Programme of Action of the International Conference on Population and Development, the Beijing Platform for Action and the United Nations Conference on Sustainable Development. (UN, 2015a, p. 4)

the 2000 "Millennium Development Goals" and aim to complete what these have failed to accomplish (UN, 2015a, p. 1).
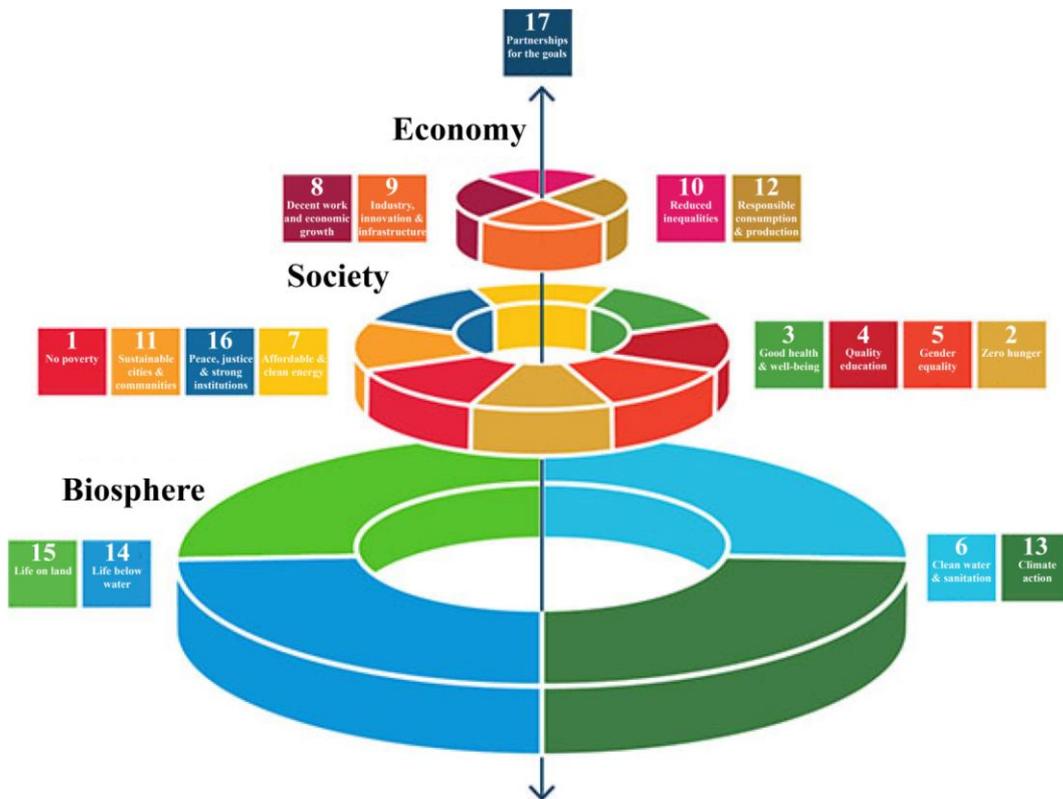
Figure 11. Integration of 17 SDGs across the biosphere, society, and the economy. Source: Azote Images for Stockholm Resilience Centre, https://www.stockholmresilience.org/research/research-news/2017-02-28-contributions-to-agenda-2030.html. Accessed on May 24th, 2022.

The 2030 Agenda also recognizes that social and economic development depends on the excellent management of human and natural resources and that territorial development and urban management play a key role in decreasing the environmental impact of cities to improve the inhabitants' quality of life. Moreover, the UN envisages:

> (…) a world in which every country enjoys sustained, inclusive and sustainable economic growth and decent work for all. A world in which consumption and production patterns and use of all natural resources —from air to land, from rivers, lakes and aquifers to oceans and seas— are sustainable. One in which democracy, good governance and the rule of law, as well as an enabling environment at the national and international levels, are essential for sustainable development, including sustained and inclusive

economic growth, social development, environmental protection and the eradication of poverty and hunger. One in which development and the application of technology are climate-sensitive, respect biodiversity and are resilient. One in which humanity lives in harmony with nature and in which wildlife and other living species are protected. (UN, 2015a, p. 4)

For the 2030 Agenda, the social component of sustainability is an important aspect to consider in this decade. However, social development —and even economic development— is still not a reality for many countries and millions of people worldwide. This absence is evident in the social and economic division between First and Third World countries and developed and underdeveloped countries. For De Sousa Santos, this is due to the current financial system and the "Western conception of rights," according to which "(...) only those who are susceptible of being subjects of responsibilities are entitled to be subjects of rights" (2010, p. 92).

This symmetry narrowed the scope of the principle of reciprocity in such a way that it left out women, children, enslaved people, indigenous people, nature, and future generations" (2010, p. 92). To these marginalized groups, one can add the informal urban communities, which do not even seem to have the right to adequate housing. The UN recognized this right through the Universal Declaration of Human Rights (UDHR) in 1948[29] , and since then has been incorporated into the policies and laws of many nations. **Table 6** shows which countries included this right in their legal system and the corresponding year. Unfortunately, according to recent data, "more than 900 million people worldwide live in slums and are subject to stigmatization and marginalization" (Adler et al., 2018, pp. 69). In this regard, Mignolo makes a pertinent observation:

> Human dignity is something parallel to yet distinct from human rights. Discourse on human rights focuses mostly on the legal question of right while the issue of human dignity shifts to the human individual, and raises the question, "Who speaks for the human in human rights? (Mignolo, 2011, p. 218)

---

[29] The right to adequate housing is "the right to live somewhere in security, peace and dignity" (The Committee on Economic, Social and Cultural Rights [CESCR], 1991, p. 10) and it is "recognized in international human rights law as part of the right to an adequate standard of living" (UN-HABITAT, 2017, p. 10). Furthermore, it is "enshrined in the Universal Declaration of Human Rights (UDHR, adopted in 1948) and the International Covenant on Economic, Social and Cultural Rights (ICESCR, adopted in 1966)" (p. 10). For further discussion, see UN-HABITAT, 2009.

Table 6. Housing as a constitutional right by 2016.
Source: Adler et al., 2018, pp. 68-69.

Country	Housing Rights legislation	Year of law	Country	Housing Rights legislation	Year of law
Anguilla	No	-	Haiti	Yes	1987
Antigua and Barbuda	Yes	1981	Honduras	Yes	1982
Argentina	Yes	1994	Martinique	No	-
Barbados	No	-	Mexico	Yes	1917
Belize	No	-	Nicaragua	Yes	1987
Bermuda	No	-	Panama	Yes	1978
Bolivia	Yes	1967	Paraguay	Yes	1992
Brazil	Yes	1988	Peru	No	1993
Chile	No	-	Puerto Rico	No	-
Colombia	Yes	1991	Saint Helena, Ascension, and Tristan da Cunha	No	-
Costa Rica	Yes	1949	Saint Kitts and Nevis	No	-
Cuba	Yes	1992	Saint Lucia	Yes	1978
Commonwealth of Dominica	Yes	1978	Saint Pierre and Miquelon	No	-
Dominican Republic	Yes	1966	Saint Vincent and the Grenadines	No	-
Ecuador	Yes	1998	Saint-Barthélemy	No	-
El Salvador	Yes	1982	Saint Martin	No	-
French Guiana	No	-	San Marino	No	-
Guatemala	Yes	1985	São Tomé and Príncipe	Yes	1975
Guinea	No	-	Trinidad and Tobago	No	-
Guinea-Bissau	No	-	Uruguay	Yes	1918
Guiana	Yes	1980	Venezuela	Yes	1999

Table 7 shows three Sustainable Development Goals and their targets to which this dissertation intends to contribute through an integrative collective-based approach. The latter is designed not only to reduce the environmental impacts of informal settlements but to homogenize the weights of all aspects of Sustainable Development: social, cultural, environmental, and economical.

Table 7. SDGs and corresponding targets to which this dissertation intends to contribute. Source: United Nations, 2015, pp. 21-23.

Goal 11: Sustainable cities and communities: Make cities inclusive, safe, resilient and sustainable
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

Goal 12: Responsible consumption and production: Ensure sustainable consumption and production patterns
12.2 By 2030, achieve the sustainable management and efficient use of natural resources
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production

Goal 13: Climate action: Take urgent action to combat climate change and its impacts
13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

In 2016, the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) held in Quito adopted "The New Urban Agenda." This guide promotes the relationship between development and urbanization, with the

premise that "cities can be the source of solutions to, rather than the cause of, the challenges that our world is facing today" (UN, 2017, p. iv). It also presents the commitments Nations must make to foster the transition to a sustainable society and achieve "the full realization of the right to adequate housing" (p. 5).

Another issue the New Urban Agenda addresses is the importance of culture, natural and cultural diversity, and interculturality in transformative and sustainable development. According to the document, these should be considered "in the promotion and implementation of new sustainable consumption and production patterns that contribute to the responsible use of resources and counteract the adverse effects of climate change" (UN, 2017, p. 4). This relationship was already discussed in Article 7 of the 2030 Agenda previously mentioned, which recognized traditional knowledge, indigenous peoples' knowledge, and local knowledge systems as a fundamental part of the development of socioeconomic and environmental policies and actions (UN, 2015, pp. 9-10). Although all of the above seems to be a step in the right direction, many of the ideas and good intentions contained in these documents have remained only on paper. One of the significant problems that the concept of development continues to have under the current economic and political power system is the failure to promote and understand diversity and plurality. Latour already expressed this at the end of the last century:

> If we do not change the common dwelling, we shall not absorb in it the
> other cultures that we can no longer dominate, as we shall be forever incapable
> of accommodating in it the environment that we can no longer control. (…) It
> is up to us to change our ways of changing. (1993/1991, chapter 5)

It is undeniable that today "the transition to a sustainable society" requires "the reconstitution and reinvention of households, villages, neighborhoods, towns, cities, and regions everywhere on the planet as interdependent, nested, self-organized, participatory and diversified wholes."[30] **Table 8** shows different factors that academics and other professionals consider necessary to achieve "urban social sustainability and socially sustainable urban settlements" (Dempsey, Bramley, Power, and Brown, 2011, p. 291). However, what is still being ignored by some — deliberately or unwittingly— is that several of the characteristics needed for change can be found in informal communities and neighborhoods. Since informality is one

---

[30] Kossoff, Gideon. 2015. "Holism and the Reconstitution of Everyday Life: A Framework for Transition to a Sustainable Society." Design Philosophy Papers 13 (1): 25–38, as cited in Escobar, 2018, p. 155.

of the main ways Latin American cities are built, the concept of a sustainable society must take them into account.

Table 8. The Social Dimension of Sustainable Development: Defining Urban Social Sustainability.
Source: Urban social sustainability: contributory factors as identified in the review of literature (in no particular order). Sources include Chan and Lee, 2008; Meegan and Mitchell, 2001; Turkington and Sangster, 2006; Jacobs, 1999; Bramley et al., 2009; Yiftachel and Hedgcock, 1993; Urban Task Force, 1999; Hopwood et al., 2005; Littig and Griessler, 2005; Burton, 2000a, as cited in Dempsey et al., 2011, p. 291.

Non-physical factors	**Predominantly physical factors**
• Education and training	• Urbanity
• Social justice: inter and intra-generational	• Attractive public realm
• Participation and local democracy	• Decent housing
• Health, quality of life, and well-being	• Local environmental quality and amenity
• Social inclusion (and eradication of social exclusion)	• Accessibility (e.g., to local services and facilities/employment/
• Social capital	green space)
• Community	• Sustainable urban design
• Safety	• Neighborhood
• Mixed tenure	• Walkable neighborhood: pedestrian-friendly
• Fair distribution of income	
• Social order	
• Social cohesion	
• Community cohesion (i.e., cohesion between and among different groups)	
• Social networks	
• Social interaction	
• Sense of community and belonging	
• Employment	
• Residential stability (vs. turnover)	
• Active community organizations	
• Cultural traditions	

Social sciences scholars, including Mignolo, Escobar, De Sousa Santos, and Fry, argue that the segregation and marginalization of informality are due to epistemological colonization. If not modified, it will result in what the philosopher Tony Fry calls *defuturing* (future-destroying), meaning a future without futures. The same author proposes the term *Sustainment* in contrast to the dominant and absolutist Enlightenment and as "a new imaginary for an age (…) where different ways of thinking, being, and doing become possible" (Escobar, 2018, p. 118).

Given what has been mentioned so far, it is essential that architecture and environmental design regain their original social vocation. In this regard, certification protocols, which, as described above, evolved in the second half of the 20th century, can play an important role. However, there is still a long way to go, with many limitations to overcome. For instance, many of them still privilege the environmental dimension of sustainability over others, especially those focused on the scale of the building. The social aspects concentrate on the users' comfort and well-being, as well as on the internal environment's quality. In addition, those based on a neighborhood scale have few criteria for assessing social aspects —e.g., BREEAM Communities (**Table 9**). A protocol moving in the direction of social sustainability and social inclusion is the recent ITACA Urban Scale Protocol approved in December 2016 (**Table 10**). It "is structured on a set of significantly more open and inclusive principles that have led to evaluation criteria for environmental, economic, and social sustainability of the interventions" (Attaianese and Acierno, 2017, p. 81).

In informal settlements, these protocols are more challenging to incorporate due to the factors that increase their design complexity. However, as will be seen in chapter 7, the toolbox could play an essential role in this regard as it would allow practitioners to have at hand a range of social and qualitative research instruments that they could use alongside these technical tools. Progressive and incremental self-construction, for instance, can be integrated into the framework of these analytical models in order to rethink positively and productively the life cycle of this type of housing. Furthermore, vernacular and contemporary materials and techniques could be analyzed together with the community to contribute to changing the inhabitants' belief that associated tradition with poverty and low living conditions (Dabaieh, 2013, p. 290). As Murray et al. said: "a system changes only when people begin to think and see differently" (2013, p. 104, as cited in Marseglia, 2018, p. 117).

Table 9. BREEAM Communities 2012: steps, categories and assessment issues (www.breeam.com/communities).
Source: Elaborated by the author based on a figure presented in Attaianese and Acierno, 2017, p. 82.

Step 1	Step 2	Step 3
Governance (GO)		
01 - Consultation plan	02 - Consultation and engagement 03 - Design review	04 - Community management of facilities
Social and economic wellbeing (SE)		
01 - Economic impact 02 - Demographic needs and priorities 03 - Flood Risk Assessment 04 - Noise pollution	05 - Housing provision 06 - Delivery of services, facilities, and amenities 07 - Public realm 08 - Microclimate 09 - Utilities 10 - Adapting to climate change 11 - Green infrastructure 12 – Local parking 13 – Flood risk management	14 - Local vernacular 15 - Inclusive design 16 - Light pollution 17 - Training and skills
Resources and energy (RE)		
01 - Energy strategy 02 - Existing buildings and infrastructure 03 - Water strategy		04 - Sustainable buildings 05 - Low impact materials 06 - Resource efficiency 07 - Transport carbon emissions
Land use and ecology (LE)		
01 - Ecology strategy 02 - Land use	03 - Water pollution 04 - Enhancement ecological value 05 - Landscape	06 - Rainwater harvesting
Transport and movement (TM)		
01 - Transport assessment	02 - Safe and appealing streets 03 - Cycling network 04 - Access to public transport	05 - Cycling facilities 06 - Public transport facilities

Table 10. ITACA Urban Scale Protocol: categories and assessment items (http://www.itaca.org/).

Source: Elaborated by the author based on a figure presented in Attaianese and Acierno, 2017, p. 86.

1. GOVERNANCE	
01	Participation
02	Social management of the construction site

2. URBAN ASPECTS	
01	Development and integration of cadastral parcels
02	Proximity to consolidated city
03	Soil conservation
04	Conservation of the built environment

2 bis. URBAN LANDSCAPE QUALITY	
01	Relation to the context
02	Relation to peri-urban agricultural areas
03	Strengthening the urban role
04	Urban edge qualification
05	Role of public space

3. ARCHITECTURAL ASPECTS	
01	Methods of project development
02	Design team qualification
03	Management criteria
04	Project's ability to interpret the context using contemporary languages
05	Flexibility of architectural projects

6. BIODIVERSITY	
01	Connectivity of Green Spaces
02	Use of native vegetation
03	Availability of green spaces

7. ADAPTATION	
MITIGATION OF THE DROUGHT AND WATER SCARCITY EFFECTS	
01.1	Extraordinary maintenance of water distribution system
01.2	Reduction and recovery of rainwater fed into the sewer system
01.3	Use of xerophytic plants
MITIGATION OF HEAT WAVES IN URBAN AREAS	
02.1	Increasing tree planting on streets, squares, and parking lots
02.2	Intensifying natural urban ventilation
02.3	Thermal comfort of outdoor areas - Albedo
ADAPTATION TO EXTREME RAINFALL EVENTS AND HYDROGEOLOGICAL RISK	
03.1	Natural quality upgrading - regreening
03.2	Reduction in building demand
03.3	Reducing the amount of rainwater entering the sewer system
03.4	Renaturalization of water courses of all categories
03.5	Trend reduction in population exposure to risk
03.6	Damage reduction in public open spaces

4. PUBLIC SPACES	
01	Relevance of public space in the design
02	Pedestrian pathway lighting
03	Crime prevention
04	Shaded streets and public spaces - thermal comfort

5. URBAN METABOLISM	

WATER	
01	Soil permeability
02	Water treatment intensity
03	Wastewater management

WASTE	
04	Accessibility to recycling

LIGHT	
05	Light pollution

GAS / AIR QUALITY	
06	Air quality monitoring
07	Greenhouse gas emission intensity
08	Acidifying emission intensity
09	Photoxidant emission intensity

ENERGY	
10	Primary energy for public lighting
11	Local renewable energy production

8. MOBILITY ACCESSIBILITY	
01	Road network connectivity
02	Cyclomatic complexity of road network
03	Road network scale
04	Access to public transportation
05	Availability of safe bicycle routes (in a protected location)
06	Proximity of bicycle and vehicular routes
07	Accessibility of pedestrian paths
07bis	Accessibility of pedestrian paths
08	Accessibility to shared mobility
09	Information and communication technology (ICT) accessibility

9. SOCIETY AND CULTURE	
01	Proximity to main services
02	Proximity to recreational facilities
03	Flexibility of use (Flexibility of uses throughout the day/week)
04	Mixitè
05	Incidence of urban gardens

10. ECONOMY	

ACCESS TO HOUSING	
01	Affordability of residential property
02	Affordability of residential rental
03	Composition and variety of housing stock

ACCESS TO EMPLOYMENT	
04	Employment potential

2.2 Pluriversal and decolonial development

It is said that "development is the road to freedom." Based on what has been discussed so far, is this true? Is this saying valid for everyone? And at what cost —

or at whose cost— is this freedom?[31] Today, the condition of freedom, as well as the right to development, does not apply equally to all individuals. According to Mignolo:

> At this point, development is no longer an option for freedom, but a global design that disrupts harmony, pollutes, transforms natural regeneration into artificial regeneration through the use of herbicides and genetically modified seeds, and, as a consequence, prevents "living in harmony and fullness." (pp. 310-311) (…) for 70 percent of the world's population (…) "development" (a particular form of the rhetoric of modernity), rather than leading to freedom, leads to coloniality: poverty, enslavement, the killing of the "nature" in favor of commodities. (2011, p. 332)

Speaking of freedom, although many countries have gained independence over the last two centuries, the phenomenon of colonization is still present in many spheres of society: from academia to popular culture. De Sousa Santos stated that "the end of political colonialism did not mean the end of colonialism in mentalities and subjectivities, in culture and epistemology and that, on the contrary, it continued to reproduce itself endogenously" (2010, p. 7). An example in this regard can be seen in the homogenization of the architecture of many Latin American regions following a modern ideal and the consequent disuse of traditional and local building materials and technologies in many rural and urban communities. The anthropologist Anke Schwittay (2014, p. 43) argued that the "application of Western expertise and technology to solve the problems of development privileges outsider, technological, and often commercial solutions over political action or indigenous practice" (as cited in Escobar, 2018, p. 61).

Colonialism, development, and globalization have contributed to the near elimination of the heterogeneity of cultures, knowledges, and politics[32], especially those belonging to marginalized groups. The sociologist John Law called this phenomenon the *One-World World* (OWW), which is "the universalizing ontology of the dominant forms of modernity."[33] According to Escobar, "once in the modern period, the world comes to be increasingly built without attachment to place, nature, landscape, space, and time" (2018, p. 12). Therefore, in design processes with

---

[31] Or as Lanzavecchia said: "it is legitimate (...) to ask whether this kind of development is good and for whom" (2000, p. 22).

[32] The politics of the people: "For it is difficult to think of any historical situation in which politics would not be an element of culture" (Guha, 1997, p. 92).

[33] Law, John. 2011. "What's Wrong with a One-World World." heterogeneities, September 25, http://www.heterogeneities.net/publications/Law2011WhatsWrongWithAOneWorldWorld.pdf, as cited in Escobar 2018, p. 66).

marginalized communities, it is essential to have a decolonized perspective of knowledge. It implies modifying the idea of "universality" of current Western and Eurocentric development models imported to non-Western contexts. This imposition is dangerous because it does not consider the consequences it may have on the local community and its tradition, which could also alter the ecological balance of the area due to its resulting environmental footprint. Decolonizing development is, therefore, a *pluriversal* — opposed to universal — option that attempts to legitimize other epistemologies. One important aspect to clarify is the difference between decoloniality and postcoloniality. In the preface to his book "The darker side of western modernity," Mignolo argued that "decolonial thinking materialized, however, at the very moment in which the colonial matrix of power was being put in place, in the sixteenth through the eighteenth centuries." On the other hand, postcoloniality:

> (…) emerged from the experience of British colonization (of Egypt and India and of Palestinian question) and, obviously, after the concept of postmodernity was introduced by the late 1970s. In the line of thought and concerns, South Asia, Australia, South Africa, and other former British colonies naturally joined postcoloniality, but the English and French speaking Caribbean did not. (2011, preface)

While postcoloniality is characterized by a critical look at the logic of coloniality, it does so from a First World point of view —the Western civilization. Decolonial thought, on the other hand, analyzes colonialism from the other perspective: the misnamed Third World —colonies and ex-colonies. This does not mean that these two concepts are opposites or antonyms, they are complementary and have similar objectives. It is for this reason that we should not expect the disappearance of one or the other school of thought since both represent options and options are what characterize diversity. In Mignolo's words:

> "Consolidating" (…) would be a modern/colonial objective and desire, not a decolonial one. (…) [There are] more advantages than problems in accepting and working with and in coexisting compatible options and sharing similar goals while taking different roads toward achieving those goals. (2011, preface)

In her book "Can the subaltern talk?" (1988), the renowned Indian philosopher Gayatri Chakravorty Spivak[34] —who is part of The Subaltern Studies Group[35]— asks if there is an ethical way for the privileged to speak for the subalterns. She argued that Western academics could not speak faithfully on behalf of the poorest and the oppressed "by differences in power, gender, and access to knowledge" (Riach, 2017, p. 10). They could not speak either for those who suffer *epistemic violence*,[36] meaning the "violence inflicted through speech, and writing (discourse) rather than actual physical harm" (p. 11). However, she also stated that professionals must "work for the bloody subaltern… against subalternity" (Spivak and de Kock, "Interview," 46, as cited in Riach, 2017, p. 13). Escobar affirms that "a decolonial perspective on development is thus essential for approaching codesign with subaltern groups in ways that strengthen, rather than undermine, their collective autonomy" (2018, p. 62). This dissertation favors this argument since it is not a matter of speaking for the subalterns but of speaking (together) with them, of uniting knowledges in a single voice.

According to Guha, politics is "structurally split between an elite and a subaltern part, each of which was autonomous in its own way" (1997, p. ix). In the case of the contemporary city in Latin America, this division is between the formal city (the elite) and the informal city (the subaltern). The epistemic violence mentioned above is prevalent in informal settlements, whose inhabitants are physically and intellectually marginalized by the formal elite. In fact, these communities' knowledge, expertise, and contributions to the city's configuration are often ignored, stigmatized, or, in the worst cases, erased. That is one of the reasons why Spivak's question, "Can the Subaltern Speak?" is still relevant today.

Although globalization "can neither be seen only in the negative nor be ignored in its complex nature" (Lanzavecchia, 2000, p. 22), one of the problems caused by it as well as by development is the *Us vs. Them* rivalry. Photographer Tuca Vieira perfectly captured this rivalry in his famous 2004 photo, which showed the drastic

---

[34] Born in Calcutta in 1942, she is one of the most important figures of postcolonial studies.

[35] A group of scholars founded by the historian Ranajit Guha. According to Riach (2017) "subaltern is a term originated in the work of the Italian political philosopher Antonio Gramsci" (1891-1937). While its meaning is questioned, in postcolonial studies, subalterns are people subordinated as a result of their class, caste, age, gender or office, or in any other way (p. 87). Although The Subaltern Studies Group works mainly in the South Asian context, the issues they addressed have global validity.

[36] For further discussion, see also De Sousa Santos, 2010.

division and inequality between *Paraisópolis* —the second largest *favela* in the Brazilian city of Sao Paulo— and the exclusive neighborhood of *Morumbi* (**Figure 12**).
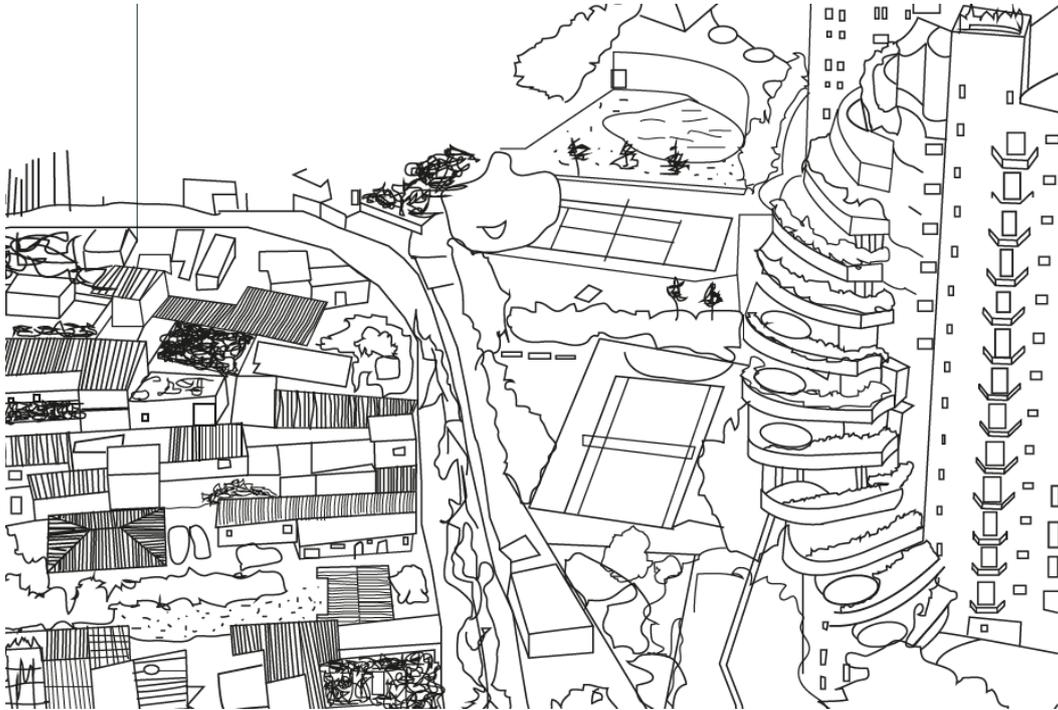
Figure 12. Contrast between Paraisópolis and Morumbi.
Source: Presentation "*Architecture Inverse. Lecciones de barrios autoconstruidos a la arquitectura sostenible*" by José Andrés Sánchez Arias. Leader of the URBZ Colombia team since 2016. http://www.urbz.net/.

In Riach's words, "the capitalized term 'Other' in postcolonial studies refers to people from developing nations as perceived by the Western gaze" (2017, p. 32). This dichotomy sees differences as a danger and therefore seeks at all costs to annul them. The present research is against such polarization and the phenomenon of John Law's One-World World mentioned above. On the contrary, it favors the concepts of Sustainment[37] and *pluriverse* (Escobar, 2018). The *Zapatistas*, in the "Fourth Declaration of the Lacandon Jungle," declare: "The world we want is one where many worlds fit. The Homeland that we build is one where all peoples and their languages fit, that all steps walk it, that all laugh it, that all dawn it" (Ejército Zapatista de Liberación Nacional [EZLN], 1996). Mignolo argues that "pluriversality means unlearning, so to speak, modernity" (2011, p. 176).

---

[37] See section 2.1.

Therefore, it is necessary to recognize that there is no single option (the Western way) (Mignolo, 2011, p. 296). On the contrary, there is a great diversity of alternatives and socio-natural configurations. These are precisely the tools "to reimagining and reconstructing local worlds" and to end "the hegemony of modernity's one-world ontology" (p. 4).

Just as the United Nations determined more than thirty years ago the right to development, today, it is necessary to stipulate the right to pluriversality, non-Western and alternative ways of thinking. Otherwise, we will not be able to overcome the current knowledge barriers. A tentative always from the United Nations came in 2017 with the approval of the New Urban Agenda. In item 146, the New Urban Agenda states that:

> We will expand opportunities for North-South, South-South and triangular regional and international cooperation, as well as subnational, decentralized and city-to-city cooperation, as appropriate, to contribute to sustainable urban development, developing capacities and fostering exchanges of urban solutions and mutual learning at all levels and by all relevant actors. (UN, 2017, p. 36)

Several scholars, such as De Sousa Santos, Escobar, Naranjo Botero, Fry, Guattari, and Lanzavecchia, agree on the need to recognize cultural and epistemological diversity. At the beginning of the 21st century, the latter stated that "it seems appropriate to seek above all to investigate what should be done to promote actions that combine the pursuit of environmental sustainability with that of cultural compatibility" (Lanzavecchia, 2000, p. 6). One way of doing so is through the decolonization of thoughts, discourses, and practices. In his 1989 book "The Three Ecologies," Guattari criticized the predominant socio-economic model and its harmful effects on the environment:

> Political parties and executive bodies are totally incapable of grasping this (environmental) problem in all its implications, generally limiting themselves to dealing with the field of industrial pollution, but exclusively from a technocratic perspective, when in fact, only an ethical-political articulation — which I call ecosophy— between the three ecological spheres, the environment, the social relations, and the human subjectivity, would be capable of clarifying these questions properly. (1990/1989, p. 23)

In the 21st century, scholars from Global South contexts such as Latin America continue critiques of the colonial paradigm. De Sousa Santos, for instance, states

that "alternative knowledge must be based on a new epistemology from the South, from the non-imperial South" (2010, p. 89). Similarly, Naranjo Botero points out that the "*epistemologies of the South* recognize the inclusion of knowledge different from the predominant ones as a contribution to overcoming the *epistemicide*[38] [italics added] of popular knowledge" (2018, p. 161). Escobar adds that "it is necessary to liberate design from this imagination in order to relocate it within the multiple onto-epistemic formations of the South, so as to redefine design questions, problems, and practices in ways more appropriate to the South's contexts" (2018, p. 6). These ideas are complemented by that expressed by García-Reyes Röthlisberger and Anzellini Fajardo which defends "the need for innovative approaches and interventions that combine scientific and ancestral knowledge for the adaptation to climate change and to the communities' own needs" (2019, p. 35).

A conclusion that emerges from this analysis is the importance of overcoming the ideological biases that western research generally manifests toward developing countries' societies. In García's own words, "it is not a matter of 'learning more things,' but rather of 'thinking differently' about the problems that arise in research, meaning to reformulate the conception of the practice of science" (2006, p. 90). The concepts highlighted in this section propose interpretative keys to address development and its predominantly economic nature. This dissertation argues that these could guide a context-appropriate design process that leads to communities' cultural and political autonomy in informal settlements.

2.3 Critical regionalism for an epistemic delinking

The previous section attempted to explain why it is crucial and necessary to move towards an epistemology detached from colonialism in all its forms. This section concentrates on how this could be achieved in the technological design of informal architecture. According to Ákos Moravánszky:

> Regions have come to occupy an extremely important place on the mental
> map drafted at the turn of the century, providing potential points of resistance
> to the dangers of progressing modernization. (2017, p. 7)

Critical regionalism is one of the concepts that this dissertation considers essential to meet this challenge. It is an approach to architecture that attempts to counter the idea of lack of identity and/or belonging by making use of social and cultural context, local characteristics, and geographical conditions of the building

---

[38] Term accurately used by the Portuguese professor Boaventura De Sousa Santos.

site: quality of light and the specific topography of a given location, autochthonous construction techniques, ways of living, local nature, rooted culture, etc.
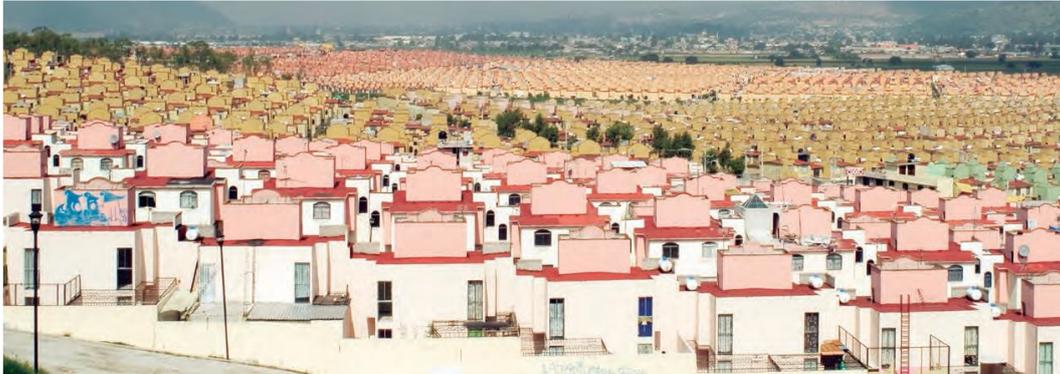
Figure 13. A social housing complex produced under the logic of the market in the periphery of Mexico City. Photograph: Isadora Hastings.
Source: Grupo de trabajo de Producción Social del Hábitat, 2017, p. 22.

While the origins of this approach are attributed to the work of architectural historian Kenneth Frampton, the same author mentions that Alexander Tzonis and Liane Lefaivre coined Critical regionalism in their 1981 essay "The Grid and the Pathway" (Frampton, 1983, p. 20). Based on the texts and teachings of Lewis Mumford[39] —with whom they had collaborated— about regionalism, these authors proposed a concept that went beyond an absolutist regionalism or a nostalgic traditionalist and vernacular perspective. In fact, the use of the adjective "critical" does not denote a complete opposition against external agents. Instead, it emphasizes the value of the particular and the benefits of the universal. It establishes a balance between the local and global spheres, between past and present, combining the best of the character and identity of the particular place and the principles and technological advances of modern architecture to respond to current needs appropriately.

Another author who critically considered regionalism was the Norwegian architect Christian Norberg-Schulz. Two years before the publication of Tzonis and Lefaivre's essay, he had already written one of his most acclaimed books, "*Genius loci*" (1979). This ancient concept that denotes the "spirit of place," its character, was used by the author to define better the notion of "region" and its relation to the daily life of human beings. In the author's words, architecture implies "visualizing

---

[39] Mumford exposed the original idea of a relative regionalism, open to the contaminations of a globalized world.

the genius loci, and the architect's job is to help people, by designing a meaningful place of inhabitation for them." [40] Genius loci is closely related to Critical regionalism since both agree that architecture must respect the particularities that give the distinctive character to a specific place/region. In his 2018 essay, Mellano recalled the words of Italian philosopher Luisa Bonesio, who, speaking on the identity of places, said:

> There is no single applicable solution in any place or culture, but not even room for *creative* subjective decisions. The dimensions of the site, its *genius loci*, dictate implicit rules that, we can say, are respected when the outcome is a good shape and deep stable harmony that do not alter the physiognomic identity of the site, but allows to recognize it in every intervention. (Geofilosofia del paesaggio, Milano, 2001, as cited in Mellano, 2018a, pp. 43-44, italics in the original)

In the famous essay "Towards a Critical regionalism. Six Points for an Architecture of Resistance," Frampton shared Tzonis and Lefaivre's opinion about the necessity to overcome the problematic polarity between a universalization/modernization and high-tech approach and a populist one based on a mere revival of "hypothetical forms of a lost vernacular" (1987/1983, p. 21). It does so by recalling the paradox presented by the French philosopher Paul Ricœur almost 20 years earlier: "how to become modern and to return to sources; how to revive an old, dormant civilization and take part in universal civilization." [41] Frampton explained that "architecture can only be sustained today as a critical practice if it assumes an *arrière-garde* position" (p. 20, italics in the original). He then specifies that "a critical arrière-garde has to remove itself from both the optimization of advanced technology and the ever-present tendency to regress into nostalgic historicism or the glibly decorative" (p. 20). Frampton further added:

> It is my contention that only an arrière-garde has the capacity to cultivate a resistant, identity-giving culture while at the same time having discreet recourse to universal technique. It is necessary to qualify the term arrière-garde so as to diminish its critical scope from such conservative policies as Populism or sentimental Regionalism with which it has often been associated. In order to ground arrieregardism in a rooted yet critical strategy, it is helpful

---

[40] Ch. Norberg-Schulz, Genius loci: Landschaft, Lebensraum, Baukunst, Stuttgart: Klett-Cotta, 1982, as cited in Moravánszky, 2017, p. 7.

[41] Paul Ricœur, "Universal Civilization and National Cultures" (1961), History and Truth, trans. Chas. A. Kelbley (Evanston: Northwestern University Press, 1965), pp. 276-7, as cited in Frampton, 1987/1983, p. 16.

to appropriate the term Critical Regionalism as coined by Alex Tzonis and
Liliane Lefaivre in "The Grid and the Pathway" (1981). (p. 20) [42]

Some critics suggest that the use of the term region or regionalism may
encompass a sense of exclusivity and, therefore, exclusion —like nationalist or
neocolonialist ideologies— or of propaganda and instrumentalization of
architecture. Others, instead, criticize its possible character of regression, imitation,
or naive vernacularism. However, Critical regionalism considers inconceivable a
future that does not recognize and understand its past as a source of meaning and
inspiration. It is precisely this critical potential that differentiates this school of
thought from rhetorical —or worse, superficial— approaches to architecture, from
those who see tradition from a nostalgic and conservationist point of view to those
exclusively focused on the future and with quality criteria based solely on
uniqueness, newness, and spectacularity. An exemplary case based on Critical
regionalism is the *Quinta da Malagueira* Housing Project by the Portuguese
architect Alvaro Siza (**Figure 14**). This will be developed in chapter 4.

Figure 14. Quinta da Malagueira, a collage of values (left); Tallageira housing, the usage
of Roman aqueduct as a concept for the new duct walls (right).
Sources: Drawn and modified by Rahmatollah Amirjani. Adapted from Guilherme
Pianca, 2014 (left); adapted from Kenneth Frampton, 2000 (right), as cited in Amirjani,
2017, pp. 19-20.

Although more than 30 years have passed since the ideas of these authors were
published, Critical regionalism is still relevant today. In a 2017 interview, Frampton
was asked about Critical regionalism's possibility of action today. He recalled the
visionary concept of *post-histoire* developed by the German philosopher Arnold

---

[42] Boano and Vergara Perucich address this issue in their critique of the "social" work of
Chilean architect Alejandro Aravena. The authors defend the work of many other architects who are
socially committed and have "acted as arrière-garde professionals rather than *avant-garde*
ideologues" (2016, p. 40). This will be discussed in section 3.1.

Gehlen in 1952, which connotes that "once progress becomes routine (as in the consumerist culture of next) it empties itself out." Frampton also added that:

> (…) in a world such as this, architecture, let alone direct democracy (as also hinted at in "Six Points for an Architecture of Resistance") can only survive as a deliberately defended condition of "otherness" set against the techno-scientific maximization of everything. Where there is a will there is a way for an arriere-garde. (p. 23)[43]

Frampton's words are related to what was stated by the authors analyzed in the previous section about understanding "otherness" not as a problem but as part of the solution. This becomes especially relevant if we consider that the environmental problems we are currently experiencing have resulted from resource-intensive and highly polluting production systems. These issues are based on a myopic vision of progress and development that has reigned in the so-called first-world nations and has been planted as a sacred seed of perpetual growth in the regions of the Global South. The obsession with the notion of progress and consumption has also led to the continuation of a crisis in architecture, which started last century with some of the ideas of the modern movement and then of the International Style. These approaches reject local architectural and cultural traditions —popular, subaltern, alternative, pluriversal, peripheral, informal knowledge— and privileges the dominant and uncritical state of rootlessness and "placelessness."[44] The latter is best expressed in the neologism of "non-place" (2009), defined by the French ethnologist Marc Augé in 1992.

In relation to this concept, the emeritus professor of Architectural Technology Rosario Giuffrè pointed out in his 2014 *Lectio* "Environmental Design, a humanistic discipline not a technical profession" that:

> Design, especially environmental design, constitutes an event that awaits confirmation, not speculative but experiential. Not surprisingly, it must be held that by its means, it is stochastically likely to recognize places and nonplaces (a purely semantic tautology) in order to transform them into neo-places through correspondence between experience and language. (p. 9)

---

[43] Postscriptum in Journal Autoportret. A quarterly on good space. Regionalisms / Modernism / Postmodernism, 2017.

[44] According to the Cambridge dictionary is "the fact of being similar to many other places and having no special character; the fact of not being in, or connected with, any particular place." See https://dictionary.cambridge.org/it/dizionario/inglese/placelessness. Accessed on May 21st, 2022.

The same author also stated the following:

> Let it be clear that Environmental Design is not an infradisciplinary medicine capable of curing the environmental patient. (...) We must become aware that every day we forget that all the environment, built, designed or not, and the so-called natural, is essentially medial, we dare say typographic, presenting itself always as a book, whose writing builds and transmits memory and readiness to be transformed, regenerated, recharged with connotations and signs, as of new materiality and active energies. (pp. 8, 14)

Figure 15. Views of informal neighborhoods from the *Pachacamac* Archeological site in *Lima*, *Peru*.
Source: Martinelli, 2020, pp. 55, 174.

Informal settlements seem to be part of these non-places due to their marginal position in the collective imagination and the general absence of *Lex rei sitae*[45]: local regulations, plans, building codes, etc. However, this is only true from external perception. For their inhabitants, these "regions" are, in fact, places full of meanings, deeply rooted processes, and a strong sense of collective and shared identity. Moreover, informal neighborhoods are the only image of the city they know for many of them.[46] Therefore, to incorporate Critical regionalism into informal design processes and the informal architectural logic itself, it is important to read the place's culture critically. Furthermore, technological and material choices should " add to the understanding of the spirit of the place, the

---

[45] Law of the place where the thing (is situated). See https://www.oxfordrefer-ence.com/view/10.1093/acref/9780195369380.001.0001/acref-9780195369380-e-1256. Accessed on May 21st, 2022.

[46] As demonstrated by the method of cognitive mapping developed by architect Kevin Lynch in his studies on African-American residents' perceptions of the city (The image of the city, 1960; Managing the Sense of a Region, 1976).

understanding of the spirit of the people" (García-Reyes Röthlisberger and Anzellini Fajardo, 2018, p. 34).

Figure 16. Examples of the architecture found in the Peruvian Pachacamac Archeological site.
Source: Martinelli, 2020, p. 55.

2.4 Collective intelligence: popular and academic knowledge

In many Latin American countries —and not only— technical education is subordinated to university education. For instance, a person who learns to transform matter with his/her hands is undervalued socially and economically and remains at the bottom of the social pyramid. This idea of "Enlightened absolutism" —Everything for the people, nothing by the people— does not let us see that without the base, the pyramid would fall.

In his book "The Reflective Practitioner," the American philosopher Donald Schön asked a question that is still relevant today: "Is professional knowledge adequate to fulfill the espoused purposes of the professions?" The same author also pointed out that "(…) professional knowledge is mismatched to the changing character of the situations of practice —the complexity, uncertainty, instability, uniqueness, and value conflicts which are increasingly perceived as central to the world of professional practice" (Schön, 1983, chapter 1).

Schön added that professionals are expected to be the ones to find solutions to our problems and that it will be through them that we will achieve social progress.

The contradiction here is that, in some cases, the same professionals are the ones who have generated these problems. This situation is evident in the contemporary Latin American city. Modern architects and urban planners —or with modernist ideas— thinking of solving some of the problems of the time have inherited others. Even today, we have not been able to solve issues such as fragmented and zoned cities, individualistic and stratified societies, and isolated and marginalized communities.

We must remember that the knowledge of the professional or the expert to which Certeau refers (1984/1980) is only one of many existing knowledges. Although "in the Expert, competence is transmuted into social authority" (p. 7), this authority is often far from the inhabitants' ways of life, dreams, memories and backgrounds. The detachment becomes even more problematic when the expert maintains "with authority a discourse that is no longer a function of knowledge, but rather a function of the socio-economic order. He speaks as an ordinary man, who can receive authority in exchange for knowledge just as one receives a paycheck in exchange for work" (p. 8). Similarly, Mignolo speaks of this authority when referring to Western knowledge. He states that:

> (…) as far as knowledge was conceived imperially as true knowledge, it became a commodity to be exported to those whose knowledge was deviant or non-modern according to Christian theology and, later on, secular philosophy and sciences. (…) Wester knowledge became a commodity of exportation for the modernization of the non-Wester world. (2011, p. 13)

De Sousa Santos referred to this Western monoculture stating that "its visibility is built on the invisibility of knowledge forms that cannot be adapted to any of these forms of knowledge. (…) [He is] referring to popular, lay, plebeian, peasant or indigenous knowledge on the other side of the line" (2010, p. 31). Informal and non-formal knowledge can be added to this group, together with "popular," being the latter often used in its pejorative sense. However, popular is included in the *Ecology of knowledge*, a concept against monoculture, mentioned by the same author:

> [It] is an ecology because it is based on recognizing the plurality of heterogeneous knowledge (one of them is modern science) and the continuous and dynamic interconnections between them without compromising their autonomy. The ecology of knowledge is based on the idea that knowledge is interconnection. (2010, p. 49) (…) The ecology of knowledge enables us to have a much broader vision of what we do not know, as well as of what we do

know, and also to be aware that what we do not know is our own ignorance, not a general one. (p. 61)

To speak of popular is to recognize and appreciate cultural diversity and its contributions (UN, 2015, p. 17), as well as the plurality in the world, often overshadowed by scientific knowledge. Instead of intent on preserving our dominance over the rest of the society, professionals must be open to the possibility "(…) of analyzing the immense field of an 'art of practice' differing from the models that (in theory) reign from top to bottom in a culture certified by education (from the universities or the elementary schools) (…)" (Certeau, 1984/1980, p. 24). This could be the basis to build "a participatory culture in the habitat" (Hernández Correa, Bucheli Agualimpia and Ramírez Ibañez, 2018, p. 279) in our world: on the one hand so globalized —One-World World; on the other, deeply divided —Us vs. Them or the "Other" (**Figure 17**).

Figure 17. Contrast between the wealthy Cartagena de Indias' tourist district and the impoverished *Tierra Bomba* island in Colombia.
Source: anamejia18. Standard license. https://stock.adobe.com/it/images/contraste-entre-la-riqueza-y-la-pobreza-en-cartagena/80685691. Accessed on May 21st, 2022.

Many approaches take into account this diversity of forms of knowledge. One is *ecological design* or *eco-design*, which considers both natural and human systems and processes and therefore does not offer universal solutions but contextualized

strategies. According to some theorists, eco-design "changes the old rules about what counts for knowledge and who counts as a knower. It suggests that sustainability is a cultural process rather than an expert one (…)" (van der Ryn and Cowan 1996, 147, 130, as cited in Escobar, 2018, p. 44).

Critical regionalism, as evidenced in the previous section, is another approach that generates appropriate responses to the local context. It is worth remembering that this context should be understood as environmental as well as social and cultural: traditional labor and activities, construction techniques and materials, needs, and resources (Potenza, 2017). Therefore, the practitioner must engage in rediscovering subaltern, non-expert, vernacular, autonomous and local knowledge in order to find adequate solutions that develop interdependence with technical, theoretical, and scientific knowledge. This complexity and multidimensionality (Attaianese and Acierno, 2017) is not only auspicious but also necessary and urgent since only in this way the architect's design and practice can be redirected —or better multidirected (De Bono, 1970, as cited in Marseglia, 2018) from the material object to the relationships between the actors.

According to García-Reyes Röthlisberger and Anzellini Fajardo, the "collective construction of knowledge" can "ensure not only greater relevance and assertiveness in decision-making, but, perhaps more importantly, the legitimacy of interventions" (2018, pp. 38,45). Eight years earlier, De Sousa Santos used the term *transcultural dialogue* to describe this interaction. In the author's words:

> In the case of a transcultural dialogue, the exchange is not only between different knowledges but also between different cultures. That means between universes of different meanings and, in a strong sense, incommensurable. (...) The recognition of reciprocal incompleteness and weaknesses is a *sine qua non* condition of any transcultural dialogue. (2010, pp. 72,75, italics in the original)[47]

The ecology of knowledge, the collective construction of knowledge, and the transcultural dialogue are fundamental tools for true epistemic decolonization with autonomy to defend what it considers essential, transform what it deems necessary, and invent what it finds absent. This dissertation agrees with the idea that some types of tradition can be tools for sustainability. It is imperative to stop seeing

---

[47] It should also be remembered that the incompleteness mentioned here, refers to the concept of "not yet" that the same author defines (2010), and to the concept of "potentiality" that Max-Neef et al. discussed (1986).

tradition as a nostalgic and romantic idea or one that must be defended at all costs and start seeing it as a potential for creativity, integration, and technological innovation. It is not a matter of praising alternative knowledge for the simple fact of being traditional but instead of identifying and articulating it with our own knowledge. In Pradilla's words, "the exercise of recognizing them is also to make them visible to other people and other cultures. To confront them with other knowledge from other places; to complement them, to project them into the future" (2010, vol. 3, p. 33).
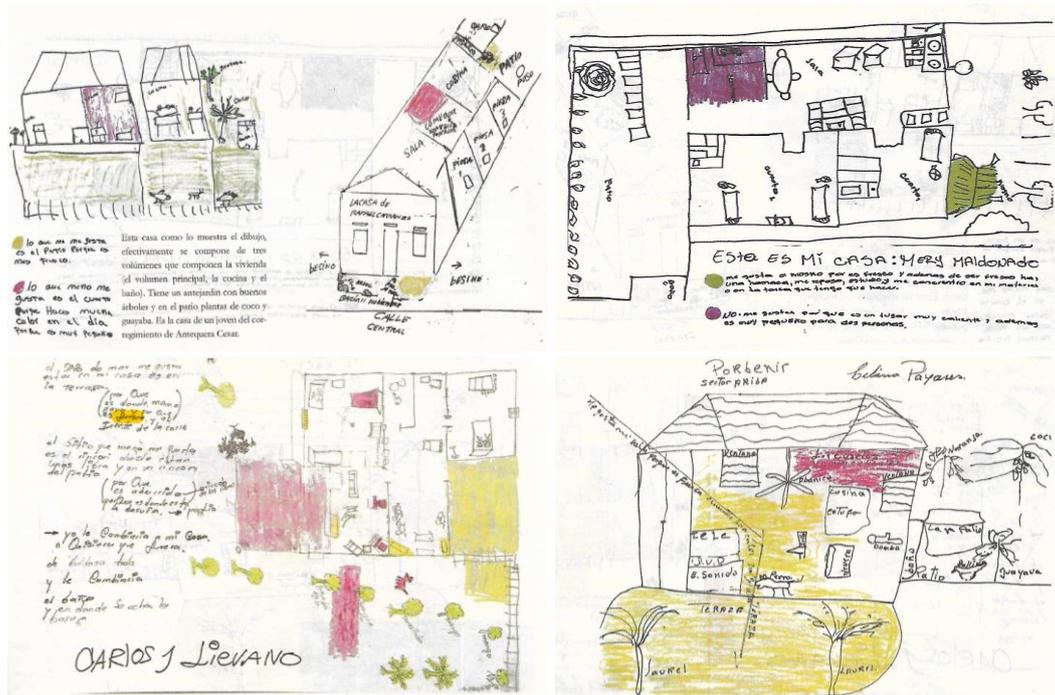
Figure 18. Plans drawn up by the inhabitants during Pradilla's research "*Cartografías Emocionales*" fieldwork.
Source: Pradilla, 2010, vol. 2, pp. 11-14.

In his book "Spaces of Hope," David Harvey "talks about the figure of the architect as one who, among other things, struggles to open spaces that create new future possibilities of social life" (Hernández Correa et al., 2018, p. 297). However, a common mistake we professionals make is to think that by talking only among ourselves, we will be able to contribute to solving the structural problems of today's cities.

This dissertation has so far attempted to demonstrate that the plurality of actors and figures and the democratization of knowledge can help overcome the inherent

problems of pyramidal behavior in design and open the way to "(…) governance instruments and bottom-up initiatives in order to serve the citizens' involvement" (Giordano, 2018, p. 65).

Pagani (2012) and Losasso (2017), full professors of Architectural Technology, expressed ideas in line with this. The first emphasizes the importance of citizens in defining policies employing "a model where the intangible assets matter more than the tangible ones." [48] On the other hand, the second points out that "(…) participation starts from the assumption that building architecture and space is always a *collective work* and a common heritage. (…) The final aim is to overcome conventional settlements principles, locked standard and the lack of cultural openness to other forms of knowledge" (Losasso, 2017, p. 9, italics in the original).

The improvement of informal housing, which is the subject of this thesis, cannot be seen only from the point of view of architecture, technology, urban planning, and design. Interdisciplinarity and even more transdisciplinarity are essential to guide the project[49]. In 2000, Lanzavecchia believed it was necessary "that the dissemination of knowledge becomes widespread since the practice adopted so far of limiting access to the most sensitive data only to insiders is unsuccessful in a Sustainable Development logic" (p. 39). This thesis considers it more appropriate to change the last two words of this statement to decolonial and pluriversal development. Such a change in the development paradigm is more capable of supporting today's necessary "climate-resilient shifting of the built environment" and the jump to an approach from a socio-technical perspective[50].

---

[48] Roberto Pagani, *L'Urbe diventa smart*, in "QUALENERGIA La Nuova Ecologia," 2012, pp. 75-78, as cited in Giordano, 2018, p. 76.

[49] Mellano (2018) affirms that:

> Today, more than ever, we must skillfully and carefully read the differences that make up our knowledge, and listen to the demand for *living* those surfaces, in order to provide a responsible, genuine, meditated answer, namely a *scientific answer*. (…) we must also open the languages of our disciplines towards other knowledge, other cultures, towards others. (p. 39, italics in the original)

[50] In the field of environmental design, the latter states that:

> (…) in each technological artefact, or, in the case of our architectural interests, each building, is an assembly of ideologies, calculations, dreams, political compromises and so on. Seen this way 'technologies are not merely efficient devices or efficiency orientated practices, but include their contexts as these are embodied in design and social insertion' (Feenberg 1999). (Guy and Moore 2004, as cited in Visconti, 2017, p. 356)

The title of this section uses a term taken from the project promoted with the same name: "*Inteligencias Colectivas*" (IC)[51], an online platform that has been operating since 2010. It contains information on numerous prototype projects based on local construction techniques and know-how from more than ten countries (**Figure 19**). According to its website, it is an "open network of research and design from which to share knowledge about all these constructive details, inventions, objects, architectural processes and non-standardized tactical urbanisms."[52]

Figure 19. Countries where Inteligencias Colectivas has a presence.
Source: https://inteligenciascolectivas.org/es/acerca/. Accessed on May 21st, 2022.

IC focuses on finding objects and construction systems based on inherited popular knowledge: semi-handmade, semi-industrialized, and hybrids. These object-processes have been evolving from generation to generation based on the practice and experimentation carried out by the same communities that use them.

In Inteligencias Colectivas' view, "a globalized idea of progress led by the standardization of processes is leading us towards the loss of the diversity and material richness of each region of the planet."[53] IC aims to counteract this effect by maintaining the relevance of these techniques through the contributions of architects in order to adapt them to contemporary situations (**Figure 20**).

---

[51] See https://arquitecturascolectivas.net/colectivos/zoohaus. Accessed on May 21st, 2022.
[52] Source: https://inteligenciascolectivas.org/es/acerca/. Accessed on May 21st, 2022.
[53] Source: https://inteligenciascolectivas.org/es/acerca/. Accessed on May 21st, 2022.

Figure 20. Images of some of the projects that Inteligencias Colectivas has carried out in Colombia
Source: PEI, Presentation of the "II *Taller Internacional Patrimonio y Apropiación Social – Cartagena de Indias y Bocahica* (Colombia) March 6-17, 2017".

2.5 From technological development to *Tecnologías Sociales*

One of the collective intelligence action fields is technology. In his book "We have never been modern" (1993/1991), Latour pointed out that:

> Sciences and technologies are remarkable not because they are true or efficient —they gain these properties in addition, and for reasons entirely different from those the epistemologists provide (Latour, 1987) —but because they multiply the nonhumans enrolled in the manufacturing of collectives[54] and because they make the community that we form with these beings a more intimate one. (Chapter 4)

---

[54] Latour differentiates between collectives and societies. The former he defines as "the association of humans and nonhumans" while the second he uses it "to designate one part only of our collectives, the divide invented by the social sciences" (Latour, 1993/1991, chapter 1).

This means that the skills and techniques of traditional nature and professional expertise should not be used because they have an intrinsic added value, but because they have a utility for improving the relationship between humans and non-humans. According to Lanzavecchia, "if the use of technology does not go beyond the 'skin' of the system, even the value of scientific knowledge will be of limited use" (2000, p. 10). In the case of architectural technology, the application of collective intelligence should aim to reassess and optimize existing techniques without falling into either absolute traditionalism or social or technological determinism (Thomas, 2008, p. 124). Mignolo criticized the action of *technological thinking* as it is only a question of "(…) spending time to package 'knowledge' according to the technological options on the menu". He also pointed out that technological thinking is now reducing other disciplines to a mere "technological packaging of options" (Mignolo, 2011, p. 15). On the contrary, technological thinking must be based on pluriversal and decolonial criteria that improve the collectives' conditions rather than sacrificed to preconceptions of an economic development conceived for a privileged part of the population: the elite, the West, the Global North, and the formal city.

Technology, therefore, cannot be universal. According to Giuffrè, "it would be difficult, in a closed programmatic scheme with standardized urban-territorial qualities, to unify in places and time the so-called global guidelines for sustainability local behaviors" (2014, p. 15). Several 20th-century intellectuals, including sociologist Lewis Mumford, economist Ernst Friedrich Schumacher, and writer Ivan Illich, shared this idea. They criticized mass production systems and centralized technology resulting from the industrial revolution and the capitalist economic model. Mumford, for instance, referred to small-scale production methods and democratic technologies as alternatives to authoritarian technology (1964). Schumacher, instead, criticized the "beaten track, of 'education for leisure' in the rich countries and on 'the transfer of technology' to the poor countries" (1993/1973, p. 2). Illich, on the other hand, pointed out that "the 'modern' technology transplanted in poor countries falls into three major categories: goods, factories that produce them, and institutions —services— first and foremost schools —that transform people into modern producers and consumers" (2013/1971).

In the new century, the unconditional acceptance of unlimited and massive technologies continues to be a matter of debate. The United Nations, for instance, calls for "North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms (…)." Additionally, the UN promotes

"the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries"[55] (UN, 2015, p. 26). Although this is a laudable and promising objective, if it is carried out from a relationship of power and domination, it will not serve any purpose. This dissertation agrees with Mumford, Schumacher, and Illich, on the one hand, on the fact that technology cannot mean domination. On the other hand, that technology transfer is not always useful or desirable because it cannot produce the same results in different contexts and circumstances. In this case, it is best for developing countries to develop technologies appropriate to their cultural and economic contexts. Technological innovation should be pluriversal, decolonial, and not "at the expense of Third World regions that pay the costs" (Mignolo, 2011, p. 304).

In the construction sector, technology transfer is described as "the process of acquiring technological innovations developed in other productive, scientific or cultural sectors and adapted to the building context in order to meet the needs of the users of an architectural project or to exploit new commercial areas" (Rossetti, 2008, p. 13). However, as described above, this practice does not always mean a benefit for the end users. In fact, many "conventional" technology transfer projects in Global South countries have failed. Two examples in this regard are the informal settlement upgrading programs and those focused on social housing construction. Often these projects are developed by professionals trained in other countries or with foreign design models that cannot always be applied to these contexts.[56] Other times, professionals prefer to use standardized materials and techniques that have nothing to do with the context where they intervene, contributing to the problem and not the solution. Both in the informal settlement requalification as well as in the improvement of the quantitative housing deficit, "there is a need to detach from the concept of product engineering, from the concept of marketing, from the determinism of instrumental reason, and especially from the central role of the economic factor" (Findeli, 2001, p. 5, as cited in Marseglia, 2018, p. 74).

Thomas (2012, p. 55) points out the problem of using the terms: *transfer*, *diffusion*, or *adaptation*[57]. According to him, the first two lead to "the false contradiction between the universal design of technologies and local implementation." The notion of adaptation, on their side, "shares with those of

---

[55] It is part of the SDG 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development (UN, 2015, p. 26).

[56] For instance, the European Passivhauss standard cannot —and should not— be automatically transferred to other climate areas without specific analysis.

[57] In addition to the term "contextualization" (Thomas, 2008, p. 23).

transfer and diffusion, the technological determinist idea of the artifact's uniqueness, regardless of the socio-technical relations system in which it is inserted." The author instead defends the use of the terms: *transduction*[58] and *resignification* of technologies. The first is because it "allows to criticize the linear, static and mechanical notions of 'transfer' and 'diffusion,'" allowing "a reduction of undesired effects and, ultimately, of the rate of developments considered as 'failures'." While the second is because it is more suited to the "complex process of reassigning meaning to technological artifacts, within the framework of local dynamics of construction, operation, and co-construction of interactions between users and artifacts." In other words, the re-signification of technologies considers the link between people, their objects, their knowledge, and their history.

The resignification of technologies in architecture goes beyond its fields of action —for instance, architectural technology and environmental design. Therefore, it requires a transdisciplinary approach between these and social sciences. From this need emerged the concept of *appropriate technology* in the 1960s, which opened another perspective on society, culture, and technology. Similar concepts such as *alternative*, *adequate* or *intermediate* technologies were also developed in the European postmodern context —with Mumford and Schumacher, among others[59]. The Indian school —with Guha as one of the most important representatives— also referred to socially appropriate technologies. In this case, the catalyst was the resistance movement against the British Empire in India in the 1930s and the consequent re-appropriation of traditional techniques in the textile industry as a political strategy. According to Vega's analysis, "the introduction of the appropriate technology concept into the discussions goes beyond the limits of the 'liberating' rhetoric and points to a broader evaluative dimension

---

[58] According to the Treccani Institute, the verb *transduce* "in technical language, to carry out a transduction, in the more specific meaning of transmitting energy with a modification of the nature of the energy itself." See https://www.treccani.it/vocabolario/trasdurre/. Accessed on May 21st, 2022.

[59] For instance, Bottero, Gangemi and Ranzo argued that:

> (…) there are technologies that are more appropriate than others, as they are better able to integrate with the biophysical cycles of the environment. However, the environment is not a homogeneous and isotropic system, since it varies in latitude, climate and orography. Different technologies will have to correspond to different environmental characteristics. In short, technologies, if appropriate, cannot be universally valid, but rather regional and local. This is true not only in relation to the physical environment, but also in relation to the cultural and social environment, which is certainly not historically and partially homogeneous. (1987)

linked to the notion of sustainability" (2004, p. 65). Furthermore, Hernández explains that:

> Any technology will be appropriate if it is developed or transferred according to the availability of local resources, if unnecessary expenses are avoided, if the most important needs of the population are prioritized, if the cost-benefit is clearly defined in relation to its implementation, and if it is able to satisfy the most urgent the population's needs by improving their living standards. To have the category of "appropriate," the technological development or technology transfer should take place only after exhaustive analysis and evaluation concerning each context, without falling into the temptation of importing fashions or techniques that indeed respond to other cultural, social, economic, or environmental reality.[60] (Hernández, 2006, p. 147, as cited in Pradilla, 2010, vol. 3, p. 23)

However, in the 1970s and 1980s, the concept of appropriate technologies was considered by many utopian and romantic. It was also widely criticized due to its technological deterministic and instrumentalist character, reinforcing the expert's dominance and Western rationality. According to Thomas, "in practice, many of the implementations of appropriate technologies resulted in 'paternalistic' experiences (technologists from developed countries designed and transferred mature technologies, with *downsizing* operations), aimed at solving specific problems" (2012, p. 35, italics in the original). More recently, concepts such as *Grassroot Innovations* and *Social Innovations* have emerged in non-Western countries. The Grassroot Innovations approach, for instance, was born in India at the end of the last century. It was based on local and traditional technological knowledge to build identity and appropriation and to end the myth of the "Western code" (Mignolo, 2011, preface) as the only knowledge that solves the collectives' various problems and needs. Under this vision of social inclusion, the subalterns are the basis for alternative, economic, efficient, and ecologically sustainable solutions.

The Social Innovations approach, born at the beginning of the 21st century, is "oriented to the development and diffusion of organizational technologies aimed at favoring social change by satisfying the needs of disadvantaged social groups" (Martin and Osberg, 2007, as cited in Thomas, 2012, pp. 38-39). According to Marseglia (2018, p. 67), the most widely shared definition of Social Innovation is

---

[60] Hernández, N.L. (2006). *La conformación del hábitat popular desde la técnica constructiva*. Universidad nacional de Colombia, Bogotá.

that of Mulgan et al. They claim it "refers to new ideas that work toward the achievement of social goals" (2007 in Busacca, 2013, p. 2). This differentiates it from conventional innovation, subordinated to economic development and expert knowledge.

Social Innovation has no specific boundaries and is related to approaches such as design for social innovation. Manzini defined the latter in his 2015 book "Design, When Everybody Designs: An Introduction to Design for Social Innovation" as "(…) *everything that expert design can do to activate, sustain, and orient processes of social change towards sustainability*" (p. 62, italics in the original). This type of design includes practices such as transition design, participatory design, codesign and Design Thinking (IDEO, 2015). These are not unidirectional practices but are instead based on the integrated interaction between top-down and bottom-up initiatives, generating hybrid processes (Marseglia, 2018, pp. 68-69, 114).

In 2017 the "Journal of Technology for Architecture and Environment TECHNE" published its volume No. 14, dedicated to "Architecture and Social Innovation." **Table 11** shows the concepts that some authors published in this volume used when discussing Social Innovation. The table also incorporates the terms used by some authors cited in the selected articles.

Table 11. Concepts related to Social Innovation, according to some authors published and cited in TECHNE 14, 2017.
Source: Società Italiana della Tecnologia dell'Architettura [SITdA], 2017.

Published author	Ideas and concepts related to the argument	Cited Author[61]	Year of publication	Ideas and concepts related to the argument
Losasso	• Everyday life	Manzini	2006	• New design networks

---

[61] Busacca, M. (2013), "Oltre la retorica della Social Innovation," *Impresa Sociale*, Vol. 2, No. 1, pp. 38-54

Koolhaas, R. (2006), *Junkspace. Per un ripensamento radicale dello spazio urbano*, Quodlibet, Macerata

Manzini, E. (2006), "Progettualità diffusa e innovazione sociale," *Equilibri*, No. 3.

Manzini, E. (2015), *Design when Everybody Designs. An Introduction to Design for Social Innovation*, The MIT Press, Cambridge, Massachusetts, USA

Mulgan, G., Tucker, S., Ali, R. and Sanders, B. (2007), *Social Innovation. What it is, why it matters and how it can be accelerated*, The Young Foundation Working Paper, Skoll Centre for Social Entrepreneurship, SAID Business School, University of Oxford

Webster, K. (2015), *The Circular Economy: A Wealth of Flows*, Ellen Mc Arthur Foundation, Chicago

(pp. 6 – 10)	• Collaborative activities			• Connect individuals and communities • Experienced designers • Collective actions • Support • Navigating the complexity
Faroldi (pp. 11 – 17)	• Formally recognized international research tradition • Ambiguous definition • Far from modernity • Architecture of and for social innovation • Architecture - Social Innovation: does not have a precise theoretical context	Manzini	2015	• Social changes • Sustainability • Reduce environmental impact • Regenerate shared assets • Improve social fabric
		NESTA-Young Foundation	2006	• Social both in their ends and means
		Koolhaas	2006	• What remains after modernization has run its course • What coagulates while modernization is in progress
Perriccioli (pp. 25 - 31)	• Numerous interpretations • Complex • New modes of decision-making and action • Horizontal forms of coordination • Collaborative capacity • Common goal • Local dimension	Webster	2015	• Agent of contemporary change • New form of economy • Ecological expectations • Contemporary society • Significant challenge for design culture • Questions about fundamental aspects of architecture
Marini (pp. 46 - 50)	• Public of architecture • Paradigmatic shift • Different meanings of "environment" • Developing theories, tools, and ways of a new humanism			

Gaspari and Busacca (pp. 362 - 368)	• Comparison of social innovation definitions adopted between 2002 and 2014	Busacca	2013	• New ideas working in a more effective way to meet social • goals • Transgressing social rules according to a vision of a different social system
	• The ecosystem of social innovation. Social innovators as catalyst NATIONAL ENVIRONMENT CULTURE NATIONAL ENVIRONMENT UNIVERSITY INDUSTRY SOCIAL INNOVATORS AS CATALYST SOCIETY GOVERNMENT			
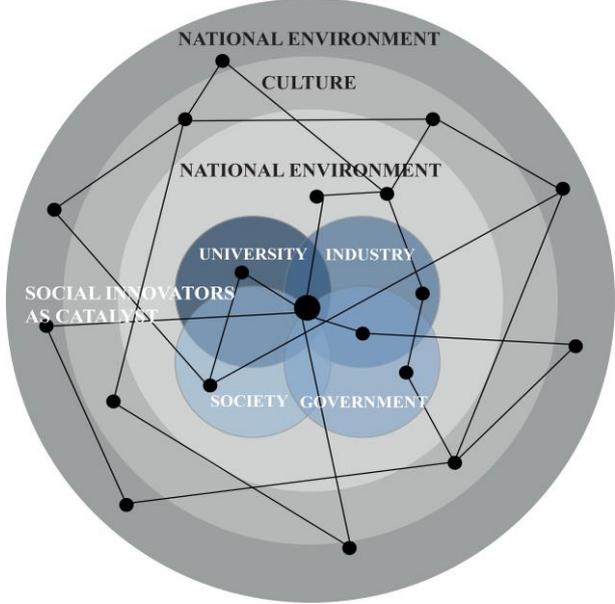
An example of a social innovation worth giving is the *Foroba Yelen* project — meaning Tree of Light in Mali— designed by Italian architect Matteo Ferroni (**Figure 21**). After an anthropological study of rural Mali conducted in 2010 and "pursuing harmony between tool, culture and nature,"[62] Ferroni came up with the concept of "collective light," a portable street lamp that helps to improve the performance of work, education, and worship activities of the local population. According to the architect, "light is a cultural phenomenon —before it is a technological challenge— that aims to illuminate life rather than space."[63] This initiative will be completed by publishing a manual to enable each community to make its own lamp.

---

[62] Source: http://www.eland.org/. Accessed on August 21st, 2019.
[63] Source: http://www.eland.org/. Accessed on August 21st, 2019.

Figure 21. Foroba Yelen project.
Source: Matteo Ferroni, http://www.eland.org/ and https://www.domusweb.it/it/no-tizie/2014/02/14/foroba_yelen.html. Accessed on August 21st, 2019.

A final concept that is part of the theoretical framework of this dissertation is the Latin American concept of *Tecnología Social* or *Technology for Social Inclusion*. This has as its antecedents the previously described approaches (**Figure 22**) and "involves products, techniques and/or methodologies that can be reapplied, developed in interaction with the community, and that represent effective solutions for social transformation" (Portela, 2009, as cited in Thomas, 2012, p. 40). It is a model of technological development in which local/traditional knowledge and

scientific/technical knowledge are related, complementary, enriched, and assimilated.[64]
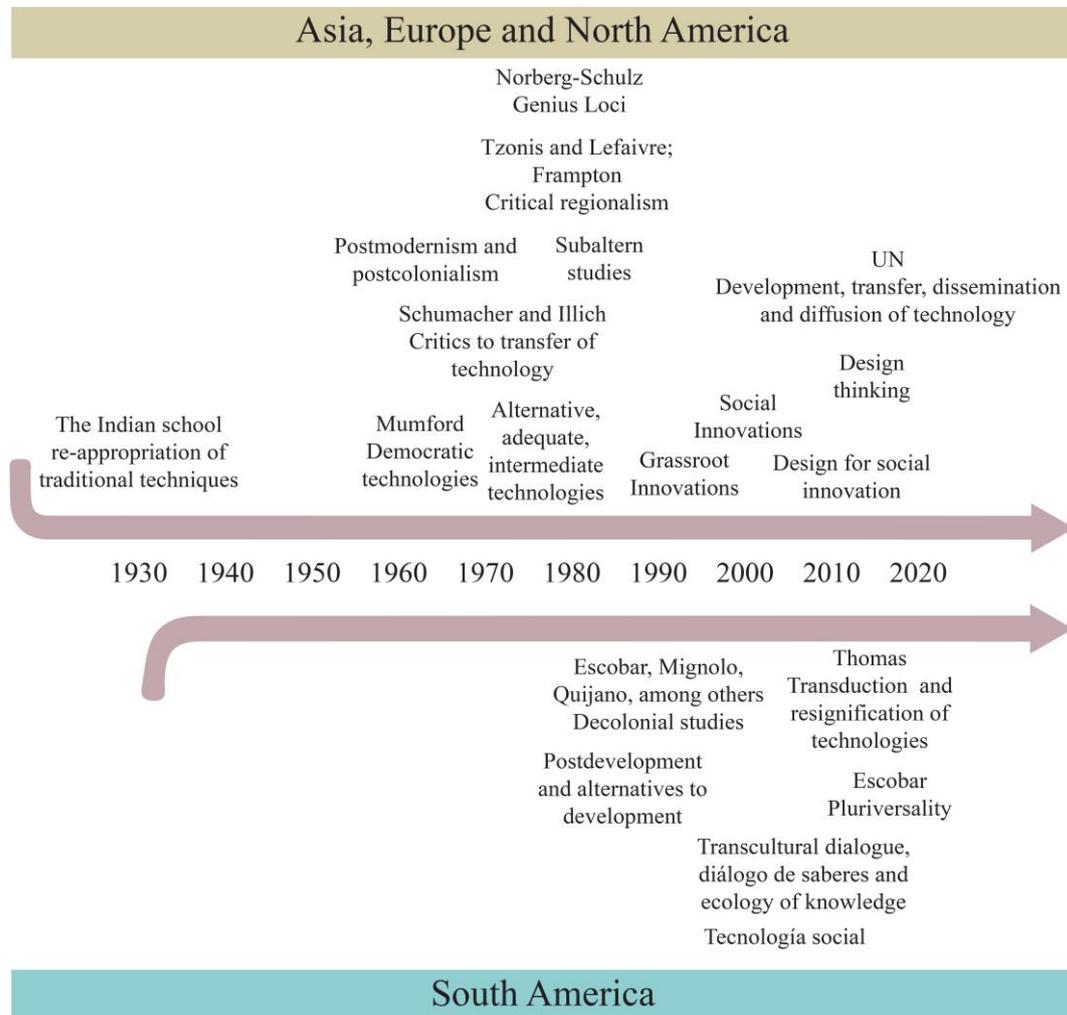
Figure 22. Two historical paths.
Source: Elaborated by the author based on a figure presented in Pozzebon and Fontenelle, 2018, p. 7.

Unlike appropriate technologies, Tecnología Social is interested in the process rather than the result (Pozzebon and Fontanelle, 2018, p. 1757), shifting the focus

---

[64] An example in this regard is the 2015 study by Osma-Pinto, Sarmiento-Nova, Calderón and Ordóñez-Plata, on the application of the Net Zero Energy (NZE) concept in social housing projects in Colombia. Another example is the program "*Verano Aprende Construye y Ayuda*" (VACA) of the Instituto *Tecnológico de Monterrey* in *Puebla* which is based on the dignification and improvement of vernacular techniques for constructive empowerment and access to basic habitability (Loyo Martínez and Márquez Martín, 2014).

from progress to Buen Vivir. Being developed by Latin American scholars, Tecnología Social literature is predominantly written in Spanish and Portuguese. It should not be confused with the literature on the Anglo-Saxon term *Social Technology* which has two uses. An older one of sociological and economic basis, and a recent one referring to web-based platforms (Pozzebon and Fontanelle, 2018, p. 1752). The use of *Tecnologías Sociales* in Latin America has begun to have greater relevance as a tool for social inclusion. Thanks to its post-development perspective[65], Tecnologías Sociales contribute to the decolonization of knowledge and, thus, the construction of alternative futures to western development in Global Periphery communities.

2.6 The tools

Based on the information gathered in the second chapter, **Table 12** shows the instruments identified to be part of the toolbox, classifying them according to their nature. Following the objectives of the thesis, the four dimensions that will organize the toolbox are: theoretical-analytical, participative-collaborative, software-digital, and practical-material.

Table 12. Classification of tools identified in Chapter 2 and adopted in the toolbox.

Dimension	Tool
Theoretical and analytical	Glossary and terminology
	Secondary Sources and propaedeutic material: bibliography and sitography
	Transdisciplinary support
Participative and collaborative	The collective recovery of history, memory, and knowledge
	Interviews
Software and digital	Information Sharing
	Environmental and technological design tools
Practical and material	Mapping

---

[65] Concept related to decoloniality. One of the best-known post development theorists is Arturo Escobar. See section 2.2.

Second part: The ugly duckling and the myth of homogeneity

> While the planet is singular, world is plural —for it is formed and seen in difference— as are we.
>
> (Fry, 2015, p. 21, as cited in Escobar, 2018, p. 117)

> I believe there should be as many imaginaries of progress as there are cultures worldwide.
>
> (Pradilla, 2010, vol. 3, p. 31)

Article 7 of the 1991 Colombian Constitution reminds us that Colombia is a multiethnic and multicultural country. This reflects the great diversity that characterizes the Latin American continent. However, decisions continue to be made as if it were a homogeneous territory and society. Thus, the "element of repetition" inherent to professional practice mentioned by Schön (1983, chapter 2) is confused with homogeneity, standardization, and monotony.

Unfortunately, one thing we haven't fully understood is that "it is not sufficient to understand that form follows function but that it also follows culture, science, technology and the different social, scientific and technological dynamics of the environment." (Hernández Correa et al., 2018, p. 298). This logic is evident in formal construction projects. For instance, the public and social housing projects for low-income families and the neighborhood improvement programs that some governments carry out with the support of building professionals often do not consider social, cultural, and environmental diversity. Boano and Vergara Perucich are in favor of removing the label "social" from housing as a "first symbolic measure to contribute from architecture to communities" (2016, p. 45).

In recent years, projects at various scales are beginning to be structured with critical issues in mind: climate change and related effects such as urban heat island (UHI), increasing social inequalities in cities, and the consequent restricted access to collective goods and services. However, these remain challenges poorly addressed by architectural technology and environmental design in Global South countries. **Figure 23** compares two social housing projects built in two Colombian cities with very different climates according to the Köppen climate classification. However, as can be seen, the building's construction materials, shape, and configuration are very similar.

Figure 23. Climate diversity and homogeneity in response. *Ciudadela La Paz* Project in Cartagena - Tropical savanna climate (top); A*rboleda Santa Teresita* Project in Bogotá - Subtropical highland climate with uniform rainfall (bottom).
Sources: https://www.eluniversal.com.co/cartagena/desmienten-venta-de-apartamentos-en-ciudadela-la-paz-YC2455771 (top); https://bogota.gov.co/mi-ciudad/habitat/viviendas-del-proyecto-arboleda-santa-teresita-no-estan-en-venta (down). Accessed on May 23rd, 2022.

In informal self-construction practices, this standardization is also presented. Arango Escobar (2004) describes the formal and spatial characteristics of the house

paradigm that characterizes many popular urbanizations[66] in the peripheries of Colombian cities: modern technologies and materials, share spaces and functions, progressive development, etc. In the author's words:

> This housing typology is found, with very few variations, throughout the length and breadth of the national territory, in cold and hot climates, in colonial towns, and in the peripheries of small and large cities, without seeming to care about cultural or regional differences. Its strength lies in its capacity to adapt to changing topographic or morphological situations, easy construction, and possibilities for height growth. It is undoubtedly the best example of the influence of modern architecture on popular construction. (p. 67)

This "inappropriate intrusion of 'modern' architecture" (García-Reyes Röthlisberger and Anzellini Fajardo, 2018, p. 35) has generated the development of anonymous cities, where the totalizing rumor[67] of the *de material* house — a term used in Colombia to refer to build with industrial, modern and contemporary materials— dominates. Through standard solutions both in the formal and the informal city, it seems as if this were the only "option," as Mignolo explained:

> If you look for alternatives you accept a point of reference (…). For that reason, the first decolonial step is delinking from coloniality and not looking for alternative modernities but for alternatives to modernity. (…) Arturo Escobar shifted the expression to "alternatives to modernities," which comes very close to "option." Thus, if you say that modernity is an option and development is an option, then decoloniality is also an option, and as "options," all are at the same level. By the same token, you highlight the privileging of one option (modernity or development) in its appearance as *the option*. Alternatives to modernity will be one step toward decolonial options building transmodern rather than postmodern global futures. (2011, preface, italics in the original)

---

[66] For definition, see section 3.1.

[67] According to Certeau:

> Stories diversify, rumors totalize. If there is still a certain oscillation between them, it seems that today there is rather a stratification: stories are becoming private and sink into the secluded places in neighborhoods, families or individuals, while the rumors propagated by the media cover everything and, gathered under the figure of the City, the masterword of an anonymous law, the substitute for all proper names (…). (1984/1980, p. 107)

In this case, the stories are the different types of popular knowledge in architecture.

The progressive "cultural impoverishment of the discipline" (Mellano, 2018a, p. 32) has resulted in the "gradual devaluation of the role of Architecture (and of architects)" (p. 32). An alternative to the "forms of this new modernity" (p. 33) is to incorporate into the practice "what is produced as *non-existent* [italics added]" (De Sousa Santos, 2010, p. 29). In other words, what "is radically excluded because it is beyond the universe of what the accepted conception of inclusion considers to be its other" (p. 29). An example of non-existent nowadays is informality, undervalued or ignored by architects and urban planners because of its organic and indeterminate form. However, informality "is a leveling system that introduces chaos into order. It is an adaptive approach that accepts lack of foresight and embraces surprise and randomness as inevitable elements of life" (Tessari, 2020, p. 12). The words of the manifesto that, in 1973, industrial designer Viktor Papanek left for history have a place in the informal settlements:

> Every man is a designer. Everything we do, Papanek writes, is almost always design, simply because design is at the basis of every human activity. Planning and creating, according to a predefined model, of any act tending to a desired end constitute the design process. Any attempt to isolate the design to make it self-sufficient goes against the intrinsic value of designing as the primary matrix of life. (Papanek, 1973, as cited in Perriccioli, 2017, p. 28)

Clearly, this does not mean that the informal dimension does not bring problems. On the contrary, there is an urgent need to improve technological aspects that informality cannot achieve alone. In fact, the architect's role in these contexts is necessary as long as it preserves "a heuristic, non-standardized attitude" (Attaianese and Acierno, 2017, p. 80). As seen in the previous chapter, in order to contribute to the fundamental right to adequate housing, the improvement of existing informal settlements needs to be a priority on the agenda. However, responses favoring the right to adequate housing can no longer be considered universally valid. As De Sousa Santos clarified: "in order to function as a form of cosmopolitan, counter-hegemonic globalization, human rights must be reconceptualized as multicultural" (p. 67). Therefore, the erroneous idea about the possibility of having "global guidelines for local sustainability behaviors" (Giuffrè, 2014, p. 15) should be discouraged in architecture.

Since not all informal contexts are equal, the architect must be able to "discover the particular features of (…) [each] problematic situation, and from their gradual discovery, designs an intervention" (Schön, 1983, chapter 5). Moreover, since "each practitioner rats his [or her] case as unique, he [she] cannot deal with it by

applying standard theories or techniques" (chapter 5) without previous deep analysis. This study considers that understanding the "how-to of design" is equally important to the "what-to-design" (Gouverneur, 2015, p. 243). In this case, the how-to of design must be based precisely on informality and its background. One way of doing so is to go beyond the used concept of *technology transfer* by recognizing informal settlements' need for technological improvement as a "potential" for technological advancement (Max-Neef, 1986). Thus, their inhabitants' knowledge, history, and memory could be legitimized and re-signified. This is the reason for the title of this second part: by learning from the ugly duckling, "we will be able to find a new shape for the city"[68] (Mumford, 1961, p. 11, as cited in Sauquet Llonch, 2013, p. 10). A pluriversal form in which the "relationship between building-system and environment-system" (Giordano, 2018, p. 73) is based on the recognition of the "connection to the territories, inhabitants, history, city, landscape" (Mellano, 2018a, p. 33).

---

[68] Mumford, L. (1961) (2012). *La ciudad en la historia. Sus orígenes, transformaciones y perspectivas*, Editorial Pepitas de Calabaza.

Chapter 3: *Peripherein.* In with the world or out with the void

> *Peripherein* is a verb that in ancient Greek literally means to draw a
> circumference, to draw a line that divides an outside and an inside.
>
> (Petrillo, 2013, p. 11)

[EN] As highlighted in the first part of the dissertation, uncontrolled importation of foreign models and inappropriate conventional technology transfer affect the preservation and dynamic use of local traditional knowledge and practices. The second part focuses on the social and geographical context in which the research operates. Chapter 3 does it on a larger scale, with topics related to the evolution of the Latin American city and the reasons for some of its characteristics.

[IT] Come evidenziato nella prima parte della dissertazione, l'importazione incontrollata di modelli stranieri e l'inadeguato trasferimento di tecnologie convenzionali compromettono la conservazione e l'uso dinamico delle conoscenze e delle pratiche tradizionali locali. La seconda parte si concentra sul contesto sociale e geografico in cui si inserisce la ricerca. Il capitolo 3 lo fa da una dimensione più ampia, con temi legati all'evoluzione della città latinoamericana e alle ragioni di alcune sue caratteristiche.

[ES] Como evidenciado en la primera parte de la tesis, la importación incontrolada de modelos extranjeros y la inadecuada transferencia de tecnología convencional perjudican la conservación y el uso dinámico de los conocimientos y prácticas tradicionales locales. La segunda parte se centra en el contexto social y geográfico en el cual se inscribe la investigación. El capítulo 3 lo hace desde una escala mayor, con temas relacionados con la evolución de la ciudad latinoamericana y las razones de algunas de sus características.

For some time now, many Latin American countries have overcome the rural-urban dichotomy, which declared that urban and rural were completely separate realities. This was due to the migratory flows from the countryside to the urban areas, the uncontrolled expansion of the cities, and the resulting changes in the territory. Adler et al. explain it as follows:

> Today, the division between rural and urban areas disappears in regions that are socially, environmentally and economically interdependent. In order to better analyze housing on the rural-urban fringe, it is necessary to understand the local context, the activities that take place there, the surrounding economy and environment, as well as family relationships. (Adler et al., 2018, p. 359)

The theory of the *rural-urban continuum* [69] (Guidicini, 1998), already developed in the early twentieth century, explained how rural and urban cultural systems mix, reorganize and contaminate each other. In fact, "current patterns of urbanization show indivisible sequences of human settlements at different scales, characterized by multi-directional flows of people and resources."[70] From this perspective, the dominant hypothesis is the "physical and cultural penetration of the urban world into the rural world" (Guidicini, p. 31). However, it is possible to find "lifestyles inspired by rural values" (p. 29) in settlements recognized as urban.

Although no clear line divides the rural from the urban areas, the concept of *Peripherein* in the contemporary Latin American city is evident in its center-periphery cultural model. In fact, "the relation between marginal areas and the city center is not always distinguished by long distances or lack of reachability" (Baratta et al., 2017, p. 160). Riach describes it as "a model in which authority is concentrated in a center (…), and is only slightly, if at all, influenced by its periphery (…). It implies that the periphery is dependent on the center, but that the inverse is not true" (2017, p. 81). This has led to a housing crisis highlighting that shifting from rural to urban is not a guaranteed solution for the most vulnerable communities. Although living in the city offers individuals more opportunities to

---

[69] According to Queen and Carpenter in the rural-urban continuum "there is a continuous gradation from rural to urban rather than a simple rural-urban dichotomy" (Queen S.A., Carpenter D.B., The American City, McGraw-Hill, New York, 1953, p. 28, as cited in Guidicini, 1998, p. 27).

[70] Inter-American Development Bank 2012. *Un espacio para el desarrollo: Los mercados de vivienda en América Latina y el Caribe* / César Patricio Bouillon, editor, as cited in Adler et al., 2018, p. 81.

improve their housing conditions, the high costs and competition for means of subsistence can also lead people into poverty (OECD, 2014, p. 4).

Consequently, this "artificial separation" (Gouverneur, 2015, p. 6) disintegrates the city system, dividing its geographical territory and the collectives and societies[71] that inhabit it. Such social distress has worsened the gap between the rich and the poor, taking shape in "areas of exclusion, of minorities, poverty and immigration" (Perriccioli, 2017, p. 26). When speaking about borders, Certeau refers to the "ambiguity of the bridge" (1984/1980, p. 128) as being both a boundary and connector between two places. In the author's words:

> As a transgression of the limit, a disobedience of the law of the place, it represents a departure, an attack on a state, the ambition of a conquering power, or the flight of an exile; in any case, the "betrayal" of an order. But at the same time as it offers the possibility of a bewildering exteriority, it allows or causes the re-emergence beyond the frontiers of the alien element that was controlled in the interior, and gives ob-jectivity (that is, expression and re-presentation) to the alterity which as hidden inside the limits (…). It is as though delimitation itself were the bridge that opens the inside to its other. (pp. 128-129)

Another author that explored the meaning of boundary was the German philosopher Martin Heidegger. He wrote that "a boundary is not that at which something stops, but, as the Greeks recognized, the boundary is that from which something begins its presencing."[72] An example of a boundary can be found in the formal city - informal city duality[73] , which is in itself a recognition of the "Other." This dissertation examines the informal city, as that "other place" referred to by Certeau, as a territory of not yet (De Sousa Santos, 2010, p. 25) of needs and potentialities[74]. A territory where the action of the rural-urban continuum is most evident due to its "dynamic order," as explained by De Toni:

> We are used to thinking about the order, and we are used to thinking about the disorder. But we are not used to thinking about order and disorder together. We are used to associating order with positive meanings and disorder

---

[71] According to Latour's definition and distinction between these two concepts (see section 2.5).

[72] Martin Heidegger, "Building, Dwelling, Thinking," in Poetry. Language, Thought (New York: Harper Colophon, 1971), p. 154. This essay first appeared in German in 1954, as cited in Frampton, 1983, p. 24.

[73] The elite and the subaltern (see section 2.2).

[74] According to Max-Neef's vision, 1986.

with negative connotations. We are used to thinking of the limit as a risky zone, possibly to be avoided. The limit is a risky zone but inevitably to be sought. (De Toni A.F. 2013, as cited in Marseglia, 2018, p. 147)

The informal city is an indisputable and irreversible reality in many cities of the Global South. In Brazil, for instance, "according to 2020 data, 84% of the country's population lives in the cities, and more than a third of Brazil's urban population lives in informal settlements" (Tessari, 2020, p. 17). However, the hegemony and the indifference that the formal city maintains towards informal settlements have generated the invisibility of the latter and the importance these areas have in the current and future global scenario. According to Perriccioli, in the 1960s:

> Two themes, until then extraneous to the modernist discourse, gained great importance in congressional debates: attention to the everyday, to the ordinary, which was the basis of the theorization of the concept of "as found" of the Independent Group (Lichtenstein, Schregenberger, 2001) and of the research of Michel de Certeau (de Certeau, 2001), and the emergence of the Third World as a political and cultural dimension at the threshold of the decolonization processes, with the consequent questioning of the Western geopolitical and cultural centrality, which gave rise to a new consideration of the relationship between center and periphery in the development programs of the cities of these emerging countries (Avermaete and Casciato, 2014). (p. 28)

The phenomenon of the informal city has been presented as a problem of the planned city, which has tried to eliminate it with tabula rasa projects that have not had the expected results, becoming even more detrimental to the city. An emblematic example of this situation is the residential complex of the *23 de Enero* neighborhood in Caracas - Venezuela (1955). It was built after the implementation of an informal housing eradication policy in the area (**Figure 24**). However, spontaneous settlements proliferated again around the 12 buildings constructed due to the population increase and the formal housing deficit.

This example illustrates two issues. The first is that modern answers are not always the solution to some modern problems. The second is that the periphery, more than a geographical concept, is a social phenomenon that gathers the urban poor —economically marginalized from the city— and the rural poor —displaced from their places of origin.

Figure 24. Before and after the Residential project in the 23 de Enero neighborhood, Caracas - Venezuela.
Source: https://www.archdaily.co/co/789996/48-anos-de-asentamientos-informales-en-caracas.
Accessed on May 24th, 2022.

Potenza reminds us that this phenomenon has never been unrelated to our discipline, much less to our reality as citizens. However, it is only at the beginning of the 21st century that architects have begun to consider it:

> The first UN-HABITAT monitoring of informal settlements, called "The Challenge of Slum," now dates back to 2003. Moreover, Mike Davis "Planet of the Slums," published in 2006, is a timely and surgical account of the dimensions of the phenomenon, with predictions on its development that, judging from the 2016 data, we can consider unfortunately now abundantly outdated. (2017, p. 121)

The UN New Urban Agenda calls for a "present and future sustained, inclusive and sustainable economic growth" that builds on local economies and recognizes "the contribution of the informal economy while supporting a sustainable transition to the formal economy" (2017, p. 6). The Agenda also highlights the need for an "urban paradigm shift grounded in the integrated and indivisible dimensions of sustainable development: social, economic and environmental." It commits to encouraging an "urban and rural development that is people-centered [and] protects the planet (…) empowering all individuals and communities while enabling their full and meaningful participation." It also promotes "culture and respect for diversity and equality as key elements in the humanization of our cities and human settlements" (p. 11). However, these goals will not be possible if we continue to see this dual formal-informal relationship from a heteronomous perspective[75] in which the former subjugates the latter. Therefore, it is vital to revindicate popular — traditional and informal— knowledge, autonomy, and rooting (Tessari, 2020, p. 11) from a perspective of ecology of knowledge, collective construction of knowledge, and transcultural knowledge dialogue[76]. We must be remembered that these marginalized areas, territories of the "not yet," are also zones:

> (…) where hopes and projects can be cultivated. In these "grey areas" where citizens constitute the masses but do not become communities, the social groups excluded from the immediate exercise of power begin to acquire self-awareness and design skills, creating community spaces and new vision for the future (Secchi, 2013). (Perriccioli, p. 26)

---

[75] As opposed to autonomous. In this case, the informal is not self-determined but is determined by the formal.

[76] See section 2.4.

The issues addressed in this chapter are analyzed for the Latin American geographic and social context. The succession of topics tries to explain how social processes have changed the identity and physiognomy of the Latin American city and what has been the spontaneous response to its housing deficit. Furthermore, it highlights the conditions to address sustainability in informal contexts through popular activities.

3.1 Kinetic cities: popular housing and urban peripheries in large Latin American cities

In his book "*Le città invisibili*" (1972), Italo Calvino described the city of *Tecla* as a city under permanent construction that never ends to define itself and is condemned to always change its shape. In the same book, Calvino also described *Moriana* as a city with two opposite faces: one beautiful and fascinating, the other abandoned and decadent.

These two descriptions can be applied to almost any contemporary metropolis, especially in the Global South. Contemporary Latin American cities, for instance, are precisely that. Spaces in motion and constant change are spatially divided mainly for social and economic reasons. These are an "amalgamation of identities, cultures, and social and economic systems" (Tessari, 2020, p. 98). According to data from the Urban Development Division of the Inter-American Development Bank, "in 1959, the urban population in Latin America and the Caribbean was 108 million people; today, that figure is nearly 500 million" (Adler et al., 2018, p. 10). This dramatic increase in the urban population brought significant changes in the new inhabitants' lifestyles and presented a great challenge for architects and urban planners.

In the first half of the 20th century, the urban expansion model in industrialized countries was based on large modern "development" projects. On the one hand, these meant new job opportunities for people from other regions —urban and rural— and even from other countries. On the other hand, these increased the area and population of the most important cities. Later, in 1963, the American economist William Alonso explained that: "in the past half-century, our cities have outgrown our concept and our tools (…)." He continued by saying, "(…) the lagging understanding of the changes in kind that go with changes in size has led us to try remedies which are unsuited to the ills of our urban areas (…)" (William Alonso, "Cities and City Planners," in Daedalus (Fall 1963): 838, as cited in Schön, 1983, chapter 1).

Figure 25. Hegemony of the predominant building model in the formal and the informal city. Bogotá's financial center in the foreground and a self-built neighborhood in the background (top); Medellín's *Comuna* 13 self-built neighborhood in the foreground and a formal residential area in the background (bottom).
Source: Pixabay License. Free for commercial use. No attribution is required.

According to Giordano (2018), it was precisely at the end of that decade when:

> (…) an approach to design that includes the environment gives way to an exclusive-type approach where solar radiation, ventilation and natural illumination are no longer able to influence construction characteristics. The combination between the construction system and the environmental system is replaced by a new coupling based upon the indivisible relationships between building and systems, without which the building itself cannot function, or, rather, cannot exist. This is a way of devising and implementing architecture that should be seen as the result of a process originating in a part of post-World War II rationalist architecture, which evolves with the vision of the city of groups of radical designers, operating until the end of the 1960s and the early 1970s reaching its peak in Archizoom's concept of the No-Stop City, inspired, in turn, by the idea of city developed by Archigram. (p. 71)

Figure 26. *Iztapalapa* neighborhood in Mexico City.
Source: Project "*La desigualdad de la Ciudad de México desde las alturas*" by photographer Jhonny Miller https://elpais.com/elpais/2016/12/07/album/1481130509_202542.html#foto_gal_5. Accessed on May 27th, 2022.

After the Second World War (Mignolo, 2011, p. 305), this exclusive-type model Giordano described was exported to the Global South without considering the diverse and complex social dynamics present in this new context. Consequently, it exacerbates the existing inequality and urban fragmentation problems. This uncritical diffusion of modern city principles contributed to increasing spatial and social segregation, excluding the poorest inhabitants who were disadvantaged in the

construction of the formal city (Gouverneur, 2015). De Sousa refers to this as "the fascism of social apartheid":

> (…) the social segregation of the excluded through an urban mapping that differentiates between "savage" and "civilized" zones. The urban savage zones are the ones of Hobbes' state of nature, the zones of internal civil war as in many megacities across the Global South. The civilized zones are the zones of the social contract that find themselves increasingly threatened by the savage zones. In order to defend themselves, they become neo-feudal castles, fortified enclaves characteristic of new forms of urban segregation (private cities, gated properties, locked communities…). (2010, p. 42)

In this changed urban reality, the modernist paradigm could not solve either the quantitative or the qualitative housing deficit, leaving the low-income and homeless population to rely on self-construction as a survival strategy and the only —often illegal— housing solution. In fact, in the last 40 years, the conditions of poverty and marginalization have become increasingly complex and extreme. These problematics have led those who arrive in the city —by their own will or because of external problems— to reconfigure it by occupying residual spaces in the urban-rural perimeter through what Naranjo Botero calls a "process of popular urban colonization in the peripheries of the cities" (2017, p. 168). That is to say, when people build gradually according to the economic availability of the household, through hiring labor or using family self-building.

This is how the spontaneous/informal neighborhoods we know today began to take shape: "(…) on the margins of a hostile institutional framework overwhelmed by the magnitude of the housing demand" (Naranjo Botero, p. 168). It is important to remember that an informal settlement is defined as a slum when the inhabitants suffer one or more of the following unfavorable conditions: 1. Lack of access to improved water source. 2. Lack of access to improved sanitation facilities. 3. Lack of sufficient living area. 4. Lack of housing durability 5. Lack of security of tenure.[77]

According to the UN (2017), poverty, inequality, environmental degradation, spatial segregation, and social and economic exclusion continue to be relevant problems worldwide (p. 3): the flip side of that modern and colonialist model of

---

[77] Operational definition agreed by the UN-Habitat and the United Nations Statistics Division. UN-Habitat, The United Nation's Millennium Development Goals. Available at: mdgs.un.org, as cited in Adler et al., 2018, p. 53).

formal urban and architectural "development" discussed in the previous chapter. Moreover, informal settlements are the "most significant social and urban phenomenon of the 20th century in Latin American countries" (Baratta et al., 2016b, p. 364)[78] and certainly one of the most influential at the global level (**Figure 27**).

Nearly 863 million people (12%) of the world's population now lives in informal settlements. In 2000 there were 760 million and in the 1990s 650 million.

Considering that 54% of the global population lives in cities, nearly 25% of urban population worldwide live in informal settlements

In developing countries, about 1/3 of the population lives in informal settlements

In Latin America, 24% of the population lives in various informal contexts

Figure 27. Informal settlements demographic data.
Source: UN-Habitat data, www.unhabitat.org. Original elaboration by Baratta et al., 2016b, p. 361.

Although the rational principles disseminated by the modern movement shaped the formal city, they were not exclusive to it since spatial and technological elements were adopted in a more empirical and "contaminated" manner by informal self-builders regardless of the context in which they were located: the use of industrial and standardized materials such as reinforced concrete, steel or glass, the importance of terraces as a meeting space and a solution to the limited interior space of the dwelling, the preference for simple geometric forms, and the search for the economy in construction. Arango Escobar (2004) described the popular habitat as the "incomplete modernity in which we live" (p. 60) and "our particular version of modernity (...) that fills the peripheries of large Colombian [Latin-American] cities (…)" (p. 63).

---

[78] According to the authors, there are four models of informality: 1. Subsistence informality (having the need). 2. Voluntary informality (wanting the "benefits" such as tax exemption). 3. Induced informality (being forced by implicit or explicit barriers). 4. mixed informality (the combination of two or more types) (Baratta et al., 2019, p. 22).

Despite the fact that data from the last 30 years in Latin America show a decrease in the population living in informal settlements (**Table 13**), the continent's large cities continue to be shaped by this type of urbanization (**Table 14**).

Table 13. Resident population in slums in Latin America and the Caribbean between 1990 and 2014.
Source: Information extracted from UN-Habitat, 2016, p. 84.

Anno	Population living in slums (thousands)	Proportion of total population
1990	106.054	33,7%
1995	112.470	31,5%
2000	116.941	29,2%
2005	112.149	25,5%
2007	112.547	24,7%
2010	112.742	23,5%
2012	116.227	23,5%
2014	104.847	21,1%

Table 14. Resident population in slums/informal settlements by 2018 (Percentage of urban population).
Source: Information extracted from https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS. Accessed on June 17th, 2022.

Argentina	15%		Guyana	31%
Bolivia	49%		Haiti	66%
Brazil	16%		Mexico	16%
Chile	9%		Nicaragua	42%
Colombia	28%		Paraguay	17%
Costa Rica	4%		Peru	33%
Ecuador	20%		Trinidad and Tobago	5%

Currently, the dialectic between the rural, which expels populations, and the informal urban area, which receives new citizens in settlements at different levels of consolidation, suggests that these two worlds go in opposite directions. However, informal urban peripheries still present a rural memory with organizational, structural, cultural, and social characteristics (Montenegro-Miranda, 2018, p. 30). In Latin American countries, the massive migratory flows from the countryside to the city forced the peasant subculture and its popular resourcefulness to move to the urban context while struggling to meet their daily needs.

As a result, an implicit relationship was established, a hidden connection between the architectural configuration of informal dwellings and that of rural habitats. It was based on the common consideration of houses not as simple real estate but as dynamic elements that allow inhabitants to develop different activities, such as working and producing their own food. In the traditional popular habitat found in rural areas, self-building expresses a sense of place, belonging, identity, and cultural heritage. In the popular habitat of contemporary spontaneous settlements, however, it acquires a different meaning. This is due to the precarious physical and social conditions of the environment where it is located that prevent these qualities from being expressed in an evident way. Nevertheless, elements of regional architectures, can still be found in the collective memory and background of the inhabitants (Arango Escobar, 2004, pp. 64-65).

Since the second half of the last century, numerous initiatives have emerged from governments, public and private entities, cooperatives, real estate developers, etc., aimed at improving the housing conditions of marginal sectors through neighborhood upgrading and social housing programs (Gouverneur, 2015, pp. 12-13)[79]. Unfortunately, many of these have been based mainly on three factors: economic advantages for builders, compliance with minimum standards of habitability —hygiene, sanitation, and comfort— and "massification of demand driven by the growth of large urban centers" (Blas, 2015, p. 80). Projects carried out under this monotonous and dehumanizing logic have resulted in low architectural and urban quality and have been criticized by academics not only from Latin America but also from the old continent and North America: from Heidegger (1951) and Jacobs (1961) to Turner (1972, 1976) and Solà-Morales (1997).

---

[79] According to Adler et al., "a number of countries in Latin America and the Caribbean have developed national housing policies accompanied, in some cases, by financing products and housing subsidies; in particular, Panama, Chile, Mexico and Colombia have been the most successful" (p. 293).

Social housing projects often do not consider the logic with which the popular habitat evolves. Thus, these end up failing to improve the inhabitants' quality of life, converting citizens into mere dwelling consumers. Consequently, informal communities prefer to return to their previous conditions, which allow them to benefit from what Certeau calls "casual time":

> Thus, to eliminate the unforeseen or expel it from calculation as an illegitimate accident and an obstacle to rationality is to interdict the possibility of a living and "mythical" practice of the city. It is to leave its inhabitants only the scraps of a programming produced by the power of the other and altered by the event. Casual time is what is narrated in the actual discourse of the city: an indeterminate fable, better articulated on the metaphorical practices and stratified places than the empire of the evident in functionalist technocracy. (1984/1980, p. 203)

Due to the rigidity of the design, the elimination of casual time in the configuration of formal housing has led to the construction of buildings with very little room for variations and unexpected changes. On the other hand, the excess of casual time in popular housing resulting from self-taught and empirical practice and a generalized lack of executive projects has reduced the structural and spatial qualities of the dwellings. Although the latter is one of the most challenging problems in informal construction, the integration of casual time is also a strong point of spontaneous housing. In his book "Informal Rooting," Tessari reminds us of the terms used by architect Rahul Mehrotra to describe better the formal-informal urban dichotomy: static city versus kinetic city. According to Mehrotra:

> The static city is built of permanent materials —such as concrete, steel and brick— and is comprehended as a two-dimensional entity on conventional city maps, and is monumental in its presence. Architecture is clearly the spectacle of the static city. And while the static city depends on architecture for its representation, it is no longer the single image through which the city is read. On the other hand, the kinetic city is not perceived through its architecture, but through spaces, which hold associative values and support lives. (…) It is a temporal articulation and occupation of space which not only creates a richer sensibility of spatial occupation, but also suggests how spatial limits are expanded to include formally unimagined uses in dense urban conditions. (R. Mehrotra, *Rethinking the informal city. Critical perspectives from Lain America*, ed. By F. Hernandez, P. Kellet, L. K. Allen, New York, Berghahn Books, 2010, pp. XI-XII, as cited in Tessari, 2020, p. 104, ellipsis in the original)

Tessari also quotes Mehrotra when the latter stated that "the kinetic city is incomprehensible as a two-dimensional entity and is instead perceived as a city in motion, (…) it constantly modifies and reinvents itself" (R. Mehrotra, *Rethinking the informal city* cit., p. XII, as cited in Tessari, 2020, p. 105, ellipsis in the original).

Informal self-built housing is, therefore, a kinetic one. A dwelling that considers casual time, continuously adapting and changing according to the functions required, the economic needs/capacities, or the size of the family unit. A type of housing that has adapted elements of modern architecture as well as those of traditional urban and rural architecture and has transformed "hyper-density into a mechanism of survival" (Tessari, 2020, p. 98). A housing that, while often in conflict with illegal developers, state or local authorities, and the community itself, has become one of the predominant forms of construction in contemporary Latin American cities.

Considering the above, it is not surprising that the spontaneous housing improvement projects that have achieved satisfactory results have been those that have taken the informal as a model. These differ from interventions based on work directed and assisted by technical professionals, as the former involve the user in the whole process: from decision-making and planning to the administration of resources and housing management. In the 20th century, one of the most prominent architects who spread this approach internationally was the renowned British architect John FC Turner, considered by many to be the first theorist of informal architecture. Since the 1950s, Turner worked in Latin American informal settlements, an experience that allowed him to develop a critical view of the modern model of development, the academy as an exclusive place for scholars, and professional practice conceived as unidirectional: I teach/they learn, or I work for them.

The architect's ideal construction system was based on light, small-scale industrialization of simple elements that could be assembled manually or with small machinery by the community itself. Turner considered the centralization of low-cost housing construction and top-down housing policies to be inefficient. For him, the answers lay in that same informality. It was the architect's duty to be a facilitator and not an authority, working with the inhabitants —learning and not teaching— to find individual and collective solutions. He pointed this out during his visit to the favelas in Rio de Janeiro in 1960 when he said, "you've shown me problems that are solutions and solutions that are problems."

Four years later, Peter Land, another British architect contemporary to Turner, was invited to Lima by the Peruvian government through the United Nations Development Program to contribute to the Peruvian Housing Bank. During the following two years, Land provided his knowledge and experience in design, planning, and technology in several projects around the country. These experiences led him to understand the need to incorporate Peruvian construction and planning characteristics in social housing projects as an alternative to the modern multi-family housing paradigm. Land proposed to the government the realization of a new neighborhood, which resulted in the formulation of the "Experimental Housing Project PREVI," formally initiated with the signing of the agreements in 1968.

PREVI was divided into four pilot projects[80], with Pilot Project 1 being the most relevant. This was developed through an international competition (1969-1973) that incorporated design principles such as the courtyard house with the possibility of progressive growth, seismic resistance, flexibility in uses and functions, modulation, low height, high density, a configuration of neighborhood cloisters, human scale and pedestrian priority. The interesting thing about Pilot Project 1 was the result achieved since 24 of the 26 proposals submitted were finally built, as opposed to just the winning project. However, this sample character is one of the criticisms that arise, as it translates into low replicability, especially in contexts with high housing demand, such as the countries of the Global South. Although one of the contributions of PREVI was the construction of a technical office to support users in the subsequent expansion of their dwellings, the institutional crises suffered in the nearly 50 years since its completion have prevented the implementation of professional assistance to the constructive action of the inhabitants (**Figure 28**).

In the last century, there have been many "grow over time" initiatives in social housing with very heterogeneous results. Among them is the well-known ELEMENTAL project of the team led by the Chilean architect Alejandro Aravena (**Figure 29**). Completed in 2003 in the city of *Iquique* in Chile, ELEMENTAL has been an established and prevalent reference in Latin America and the world. It was conceived as an alternative to the construction of "finished" social housing through the progressive "informal" growth of the house starting from a "formal" nucleus or essential base.

---

[80] The latter was included at a later stage after the 1970 earthquake.
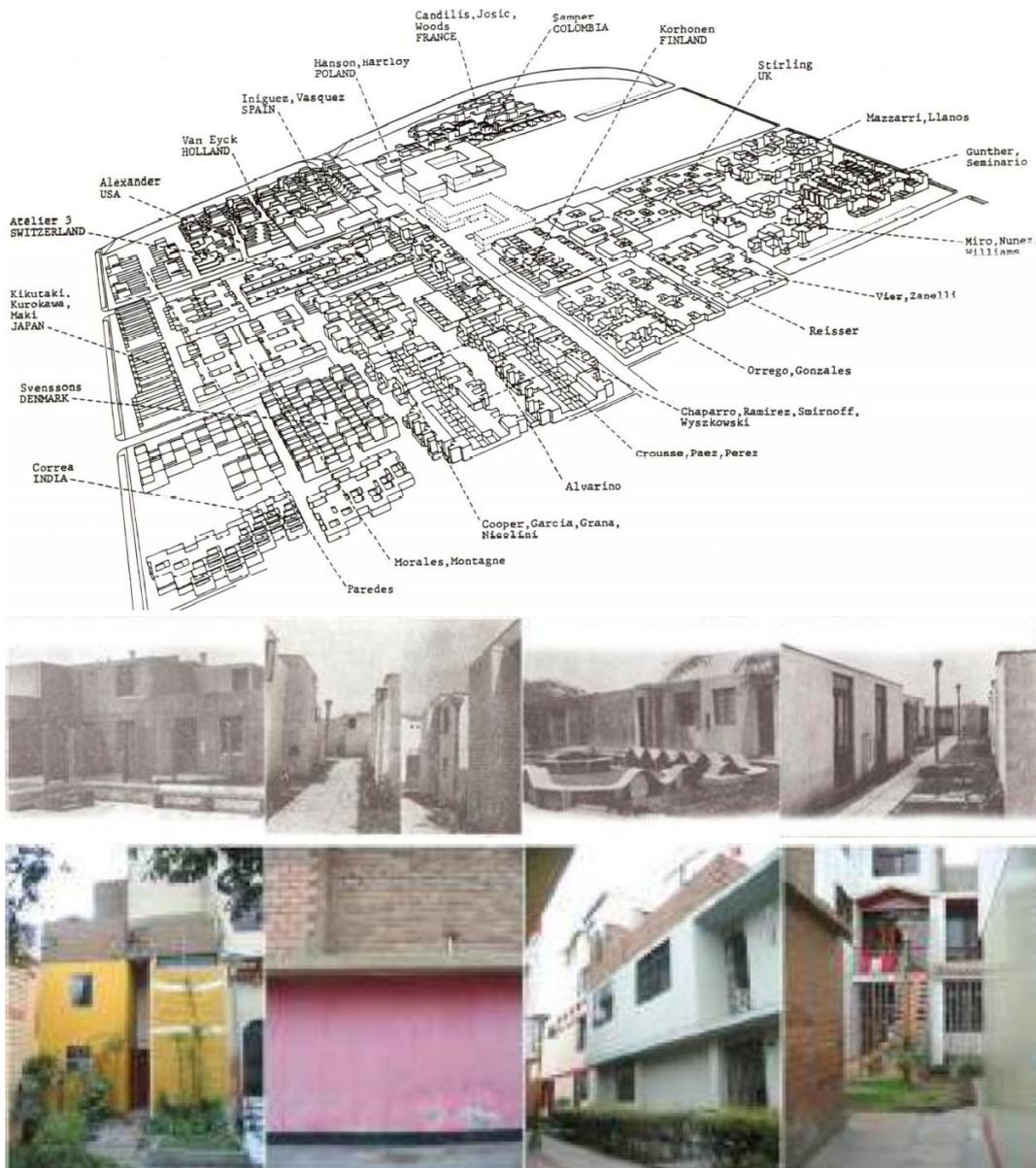
Figure 28. Drawing of the PREVI Project (top) and photos of some houses' changes over time (middle and bottom).
Sources: Land et al., 2015, cover (top); Lucas Alonso, 2015, pp. 7,9 (middle and bottom).

Figure 29. ELEMENTAL Project. Changes over time: years 2004, 2006, and 2016. Source: Millones Segovia, 2016, p. 69.

At first, ELEMENTAL allowed families who did not have legal and decent housing access to one with the great advantage of not being displaced to the city's periphery, as happens in many social housing projects. However, like PREVI, this social housing initiative failed in the long term due to the lack of professional support over time to prevent its gradual deterioration. The organization achieved at the beginning of the project was not maintained. Due to the difficulties in managing collective spaces, the latter have been attacked by individual needs, weakening the neighbors' relationship. In addition, the reduction of project costs through the use of economic construction techniques resulted in what many of its detractors refer to as the "reproduction of poverty aesthetics" (Boano and Vergara Perucich, 2016, p. 41).

The interesting criticism that Boano and Vergara Perucich make of Aravena's famous project the same year in which the latter won the Pritzker Prize[81] and was curator of the "*Biennale di Venezia*" (2016) agrees with something that Turner warned at his time: the danger of instrumentalizing the self-construction of progressive growth housing by a *laissez-fare* policy (TURNER: 1977, p. 75, as cited

---

[81] The jurors wrote:

  Alejandro Aravena is leading a new generation of architects that has a holistic understanding of the built environment and has clearly demonstrated the ability to connect social responsibility, economic demands, design of human habitat and the city. Few have risen to the demands of practicing architecture as an artful endeavor, as well as meeting today's social and economic challenges (The Pritzker Architecture Prize 2016, Jury Citation, www.pritzkerprize.com, as cited in Perriccioli, 2017, pp. 29-30).

in Blas, 2015, p. 87). The authors disagreed with "the false discourse of the half-house, promoted as the best housing alternative for low-income people" (Boano and Vergara Perucich, 2016, p. 38). This implies that low-income people "should be satisfied with the minimum, with what is possible and not with what is appropriate" (p. 38). Boano and Vergara Perucich also show how this type of "**good practices for development**" (p. 40, bold in the original) —often promoted by international entities such as UN-Habitat and in which internationally recognized and award-winning architects participate— are, in reality, palliative actions that focus on solving what is urgent and do not give space or time to think about what is really important. In the words of the authors:

> In the Chilean case, it is striking that it is Elemental and not the *Movimiento de Pobladores en Lucha* [italics added] the one that teaches collective housing when the latter has generated grassroots organizations with high management capacity and architectural results that far exceed those of Elemental (Boano and Vergara Perucich, 2016, pp. 40-41).

Both PREVI and ELEMENTAL are examples of good intentions that have failed in the long run to improve the living conditions of informal dwellers (**Figure 30**). On the one hand, these two projects considered the users and utilized local materials and accessible building technologies, as well as ant seismic structural components. On the other hand, the local social agendas of PREVI and ELEMENTAL were limited and subordinated by a global economic one, which contributed to legitimizing the continuation of popular housing problems in Latin America.

Figure 30. House extension in PREVI Project, 2007 (left) and ELEMENTAL Project, 2016 (right).
Sources: Lucas Alonso, 2015, p. 149 (left); Millones Segovia, 2016, p. 70 (right).

As has been shown in this section, it is not enough to give the possibility of transformation and/or extension of the house over time to be able to speak of progressive housing, nor is it enough to involve the users as labor or as a way of economizing construction in order to call it a process of participatory architecture. This dissertation agrees that the search for quick solutions to such a complex phenomenon as spontaneous settlements has trivialized the importance of understanding the origin of these, their background, and their rural memory, which could be precisely where the key lies. To conclude, the phrase said by Turner in Rio de Janeiro should not be taken as an invitation to architects to imitate the "formal aesthetics"[82] of informality but rather to understand its "social aesthetics" (Arango Escobar, 2004). For, as Blas expressed, "the informal and picturesque variety produced by a spontaneous and uncoordinated process of construction can never be reproduced by a project" (2015, p. 86).

3.2 In-formal: the city without form?

The informal city is not a new phenomenon. As evidenced in the previous section, the modern model of development in Latin America was not able to provide a satisfactory response to the challenges presented by this particular context. Thus, it contributed to the deepening of urban social segregation and, consequently, the proliferation of informal neighborhoods where low-income people settled. According to Lanzavecchia:

> (…) in many Third and Fourth World countries, a considerable portion of the inhabitants must rely on alternative economies in order to survive. These are effective despite their dis-organization (formal, not in results) because they are set up according to a logic that is very reminiscent of the "Lilliputian strategy" (or "globalization from the bottom up" as defined by Jeremy Brecher and Tim Costello). Despite the skepticism and amazement of the followers of classical economics, in many emerging countries, people who otherwise would be condemned to succumb can survive thanks to the informal economy. (2000, pp. 51-52)

The informal city is not a temporary phenomenon either. In fact, according to several authors (Gouverneur, 2015; Baratta et al., 2016b; Tessari, 2020), this type of urbanization will be the habitat of the majority of the urban population in Latin America and the main form of city expansion in that part of the world in the following years. Despite the above, the formation of this other face of the city continues not to be a priority for professionals in architecture. There is still a

---

[82] Understood in this case as the philosophical branch and not as the counterpart of informal.

significant absence of specialized literature on informal urban spaces (Tessari, 2020, p. 106). Moreover, there is an urgent need to understand the architecture produced by this type of self-construction based on scarce resources. In chapter 9 of "The Reflective Practitioner" (1983), Schön explained that "difficulty is not in the inherent complexity of the material brought to consciousness but in our ways of representing complexity." This statement explains why many proposals for neighborhood and housing improvement failed in economically poor areas. It is precisely the simplistic way of representing the complexity of informal architecture and the empirical knowledge of informal builders that makes it difficult for professional architects to achieve long-term sustainable results.

This dissertation, however, does not intend to glorify poverty and informality. It tries to acknowledge the implicit and often ignored popular knowledge that exists in the generation of the city through informality, which can help us architects improve our work methods in these contexts. In fact, informality shares with environmental design what Giuffrè said about the latter. And it is that it "has the same *temporal character as being*." He added that "there can be no timeless environmental design, just as no architecture, even when projective thus *transformative*, can be more than *heritage* memory, and actuality, a process in action" (2014, p. 13, italics in the original).

Due to its precarious origin and unregulated development, informal architecture presents evident structural and spatial problems that urgently need to be solved. However, a pluriversal and decolonial approach can reveal that far from being anonymous and deprived of rules and a defined form, it is, in fact, a dynamic hybridization between forms, technologies, and materials adopted from different sources and adapted to their own capacities and needs. It is a hybridized model in which the ideas of the globalized and famous modern paradigm, as well as the popular knowledge of traditional, regional, and rural models (Arango Escobar, 2004), are reinterpreted by self-builders. This is how informal settlements have adapted to diverse and complicated contexts. They offer an alternative to the rigid order of the dominant formal housing systems that have characterized Latin American cities since the last century, minimizing the participation of the inhabitants in the realization of domestic spaces. Such rigidity has also been contested by thinkers such as Colin Ward[83] and John F.C. Turner, who defended

---

[83] British architect and urban planner, defined as one of the most important figures of anarchist thought after World War II.

the idea that the answer to improving informality was in informality itself. In Tessari's words:

> Informal settlements gradually integrate themselves within the metropolitan fabric through a process that goes from subordination to coordination, from parasitism to autonomy, from dependence to interdependence. Thus, the informal settlement abandons its stereotypical role of "launchpad" to the city and becomes an integral part of the contemporary city, characterized by varying degrees of informality. (2020, p. 99)

Regardless of the obvious and rightly criticized aspects of informality, it is crucial to study the intrinsic form of this city model and its architecture to avoid other kinds of colonialization.

Many authors throughout history have had similar intuitions about popular architecture in other contexts —rural, historical urban centers— and other latitudes —Europe, Asia, Africa— to those of Turner regarding Latin-American informal architecture[84]. Blas, for instance, reminds us of what John Ruskin stated in "The Nature of Gothic," a chapter in the second volume of his work "The Stones of Venice" (1853): "In all living things there are certain irregularities and deficiencies which are not only signs of life, but sources of beauty" (RUSKIN 1893 [1981: 118 y ss.], as cited in Blas, 2015, p. 81). A century after Ruskin's work, the Austrian architect Bernard Rudofsky published his famous book "Architecture without architects, introduction to non-pedigreed architecture" (1964). It collects some examples that show the virtuosity of vernacular architecture, one not built by specialists but collectively by urban and rural communities worldwide. Rudofsky is, in fact, a supporter of the idea that this type of "primitive" or communal architecture is a great source of inspiration for professionals since its apparent fortuitous or casual character is actually based on a deep knowledge of the place.

Informal settlements result from emergency situations suffered by the poorest inhabitants, who seek to respond autonomously to the housing problem with the few resources at their disposal. Yet, it cannot be denied that this accidental way of making the city also embodies a collective intelligence and recursiveness based on the popular knowledge of those who self-build their homes. Arturo Escobar recognizes this connection between the architecture studied by Rudofsky and informal architecture when talking about autonomous design:

---

[84] See section 3.1.

(…) every community practices the design of itself. This was certainly the case with traditional communities (they largely endogenously produced the norms by which they lived their lives), as it is today with many communities, in both the Global South and the Global North, that are thrown into the need of designing themselves in the face of ever-deepening manifestations of the crises and the inescapable techno-economic mediation of their worlds. (2018, p. 2)
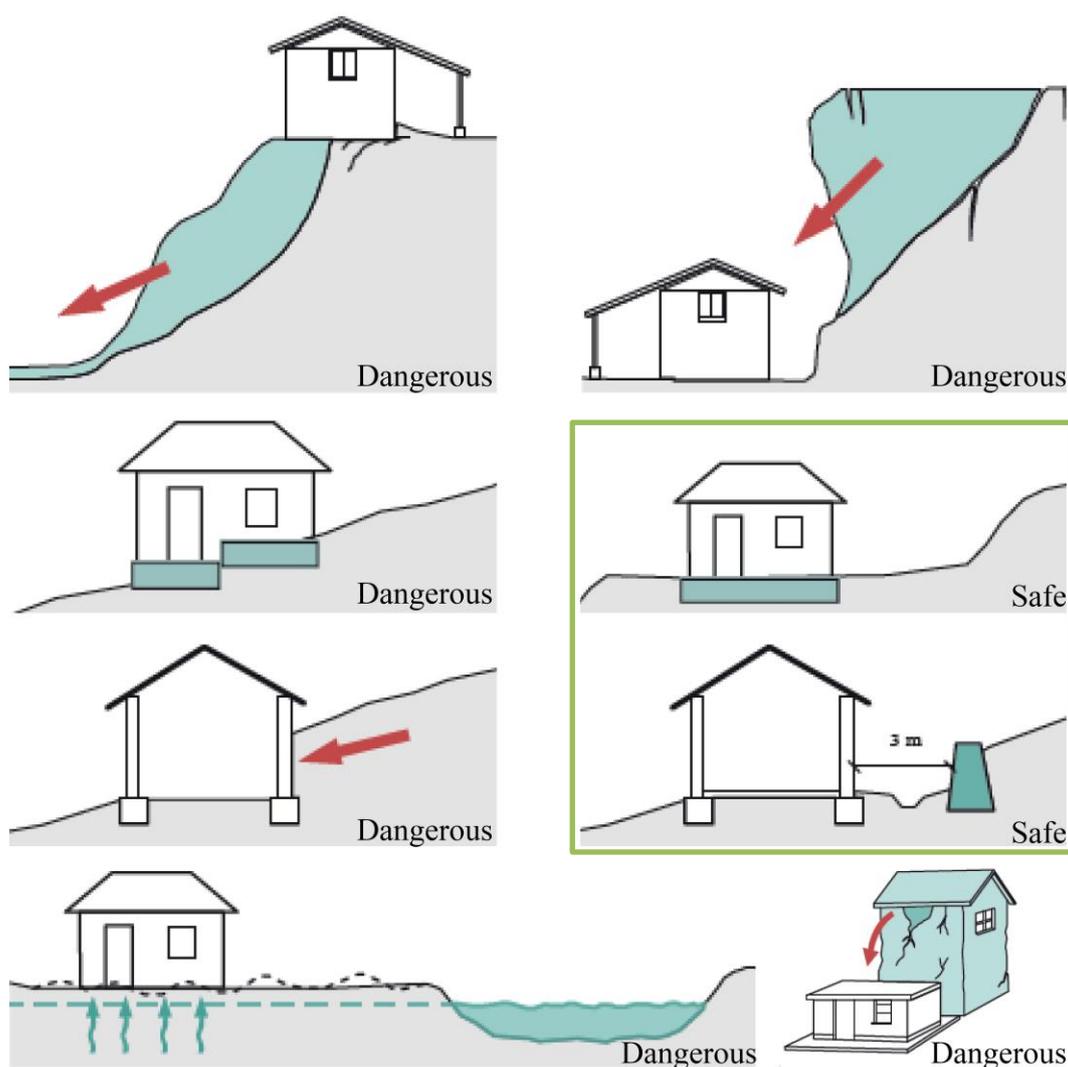
Figure 31. Recommendations for the building's location in coherence with the surroundings.
Source: Image redrawn from: Carazas et al. 2002. Pg,7; BLONDET, M. 2010. Pg, 21. And MINKE, G, 2001. Pg, 8, as cited in Torres Dueñas, 2018, p. 74.

The organic form of informal neighborhoods depends, on the one hand, on the environmental and physical characteristics of the context. This is due to the fact that, unfortunately, spontaneous dwellings are often located in difficult and even dangerous areas to build (**Figure 31**): with problems of hydrogeological instability, possible flooding, and high topographic slopes, among others (Baratta et al., 2019). On the other hand, their organic form is due to their origin, being three the main typologies of settlements. The first is the individual one, in which the illegal land occupation occurs progressively and spontaneously, depending on each family unit that arrives to inhabit the area. The second is the result of collective organization among a group of people who decide to occupy a piece of land. The third is the illicit subdivision of land by the so-called *pirate developer*, a common figure who profits from selling public or private land that does not belong to him to people in need of housing[85].

In the last two cases, the form of the housing complex becomes more regular in terms of vehicular infrastructure and exterior facades of the houses (Tessari, 2020). In all scenarios, the initial occupation of the land and the appropriation of the space begin with the definition of the lot boundaries and often with the realization of a transitory shelter with waste materials collected by the inhabitants themselves and using a few tools: plastic waste, aluminum sheets, wooden planks, etc. The lack of public services, infrastructures, and urban facilities is a significant problem at this stage. The urgency to solve these basic needs —through collective or individual illegal initiatives— leaves no room for aesthetic values to be considered.

The scenario of illegality in which these dwellings are born is not always permanent. Over time and with continued consolidation of the settlement (**Figure 32**), the inhabitants can gain property titles or ownership rights through agreements with local authorities. The latter then formalize the provision of public services and provide the neighborhood with new and legal infrastructures. Gouverneur (2015) points out something particularly revealing about informal dwellers' perception of their territory. While they demand better living conditions and urban and architectural quality standards equal to those in the formal city, their goal is rarely to abandon the houses and the neighborhoods they build and live in simultaneously as they consider these can be gradually improved (p. 4). As Tessari explains, referring to the favelas in Rio de Janeiro, "what emerges here is the distinct

---

[85] According to Naranjo Botero "the 'pirate developers' are illegal sellers of land and cheat low-income buyers" (2017, p. 157).

character of informal housing systems, their predisposition to constant mutation, which gives them the appearance of being 'unfinished,' revealing the tireless ability of their inhabitants to dream of a future" (2020, p. 253).
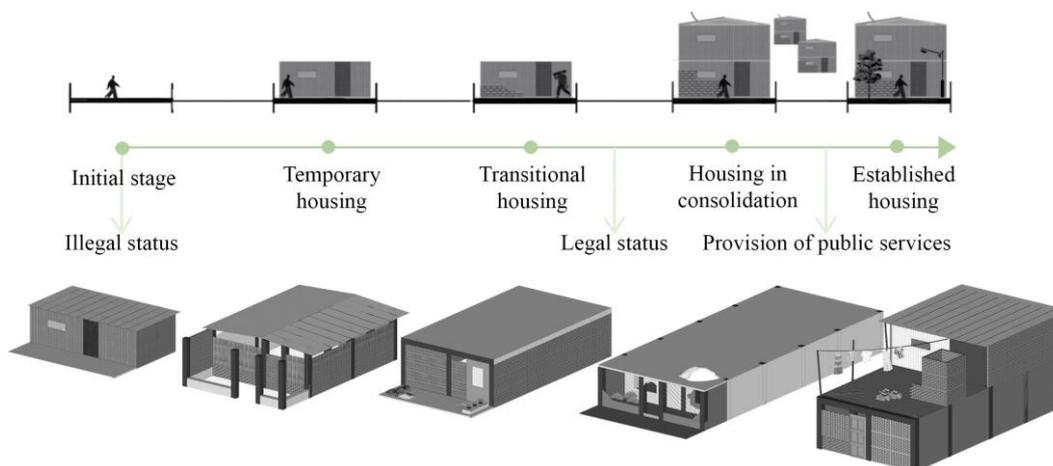
Figure 32. Informal self-construction over time.
Sources: The original graphic was produced by Liyana Meh for her Politecnico di Torino M.Sc. Thesis "Habitats for Inhabitants. Prototype housing for slums settlements in Lima, Peru," of which the author was co-supervisor in 2020. The information was complemented with that of Gouverneur, 2015, p. 206; Baratta et al., 2016a, p. 144; Tessari, 2020, p. 96; Regatero Ortiz-Cañavate, 2020, pp. 51-53.

Progressiveness is, therefore, an essential characteristic for informal self-builders who develop their homes "as a temporary settlement but adapted to a state of permanence" (Tessari, 2020, p. 102). Generally, they do not follow a defined schedule, a design, or a project determined *a priori*, much less legal guidelines. They instead depend mainly on the availability of economic, material, and human resources. For instance, one of the common practices inside dwellings —usually in the backyard— is the storage of building elements. By doing so, the inhabitants can gradually improve the material quality of the dwellings.

Unfortunately, this state of constant improvisation often results in inadequate architectural solutions that do not respond to local conditions and are not environmentally friendly. For instance, although the initial precarious dwellings are transformed by self-builders, replacing fragile waste materials with more resistant, durable, and standardized ones —such as concrete and brick— the latter often become unsuitable for the physical characteristics of the environment. The process of consolidation can also mean sacrificing spatial qualities and indoor comfort in favor of densification. These changes, in turn, make it challenging to meet

sanitation and hygiene standards —ventilation, lighting, etc.— and to adopt risk mitigation measures in case of natural phenomena —seismic-resistant characteristics— (Arango Escobar, 2004; Anzellini, 2015; 2016).

Figure 33. Self-construction as progressive practice.
Source: Solène Veysseyre. "Case Study: The Unspoken Rules of Favela Construction" 03 Aug 2014. ArchDaily. Accessed May 23rd, 2022. https://www.arch-daily.com/531253/case-study-the-unspoken-rules-of-favela-construction ISSN 0719-8884.

It is clear that form is a variable that adapts to the needs of the inhabitants and is based on the resources available to them. Likewise, function in informal housing is also changeable and flexible: a dining room is not always a dining room, just as a kitchen is not always a kitchen. Once all the available land is exhausted, and there is no room to grow horizontally, the demand for new spaces is satisfied through vertical expansion of the house. For instance, a one-story single-family dwelling can become a three-story building with commercial space on the ground floor and independent apartments on the top two floors[86]. In this case, the temporary roof becomes a new foundation system for the beginning of the vertical layering process of informal housing (**Figure 33**). However, this addition of improvised floors through discontinuous and interrupted support elements generates structurally precarious buildings and increases the residents' vulnerability.

As described so far, the results of the self-built city are problematic on many fronts. As evidenced above, the lack of a defined project has a negative impact on the spatial, structural, and material quality of informal housing. However, beneath these urbanistic, architectural, and technological deficiencies, there are positive characteristics that are an example of adaptation to challenging external conditions. In his article, Blas raises a provocative question: "is time enough to build architecture?" The same author answers, "perhaps it is this singular relationship with time and with the city, the only thing that can turn construction, even self-construction of the house, into Architecture" (2015, p. 87). Therefore, as described in chapter 3, informal construction can be classified as "popular modern architecture."

In self-built urban housing, the unexpected becomes an intrinsic element of its development and growth. Moreover, its aesthetic of unfinished architecture and permanent construction reveals the self-management capacity of the inhabitant-builder. This actor generates a kind of informal, partly sustainable circular economy based on recollecting second-hand materials or waste from other construction and demolition processes. This "art of making" relies on resourcefulness and creativity as daily tactics, multiplying the possibilities of each element used in the way of building the dwelling, overcoming "the limits that the determinants of the object set on its utilization" (Certeau, 1984/1980, p. 98).

---

[86] To rent and have an economic income, or as a form of independence for one of the household members, especially a child starting his or her own family.

Unlike the form imposed by the planned city, the "informal form" is dynamic and mutates according to the changes in the inhabitants' lives. These transformations are the direct result of processes carried out by the residents themselves to generate new spaces through building techniques based on experiences, memories, and social relations[87]and local and foreign models adapted "by force." All this generates an architecture which, as Tessari explains:

> It overturns the sequence of project-construction-use into a sequence of construction/use-project instead. Indeed, the process of use and construction —usually carried out by the inhabitants— coincides and even precedes the stage of planning. Here, "planning" should not be understood in conventional terms, namely as an abstract technique of designing and calculating, but rather as an open process that entails collective action, an expression of a shared culture. (2020, p. 103)

According to Manzini: "Giving form' also means acting on the cultural level by amplifying and giving visibility to the 'weak signals' that society manifests, proposing quality criteria consistent with a sustainability perspective" (in Lotti 1998, p. 102, as cited in Marseglia, 2018, p. 76). This form is thus understood as "the set of relationships among all actors in the system including users and their needs" (p. 76). In spontaneous dwellings, even more important than the material form is what Lefebvre calls the social form[88]. In fact, the strong fabric of human relationships developed in self-built neighborhoods from the occupation stage onwards is a feature hardly achieved by formal architecture. This is partly due to the precariousness and necessity of informal residential spaces' construction. The same conditions are related to the idea of "not yet" raised by De Sousa Santos (2010) and of "needs and potentialities" defended by Max-Neef (1986). In the informal case, people reinforce the relationship between the public and private spheres by using outdoor spaces as open rooms to develop their daily activities, thus compensating for the lack of space and comfortable conditions inside the house[89]. From this strong social form are born different modalities of self-management

---

[87] Or, as expressed by Escobar, "communal forms of knowing, being, and doing" (2018, p. 16). This sense of community and solidarity is stronger in smaller spontaneous settlements than in large informal agglomerations (Gouverneur, 2015, p. 199).

[88] H. Lefebvre, *La production de l'espace*, Paris: Anthropos. Translation and Précis, 1974.

[89] For instance, the cultivation of food and ornamental plants in front and backyards is a widely used practice and is part of the cultural heritage of those who migrate from rural areas. The front porch is also used as a living room, taking advantage of the fact that during the day, the main doors are rarely closed, allowing the house's interior to be ventilated.

known as the *madres comunitarias, juntas de acción comunal,* and *junta de vivienda comunitaria[90]*.

Biases against informal settlements by those who do not live there are still tricky barriers to overcome. The formal city and its authorities remain skeptical about supporting the consolidation of informal settlements due to the fact that the latter are considered a threat because of unsanitary housing conditions, violence, poverty, and drug dealing (Gouverneur, 2015). Unfortunately, these prejudices are also the basis of many neighborhood and housing improvement programs, especially when those conducting them have been trained in contexts very different from the Global South: architects and urban planners working or formed in historical European cities or the Anglo-Saxon metropolis, among others[91].

Although the existence of conflictive and emergency situations cannot be denied —a general lack of external support and appropriate architectural or structural designs— more than a problem in itself, informal self-construction is actually a consequence of past and present structural problems linked to the dominant development model. However, the responses of authorities, institutions, professionals, and academics to "put an end" to this phenomenon have dismissed its innovative and creative force, opting for quick solutions: ignoring, displacing, eradicating, or substituting it.

In areas such as Latin America, where an accelerated urban population increase must be faced along with a high degree of social and economic inequality, spontaneous self-building cannot be reduced only to an illegal practice or to a gap in city planning. On the contrary, it must be considered in its complexity as a strategy, a political act, and an opposition to the formal exclusionary order. As mentioned above, it is not the object of this dissertation to give a fetishized and "aestheticized interpretation" (Tessari, 2020, p. 111) to the material and spatial precariousness of informal settlements. Neither is it to invite professionals to copy or reproduce the variety and spontaneity inherent to these through a "false appearance of indeterminacy" (Blas, 2015, p. 86) nor to validate or consolidate poverty and misery through a laissez-faire approach. This thesis, instead, is consistent with the heterodox idea that the terms informal city, self-build, and

---

[90] Meaning community mothers, community action boards, and community housing board.

[91] In his doctoral thesis on the favelas in Brazil, Tessari states that for him, "(…) an European-educated architect accustomed to the historical city of the contemporary North-American Metropolis, this inconceivable proliferation of disorder, chaos and irrationality was a moment of rupture with all possible interpretative schemes" (2020, p. 3).

spontaneous construction embody positive values such as creativity[92], economy of resources, cooperation, adaptability, and diversity. As Mellano stated, we should "(…) convince ourselves that the threats of the constructed environment, from which we often only seek to defend ourselves, can become opportunities" (2018a, p. 38). If appropriately conducted through a pluriversal and decolonial approach, informality, together with tradition[93], could have the potential to be the basis of an alternative to development through Social Innovations and Tecnologías Sociales.

3.3 Artisanry vs. backwardness

Two criticisms this dissertation may face are opposed in many respects. The first accuses it of having a nostalgic character that romanticizes poverty, glorifies the past, and idealizes nature, "a static nature to be protected" (García García, 2017, p. 14). The second gives it a positivist and reductionist label that interprets and analyzes the complexity of informal housing as a simple sum of processes.

However, these two points of view could not be further from reality and the true objective of this study, which considers "populist" (LOOS, 1914 [1980: 223-239], as cited in Blas, 2015, p. 82) and wrong to propose building in informal urban areas as past generations did when they were still rural. After all, "being against globalization (is) as reasonable as protesting bad weather" (Piper, 1996, as cited in Lanzavecchia, 2000, p. 21, brackets in the original).

On the one hand, the proposal to reincorporate tradition in informality as a critical element to counteract the precariousness and uprooting of spontaneous urban self-construction in Latin America means to problematize the past and the present in order to propose alternative futures[94]. On the other hand, understanding that architecture is not an exact science but a social practice[95] is to recognize the importance of unveiling the palimpsest of popular and informal housing through memory and collective intelligence[96]. Thus, avoiding the risk of prefiguring an asocial work methodology or an imposition of colonialist and monologic "solutions."

---

[92] "Creativity motivated not by competition, but by love and the will to live in search of the communal" (Mignolo, 2011, p. 332).

[93] Concept discussed in Chapter 2.

[94] See section 2.1.

[95] As Dilnot C. reminds us, design is a social activity carried out for social purposes (1982, p. 140, as cited in Marseglia, 2018, p. 73).

[96] See section 2.4.

As Certeau already expressed 40 years ago, "the operating models of popular culture cannot be confined to the past, the countryside, or primitive peoples. They exist in the heart of the strongholds of the contemporary economy" (1984/1980, p. 25). In this case, a change in the current economic paradigm of progress and technical-constructive development prevailing in Latin American cities is encouraged to achieve a decentralized model that incorporates popular knowledge in the innovation of materials and technologies (**Figure 34**).

Figure 34. Some vernacular techniques still used in Colombia.
Source: Anzellini and Garcia-Reyes Röthlisberger, 2015, p. 123.

Never before have the concepts of urban and rural been at such opposite places in the collective imagination. In the 1990s, Latour pointed out that "the adjective

'modern' designates a new regime, an acceleration, a rupture, a revolution in time. When the word 'modern,' 'modernization,' or 'modernity' appears, we are defining, by contrast, an archaic and stable past" (1993/1991, chapter 1).

Figure 35. Attempts to make a latticework with concrete bricks to improve internal comfort.

More than 20 years later, Gouverneur maintains the same idea about this duality stating that "(…) urban is interpreted as hard, constructed, engineered, technically

managed, and associated with modernization and progress. The rural, on the other hand, is viewed as green, unmanaged, poor, traditional, and backward" (2015, p. 221). However, as discussed in this chapter, informal settlements are hybrids between these two worlds, both in their material and intangible forms. On the one hand, they conserve "traces of the rural past" (Gouverneur, 2015, p. 149) and of their inhabitants' traditions. On the other, they possess traits and characteristics of modernity in the use of building materials and technologies (**Figure 35**). As Certeau explained it by giving the example of the Spanish colonists and the American Indians:

> (…) the ambiguity that subverted from within the Spanish colonizer's "success" in imposing their own culture on the indigenous Indians is well known. Submissive, and ever consenting to their subjection, the Indians nevertheless often *made of* the rituals, representations, and laws imposed on them something quite different from what their conquerors had in mind; they subverted them not by rejecting or altering them, but by using them with respect to ends and references foreign to the system they had no choice but to accept. They were *other* within the very colonization that outwardly assimilated them; their use of the dominant social order defected its power, which they lacked the means to challenge; they escaped it without leaving it. The strength of their difference lay in procedures of "consumption." To a lesser degree, a similar ambiguity creeps into our societies through the use made by the "common people" of the culture disseminated and imposed by "elites" producing the language. (1984/1980, p. XIII, italics in the original)

In goal #12 (Responsible consumption and production) of the Agenda for Sustainable Development (2015), the United Nations highlighted the need to achieve by 2030 an appropriate management and efficient use of natural resources. Two years later, this same organization committed to "the sustainable leveraging[97] of natural and cultural heritage, (…) as well as traditional knowledge and the arts, highlighting the role that these play in rehabilitating and revitalizing urban areas and in strengthening social participation and the exercise of citizenship" (UN, 2017, p. 13). Although these seem to be laudable purposes, they may hide a dangerous reification of nature and culture, understanding the former only as natural resources and the latter as folklore. This judgment, typical of the current hegemonic imaginary of progress, reduces nature to mere raw material for the realization of a "product" or, in Mignolo's words, a "neutralized, and largely inert materiality that

---

[97] Oxymoron.

existed for the fulfillment of the economic goals of the 'masters' of materials"
(2011, p. 12).

It should be remembered that this simplification of the concept of the
environment has changed over time. For instance, in the 70s and 80s, it was
understood only as the climate and physical characteristics of a given context from
which we had to protect ourselves. Then, at the end of the 20th century, we began
to think of the environment as a resource (Attaianese and Acierno, 2017). Only in
recent years has there been an improvement in our relationship with this concept
through terms such as heritage, protection, collective wealth, vital importance,
immeasurable value, safeguarding, and reduction of impacts, among others.

Regarding the reification of culture, it favors the demagogic use of the latter
through "the uncontrolled application of craft solutions" (Blas, 2015), legitimizing
the order pre-established by the dominant classes. It is worth recalling Certeau's
words in this regard:

> First, on what grounds can we call this "art" *different*? Second, *from what*
> *position* (from what distinct place) can we set out to analyze it? Perhaps by
> resorting to the very procedures of this art, we revise our views on both its
> definition as "popular" and our position as observers. To be sure, there remain
> social, economic, historical differences between the practitioners (peasants,
> workers, etc.) of these ruses and ourselves as analysts. (1984/1980, p. 30,
> italics in the original)

The alternatives to development, meaning those that are not based on the latter
as a measurement unit for societies (underdeveloped, developing, developed), move
away from these colonial preconceptions about nature and culture by understanding
that these are complex systems of which we are part and not of which we are the
owners. In architecture, this approach can be seen in the "balanced relationship with
the environment and the territory, a cyclical and sustainable correspondence in the
use of available goods (material, energy, and time.)" (Anzellini and Garcia-Reyes
Röthlisberger, 2015, p. 22). For instance, the constructive models of indigenous and
some rural communities in the Global South are representative examples of this
relationship in which tradition is appreciated not for having an intrinsic added value
but for being effective and, simultaneously, harmonious with nature. Moreover,
these "archetypes that maintain their validity in the current culture of the sustainable
and smart city" (Giordano, 2018, p. 68) do not lead to the "non-existence" to which

De Sousa Santos refers[98]. Since not being guided by the pursuit of modern progress, they do not define —by contrast— backwardness (**Figure 36**).
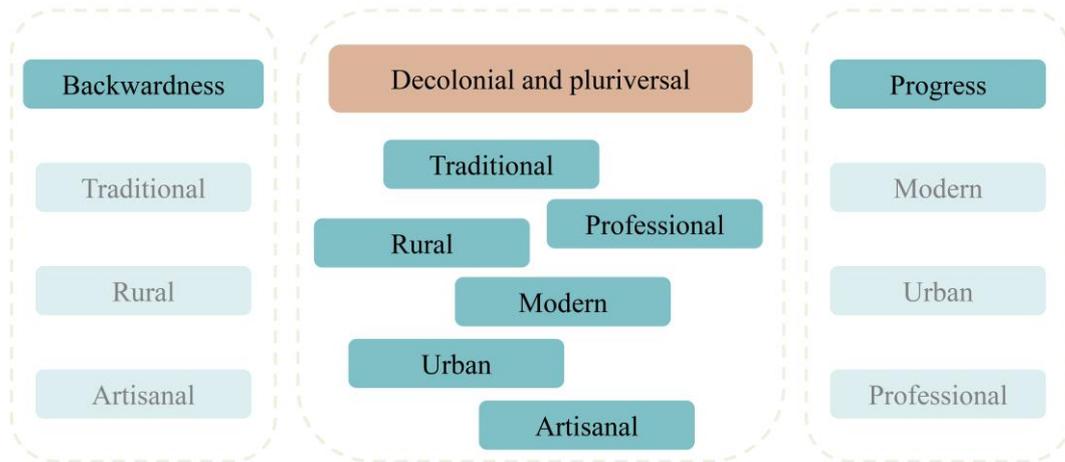
Figure 36. *From a non-existence approach to a decolonial and pluriversal design.*

According to Anzellini and Garcia-Reyes Röthlisberger, "from the perspective of its relationship with the environment, vernacular architecture and handicrafts is a product of a decision-making process by individuals and communities by virtue of managing their own needs and guaranteeing them in the long term" (2015, p. 22). Unfortunately, the "residualization" generated by the urban-rural contrast has resulted in the domination of the former over the latter. As a consequence, craftsmanship has gradually lost its value. Rural communities have been increasingly permeated by modern urban models, contributing to the disuse of local construction techniques that industrial mass production methods have replaced. This replacement has standardized and homogenized regional architectures, as Pradilla explains:

> Little by little, the people who knew the minutiae of working *adobe*, *tapia pisada, bahareque, cañalata*, or *palma amarga, bendeaguja, vino, jicra* [italics added], etc., have become unemployed. In these remote places, more and more people prefer to change these technologies for other technologies more related to the imaginary progress sold by the consumer society. (2010, vol. 3, p. 24)

Table 15 shows some traditional and regional materials and technologies in different regions of the Global South that, depending on the climatic characteristics

---

[98] See chapter 1 and 2.

of the site, could be used in the construction of social housing. The table also compares each material/technique used in virtuous examples of vernacular (left) and contemporary architecture (right).

Table 15. Traditional materials considered adequate for social dwelling construction in terms of thermal inertia and their adaptability to different climates. Source: Elaborated by the author based on a table presented in Ministerio de Ambiente Vivienda y Desarrollo Territorial, *Los materiales en la construcción de vivienda de interés social, Serie Guías de Asistencia Técnica para Vivienda de Interés Social*, vol. 2, pp. 21-22, 2011.

Cold: 12º - 18 ºC		
Walls	Rammed earth	
	Housing typology. *Funes, Nariño* (CO). Source: Arch. Carlos Burbano, as cited in Sánchez, Afanador, and Castillo, 2016, p. 71.	Dwelling / *Fundación Tierra Viva*. *Sopó, Cundinamarca* (CO). Source: http://www.fundacion-tierraviva.org/2014/09/casa-sopo-cundina-marca/. Accessed on September 15th, 2022.
	Adobe	
	Housing typology. *Firavitoba, Boyacá* (CO). Source: https://casasrusticas.org/casas-rusti-cas-con-bellas-terrazas.html. Accessed on September 15th, 2022.	*Casa El Encuentro* / Hernando Baraya. *Chía*, Cundinamarca (CO). Source: Santiago Baraya in https://www.arch-daily.co/co/944575/adobe-el-material-reciclable-mas-sostenible. Accessed on September 14th, 2022.

	Stone	
Walls	 *Templo de las 3 ventanas* / *Inca* Civilization. "*Hanan*" sector, *Machu Picchu* (PE). Source: https://www.boletomachupic-chu.com/templo-de-las-tres-ventanas/. Accessed on September 15th, 2022.	 *Casa Chontay* / Marina Vella Arquitectos. *Huamansica*, Lima (PE). Source: Gonzalo Cáceres Dancuart in https://www.archdaily.cl/cl/770559/casa-chon-tay-marina-vella-arquitectos. Accessed on September 16th, 2022.
	Clay / terracotta	
Roof	 Rural house. *Gualmatán,* Nariño (CO). Source: Juan Carlos Figueroa, as cited in Sánchez, et al., 2016, p. 77.	 *Casa Terracota* / Octavio "Payo" Mendoza. *Villa de Leyva*, Boyacá (CO). Source: https://casaterracota.com/. Accessed on September 15th, 2022.
	Wood	
Floor	 Republican house in *La Candelaria*. Bogotá, Cundinamarca (CO).	 *Casa Patios* / Rama Estudio. *San José de Chimbo*, *Bolívar* (EC).

	Source: https://www.lahaus.com/p/se-vende-casa-republicana-en-la-candelaria-809-m-bogota/bogota. Accessed on September 17th, 2022.	Source: JAG Studio in https://www.arch-daily.cl/cl/922507/casa-patios-rama-estudio. Accessed on September 18th, 2022.
Windows and openings	Wood	
	Republican-style housing. Bogotá, Cundinamarca (CO). Source: Manrique Gómez, 2013, p. 215.	*Casa Puente* II / Rogelio Salmona. *Tabio*, Cundinamarca (CO). Source: https://www.fundacionrogeli-osalmona.org/proyectos/casa-puente-ii---tabio. Accessed on September 15th, 2022.
	Mild: 18º - 24ºC	
Walls	*Guadua* (Bamboo)	
	House. *La Mesa* / Cundinamarca. Source: Martin Anzellini García-Reyes, Programa Paisajes de Conservación. Sheet C_14.	*Taller de costura comunitario Amairis* / RUTA Arquitectura. *San Isidro, Risaralda* (CO). Source: Federico Cairoli in https://www.ar-chdaily.cl/cl/935263/taller-de-costura-comuni-tario-amairis-ruta-arquitectura. Accessed on September 15th, 2022.

Walls	Compressed earth block	
	  Local block fabricator, Ali Cedric, making blocks for sale. *Pujini, Pemba Island* (TZ). Source: Craig Norris in https://www.arch-daily.co/co/760617/como-simples-bloques-de-tierra-pueden-revolucionar-la-construc-cion-en-la-isla-africana-de-pemba. Accessed on September 18th, 2022.	 *Casa Viva* neighborhood (compressed stabilized earth block) / Fundación Tierra Viva. *Vegachí*, *Antioquia* (CO). Source: http://www.fundacion-tierraviva.org/2009/11/vegachi-antioquia/. Accessed on September 15th, 2022.
	Plastering (cow dung)	
	  VACA Project / Tecnológico de Monterrey and Sánchez family. Puebla, Puebla (MX). Source: Loyo Martínez and Márquez Martín, 2014, p. 63.	 *Tocagua* house. *Barichara, Santander* (CO). Source: http://www.tocagua.com/arquitec-tura.html. Accessed on September 15th, 2022.
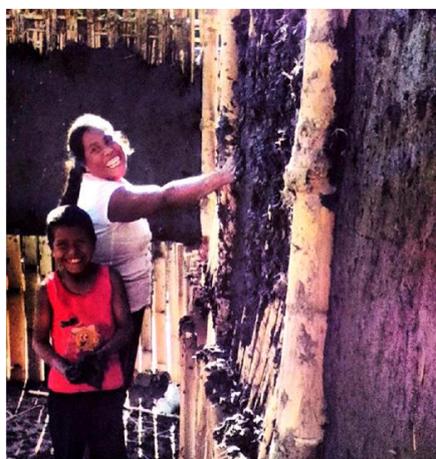
	Wood	
Roof	Restructured colonial house / Fundación Tierra Viva. *Concepción*, Antioquia (CO). Source: http://www.fundaciontie-rraviva.org/2010/06/concepcion-antioquia/. Accessed on September 15th, 2022.	*Casa Pinto* (with rammed earth walls) / Jesús Moreno. Barichara, Santander (CO). Source: http://www.fundacion-tierraviva.org/2009/12/casa-pinto/. Accessed on September 15th, 2022.
	Wood	
Floor	Elaborate woodwork on a house balcony. *Pereira, Risaralda* (CO). Source: Alberto Saldarriaga in https://www.revistacredencial.com/historia/te-mas/la-vivienda-popular-tradicional-en-la-re-gion-cafetera-central. Accessed on September 16th, 2022.	*Casa Tunquén* / Nicolas Loi. *Algarrobo, Valparaíso*, (CH). Source: Marcos Mendizabal in https://www.archdaily.co/co/934433/casas-de-madera-en-chile-honestidad-material-e-integra-cion-al-paisaje. Accessed on September 18th, 2022.

Ceramic tiles	
Talavera ceramic. Kitchen of the *Ex Convento de Santa Rosa* Museum. Puebla, Puebla (MX). Source: Carolina Miranda in https://www.identidadpue-bla.com/2021/08/22/convento-cuna-del-mole/. Accessed on September 18th, 2022.	*Sarape y Sombrero* / Javier Senosia *Dolores, Guanajuato* (MX). Source: https://www.arquitecturaorgan-ica.com/habitat-organico/sarape-y-som-brero.php. Accessed on September 18th, 2022.
Wood / Guadua	
Structure in guadua and three-story building in bahareque. *Neira* and *Manizales, Caldas* (CO). Sources: Fonseca Martínez and Saldarriaga Roa, 1984, pp. 184-185; Salas Delgado, 2006, p. 90.	Taller de costura comunitario Amairis / RUTA Arquitectura. San Isidro, Risaralda (CO). Source: Federico Cairoli in https://www.ar-chdaily.cl/cl/935263/taller-de-costura-comuni-tario-amairis-ruta-arquitectura. Accessed on September 15th, 2022.

Windows and openings

	Hot: ≥ 24 ºC	
Walls	Guadua	
	Guadua *Canutos* Lattice. *Cabildo de San Martín, Sucre* (CO). Source: Martin Anzellini Garcia-Reyes, Programa Paisajes de Conservación. Sheet C_10.	*Casa Convento* / Enrique Mora Alvarado. *Chone, Manabí* (EC). Source: https://www.domestika.org/en/projects/159975-casa-de-bambu-en-manabi-ecuador-arquitectura-vernacula. Accessed on September 15th, 2022.
	Wood	
	Housing typology. *Napipí, Atrato* River (CO). Source: Mosquera Torres, 2014, p. 117.	*Estación de Servicios Turísticos Punta Arenas* / Colectivo Taller Independiente + Ruta 4 Taller + Pico Estudio. Punta Arenas, *Margarita* Island, (VE). Source: Veo Productores in https://www.archdaily.cl/cl/768936/estacion-de-servicios-turisticos-punta-arenas-colectivo-independientes-plus-ruta-4-plus-pico-estudio?ad_medium=widget&ad_name=more-from-office-article-show. Accessed on September 16th, 2022.

Internal divisions in lightweight materials

Carpenters working on an interior wall.
Huina, Chocó (CO).

Source: Mosquera Torres, 2014, p. 116.

Comedor de Guadurnal / Al Borde + Taller General.
Esmeraldas, Esmeraldas (EC).

Source: JAG Studio in https://www.arch-daily.cl/cl/759184/casa-convento-enrique-mora-alvarado. Accessed on September 16th, 2022.

Bahareque

Bahareque Enjaulado wall / Artisanians Juan Carlos Martínez and Gregorio Martínez.
Chimichagua, Cesar (CO).

Source: Martin Anzellini Garcia-Reyes, Programa Paisajes de Conservación. Sheet C_01.
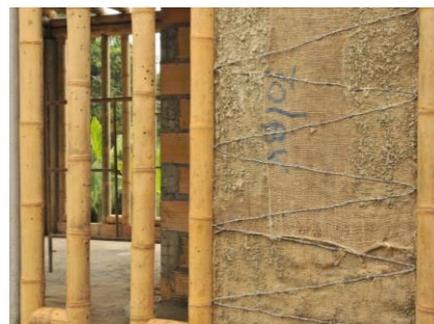
Tendinous System: it fuses wattle and daub architecture, to which barbed wire is added for tension and sacks and mats filled with cement. Casa Montoya / Carolina Zuluaga Zuleta.
Fusagasugá, Cundinamarca (CO).

Sources: Carolina Zuluaga Zuleta in https://www.youtube.com/watch?v=XrX9XeCgZFI&list=PL1C7ACF56C64440E8 and https://www.disartebambu.com/casa-montoya-sistema-tendinoso-casa. Accessed on September 18th, 2022.

	Cow dung	
Roof	 Self-build house. *Planeta Rica, Montería* (CO). Source: https://www.elheraldo.co/cordoba/carmen-la-arquitecta-de-casas-hechas-con-boniga-686055. Accessed on September 15th, 2022.	 Centre for Health and Social Welfare / Kéré Architecture. *Laongo, Kadiogo* (BFA). Source: https://www.kerearchitecture.com/work/building/centre-for-health-and-social-welfare. Accessed on September 16th, 2022.
	Leaves	
	 Thatch Roof or Alang Longo. Harvested and dried congo grass. Bali (ID). Source: Bamboo U in https://bamboou.com/5-roofing-systems-for-bamboo-buildings/?utm_medium=website&utm_source=archdaily.com. Accessed on September 18th, 2022.	 Ho Chi Minh City, Southeast (VT). Source: Alyn Griffiths in https://www.dezeen.com/2015/04/12/mm-architects-tropical-suburb-house-ho-chi-minh-city-brick-palm-tree-leaf-roof/. Accessed on September 18th, 2022.

Weaving

Wine Palm or *Noli* Palm woven roof / La Unión- Sucre artisans.
San Onofre, Sucre (CO).

Source: Martin Anzellini Garcia-Reyes, Programa Paisajes de Conservación. Sheet T_15.

Casa Traversa / Marina Vella Arquitectura.
Tanlajas, San Luis Potosi (MX).

Source: dc Fotografia arquitectonica in https://www.archdaily.cl/cl/957443/casa-traversa-marina-vella-arquitectura?ad_source=search&ad_medium=projects_tab. Accessed on September 16th, 2022.

Clay
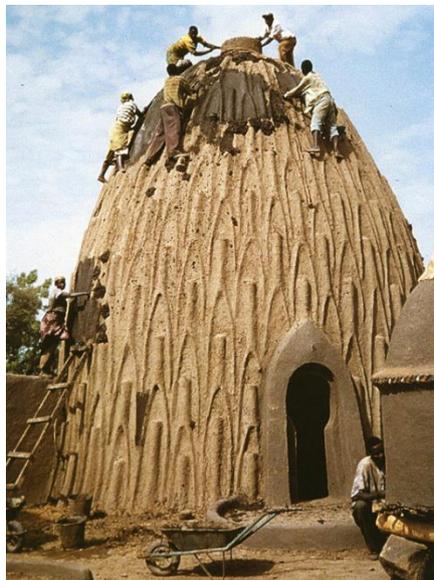
Mugsum Mud Huts / Musgum ethnic group.
Far North Region (CMR).

Gando Primary School Library / Kéré Architecture.
Gando, *Boulgou* (BFA).

	Source: https://www.designboom.com/architecture/musgum-earth-architecture/. Accessed on September 17th, 2022.	Source: https://www.kerearchitecture.com/work/building/gando-primary-school-library. Accessed on September 16th, 2022.
Floor	Guadua	
	Constructive tradition: the corridor. *Quimbaya, Quindío* (CO). Source: Fonseca Martínez and Saldarriaga Roa, 1984, p. 184.	*Casa comunal renacer de Chamanga* / Actuemos Ecuador. Chamanga, Esmeraldas (EC). Source: Kliwadenkonovas in https://www.archdaily.cl/cl/871527/casa-comunal-renacer-de-chamanga-actuemos-ecuador. Accessed on September 16th, 2022.
Windows and openings	Openwork	
	Openwork in wood dwelling. *Buenaventura, Valle del Cauca* (CO). Source: Juan Carlos Dávila, as cited in Mosquera Torres, 2014, p. 115.	Gando Teachers' Housing / Kéré Architecture. Gando, Boulgou (BFA). Source: https://www.kerearchitecture.com/work/building/gando-teachers-housing. Accessed on September 16th, 2022.

Guadua	
Palafitic rural house. *Alhajuela*, Manabí (EC). Source: Castro Priego, Barcia Moreira, Labrada Ochoa, and Chasing Guagua, 2018, p. 83.	Chamanga Cultural Center / Munich University of Applied Sciences + Portland State University + Atarraya Taller de Arquitectura + Opción Más. Chamanga, Esmeraldas (EC). Source: Santiago Oviedo in https://www.arch-daily.com/953017/chamanga-cultural-center-designbuild-studio-plus-portland-state-university-plus-atarraya-taller-de-arquitectura. Accessed on September 16th, 2022.
Wood	
Rural dwelling. Buenaventura, Valle del Cauca (CO). Source: Juan Carlos Dávila, as cited in Mosquera Torres, 2014, p. 113.	*Lycée Schorge* (use of local eucalyptus wood) / Kéré Architecture. *Koudougou, Boulkiemdé* (BFA). Source: https://www.kerearchitec-ture.com/work/building/lycee-schorge. Accessed on September 16th, 2022.

The recovery of local knowledge in self-built settlements must be based on its dialogue with other cultures. Through what Richard Sennet calls a *dynamic repair*, it must be related to the integration of tradition and cultural diversity in informality. According to him:

> The simplest way to perform a repair is to disassemble, find what is wrong, fix it, and then return the object to its previous state. This might be called a *static repair* [italics added]; it is what happens, for instance, when replacing a blown fuse in a toaster. A *dynamic repair* [italics added] will change the form or function of the object, which is what happens if a broken toaster filament is replaced with a higher-power one so that the appliance can toast bread in both slices and buns. At a more complex technical level, dynamic repair may involve jumping domains, as when a mathematical formula corrects errors in data sequences. Or it may require new tools; (…) (2009/2008, p. 131)

This dynamic repair concept goes beyond the "state of artificial survival due only to historicism" criticized by Latour (1993/1991, chapter 5). Instead, it favors the transduction and resignification[99] of vernacular architectural practices and the evolution of popular construction techniques[100] (**Figure 37**). In the case of informal housing, a dynamic repair can take advantage of its hybrid urban-rural character, becoming a bridge that, to use Mignolo's words, "decolonizes modernity." Adolf Loos once wrote:

> Pay attention to the construction modes used by the farmer because they are a heritage handed down by the wisdom of the fathers. But try to discover the reasons that led to that form. (…) Do not think of the roof, but of the rain and snow. This is how the farmer thinks and subsequently builds in the mountains (…) He does not fear being considered modern. Changes in the traditional construction method are only allowed, if they represent an improvement; conversely, follow the tradition. Because the truth, even if centuries old, has a closer bond with us than the lie that walks beside us. (Adolf Loos, Regole per chi costruisce in montagna, in Adolf Loos, Parole nel vuoto, Milan 1972, as cited in Mellano, 2018a, p. 44, ellipsis in the original)

---

[99] See section 2.5.

[100] "Sow, harvest, gather, dig, dry, rip, weave, tie, thatch, cover, insert, carve, stick, whittle, fill, smooth, plaster, are a few of the verbs of the ancient profession of construction" (Anzellini and Garcia-Reyes Röthlisberger, 2015, p. 13).

Figure 37. School in South Africa designed and built by students. Studio SPN: Ruth Cuenca, Nottingham University students.
Source: https://estudiospn.files.wordpress.com/2014/05/brochurebtt_tallercolombia_esp.pdf. Accessed June 1st, 2022.

In this flexible logic, the intersection of nature-culture, subject-object, as well as popular knowledge-academic knowledge become indispensable. For instance, the structural improvement can be based on autochthonous techniques revisited in a contemporary key, or the façade elements can be produced with local materials through artisanal work together with the integration of a mechanical opening system (**Figure 38**). This possible scenario is in line with the purpose of the United Nations to support the development of housing policies that "foster local integrated housing approaches by addressing the strong links between education, employment, housing and health, preventing exclusion and segregation" (2017, p. 28).
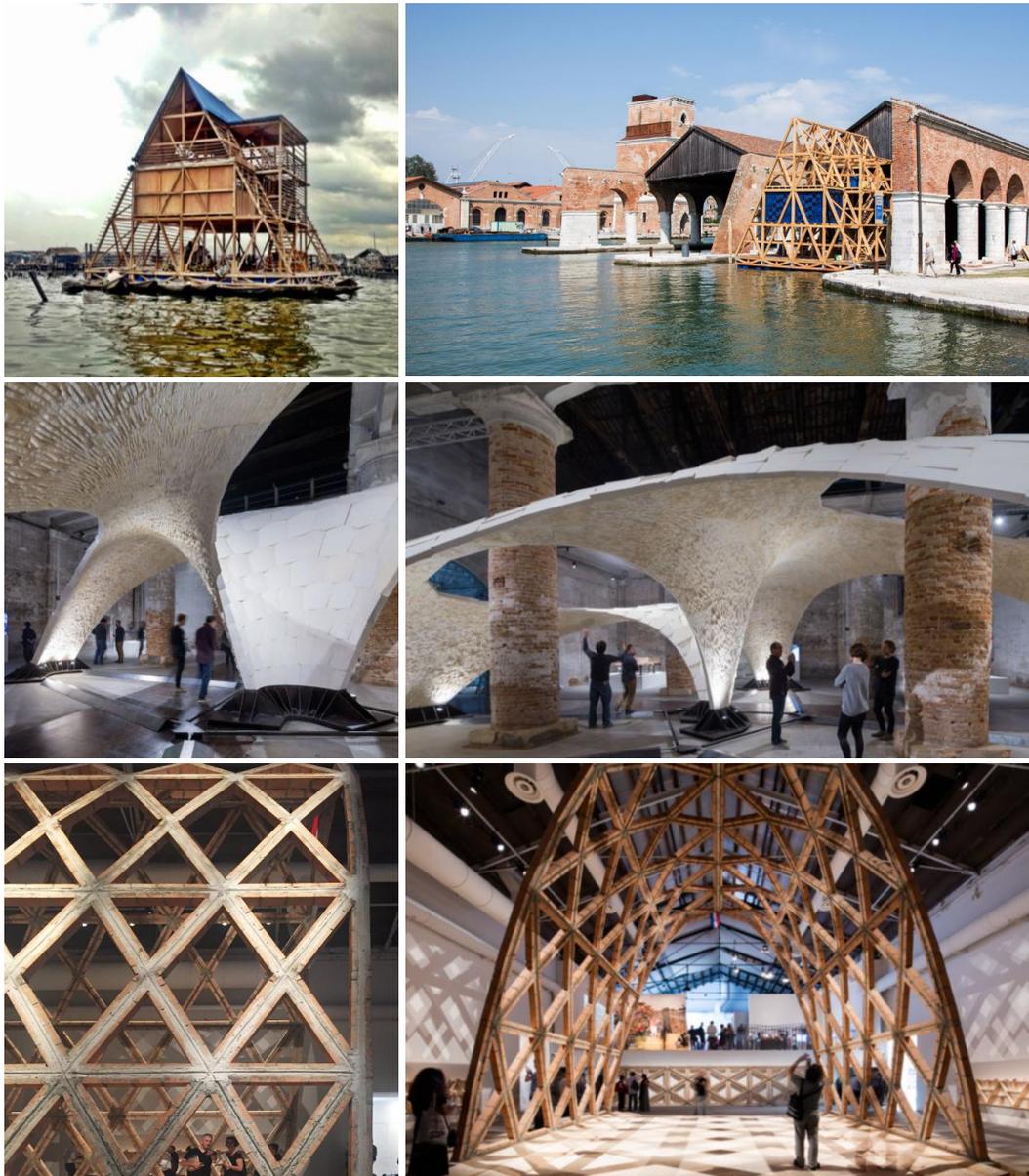
Figure 38. Projects of the Venice Architecture Biennale 2016: REPORTING FROM THE FRONT. According to its Director, Alejandro Aravena, these are "examples where different dimensions are synthesized, integrating the pragmatic with the existential, pertinence and boldness, creativity and common sense." "Floating school" is a building prototype for coastal regions of Africa, designed by the Nigerian architect Kunlé Adeyemi, awarded the Silver Lion (top); "Armadillo Vault" is a pioneering stone structure that supports itself without any glue, built by the team led by ETH Zurich researchers (middle); Arch. Solano Benítez's "*Gabinete de Arquitectura*" is a latticed brick arch model for low-cost construction, awarded the Golden Lion (bottom).
Source: www.dezeen.com and https://www.labiennale.org/en/architecture/2016/biennale-architettura-2016-reporting-front. Accessed on June 5th, 2022.

An inflexible and insurgent defense of traditions is as erroneous as it is naive. However, so is the idea that tradition "existed back in time and out there in space" (Mignolo, 2011, p. 144). The colonization of the past that decides what is considered to be current and what is relegated to backwardness has devalued local labor and made obsolete many artisanal activities that the inhabitants of informal areas have stored in their memories and their hands (**Figure 39)**.

Figure 39. *Escuela Taller* of Cartagena. International Workshop on Emerging Heritage and Social Appropriation 2019.
Source: PEI, Pontificia Universidad Javeriana of Bogotá.

A critical reading of the past means "recognize, in what has been left behind, what has value and should be maintained and enhanced, from what can be forgotten, and perhaps even erased" (Mellano, 2018a, p. 38). The disassociation of craftsmanship from backwardness would facilitate the achievement of true sustainability. One based on the real condition of diversity that characterizes and has characterized our world, and not on the invented and excluding rule of homogenizing normality. Borrowing Escobar's words:

> (…) one would be remiss to overlook pleas for the renewal of vernacular architectural practices, for mobilizing the elements of the earth along with those of place and culture to deal with the seemingly intractable problems of urban poverty and environmental degradation. (2018, p. 37)

Under these premises, it can be hypothesized that informal contexts are suitable for proposing "bridges" that contribute "to move toward undoing the pair modernity and tradition" (Mignolo, 2011, p. 179) (**Figure 40**). In other words, looking to the past to design the future of the informal built environment, in this case, in Latin America.
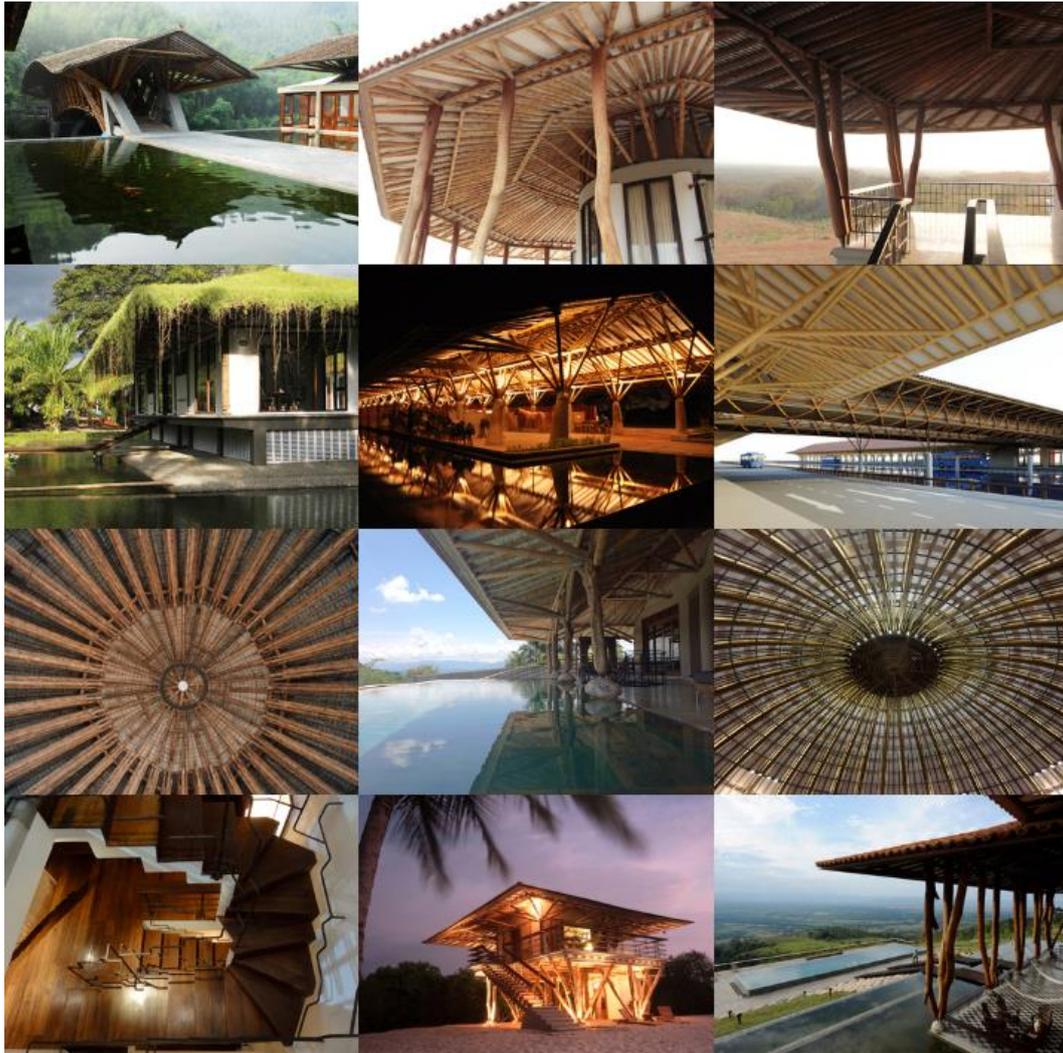
Figure 40. Contemporary architecture made with *guadua* (a Neotropical genus of bamboo). Architect: Simón Vélez.
Source: http://www.simonvelez.net/projects.html. Accessed on May 27th, 2022.

3.4 The tools

As in chapter 2, **Table 16** shows the instruments identified to be part of the toolbox, classified according to their nature.

Table 16. Classification of tools identified in Chapter 3 and adopted in the toolbox.

Dimension	Tool
Theoretical and analytical	Secondary Sources and propaedeutic material: bibliography and sitography
Participative and collaborative	Collective self-construction
	Exhibitions
	Surveys
	Questionnaire
Software and digital	Data visualization
	Databases of best practices
	Online Design Platform
Practical and material	Database of traditional techniques and materials
	Categorization of the information

Chapter 4: Chasing the dream of a *"casa de material"*

We have the right to be equal when difference makes us inferior and the right to be different when equality jeopardizes our identity.

(De Sousa Santos, 2010, p. 87)

Del trabajadero a la ciudad y del rancho en palma a la casa en material.

(Mosquera Torres, 2014, p. 63)

[EN] This chapter jumps in scale by focusing on the Colombian context, analyzing it from several points of view. The first section defines the socio-economic dynamics of the country. The second describes how these dynamics have affected formal and informal urban development. Finally, the third section highlights the importance of popular architecture in Colombian society and points out traditional/vernacular regional architecture's qualities.

[IT] Questo capitolo fa un salto di scala concentrandosi sul contesto colombiano, analizzandolo da diversi punti di vista. La prima sezione definisce le dinamiche socio-economiche del Paese. La seconda descrive come queste dinamiche abbiano influenzato lo sviluppo urbano formale e informale. Infine, la terza sezione evidenzia l'importanza dell'architettura popolare nella società colombiana e sottolinea le qualità dell'architettura regionale tradizionale/vernacolare.

[ES] Este capítulo salta de escala al centrarse en el contexto colombiano, analizándolo desde varios puntos de vista. La primera sección describe las dinámicas socioeconómicas del país. La segunda expone cómo estas dinámicas han afectado al desarrollo urbano formal e informal. Por último, la tercera sección destaca la importancia de la arquitectura popular en la sociedad colombiana y señala las cualidades de la arquitectura tradicional/vernácula regional.

Since the 1980s, Colombia has witnessed a rural exodus to urban areas. The main reasons vary from the search for work or study and the illusion of a better life to political/economic factors related to forced displacement due to the intensified armed conflict in the countryside. This significant migration has had a clear impact on the transformation of cities with the increase of poor peripheries and informal settlements (Sánchez-Steiner, 2008). According to data from the *Departamento Administrativo Nacional de Estadística DANE*, in 2016, 1.2 million Colombian households lived in spontaneous urban settlements (DANE, 2017).

As pointed out in the previous chapter, one of the biggest problems in informal settlements is the disregard for the context's environmental factors and physical and climatic characteristics (**Figure 41**). This is not only because of the precarious economic conditions of the inhabitants —they build as they can— but also because of the cultural conceptions that people who arrived in the cities built around urban living. For instance, some materials are not suitable for certain climate zones because they contribute to increasing energy consumption to cool or heat the internal spaces. However, as soon as the inhabitants have the opportunity and the resources, they choose to build with them. The choice is not motivated by the comfort advantages of these materials but by the desire to improve their social status[101].

This is why throughout the national territory, it is easy to find houses out of context: "a house that could be on the periphery of a cold city like Bogotá (...) corresponds to the current imaginary of 'progress' in Colombia's hot and small rural towns" (Pradilla, 2010, vol. 1, p. 16). Unfortunately, this standardization has led to a cultural detachment. Moreover, it has resulted in the disuse and, in some cases, extinction of vernacular construction methods and materials in different areas of the country. The traditional knowledge transmitted from generation to generation, often orally, has become a thing of the past in many rural and, more evidently, urban communities.

---

[101] As explained in Section 3.3, traditional materials are related to backwardness.

Boyacá

Thermal level:
 cold

Altitude:
2,810 m

Average annual T°:
12.7°C

Population:
296,000

Guajira

Thermal level:
hot-dry

Altitude:
5 m

Average annual T°:
28°C

Population:
203,000

Figure 41. "*Campesinas*" houses (top)[102] vs. informal "*de material*" houses (middle) in two contrasting climatic zones in Colombia.
Sources: Téllez, 1993 (top left and right); Google Maps (middle left and right).

Nowadays, houses built with local and natural materials are most probably in this condition due to the lack of economic resources of the family that inhabits it

---

[102] In Spanish it means peasant. The word *campesino* "positions the house, meaning it puts it in its place, the countryside, and at the same time gives it a certain kind of users and creators, the country people, the *campesinos*" (Téllez, 1993).

and not by choice of its residents. Self-builders, as well as *maestros de obra*[103], prefer to build houses "*de material*." The latter is a colloquial expression that refers to using standardized materials and industrial construction techniques such as masonry, reinforced concrete, and steel (**Figure 42**). Usually, the maestros de obra do not have a professional degree. They have learned —correctly or not— to build "de material" and are the ones the inhabitants rely on when they can afford to pay for external help. However, even if a maestro de obra is hired, it is considered self-construction because, usually, the users continue to contribute with their labor to build the dwelling.

Figure 42. House in wood (left) and "de material" house (right) in El Pozón neighborhood.
Sources: Caterina Dadati (left); the author (right).

In his book, "Dominance without Hegemony," Guha described the improvement measures taken by the British colonial state as "a strategy of persuasion to make imperial dominance acceptable, even desirable, to Indians" (1997, p. 34). Although Guha was writing about a historical, social, and political context distinctly different from Colombia, this definition can refer to the development pursued when building or renovating informal dwellings. "De material," therefore, is leaving aside tradition. Mignolo's critique of the latter is worth remembering: "(…) 'tradition,' in the modernist lexicon, means underdevelopment. (…) Who would want to be traditional once the rhetoric of modernity put a value on time, progress, and development, and those time values became accepted by rulers as well as by the governed? (2011, pp. 176-177).

---

[103] As empirical and self-taught contractors —generally men— are commonly known in Colombia.

Usually, formal neighborhood improvement programs follow this unfortunate logic by not considering the use of local materials. According to Certeau, "every urban 'renovation' nonetheless prefers a *tabula rasa* on which to write in cement the composition created in the laboratory on the basis of discrete 'needs' to which functional responses are to be made" (1984/1980, pp. 200-201, italics in the original). One approach that offers a better outcome for these programs is the collaboration between professionals and the community through participatory design. However, when this is based only on asking the inhabitants how they want their houses, this practice ends up being wasted since they will most likely answer "de material": "the most uneconomical, socially anti-functional, and materially unstable type of construction ever devised" (TURNER: 1977, 33, as cited in Blas, 2015, p. 83). This dissertation considers not only that traditional, local, vernacular, and natural construction elements are, in fact, materials but also that, from an integral sustainability perspective, it is worth reconsidering and re-signifying them (Pradilla, 2010).

4.1 It's Colombia, not Columbia: the importance of context

Due to its rich topography, favorable geographical position, and history, Colombia has a wide climatic and ecosystemic variety (**Figure 43**), along with vast cultural and ethnic diversity and heterogeneity. The latter manifest collective behaviors, physical settings, rituals, languages, symbols, traditions, and vernacular architectures inherent to each community. The natural and social richness of the South American country has resulted in multiple and interesting forms of space appropriation through time, using for this purpose local materials. For instance, in building houses, it was common in some areas to use *palma amarga* for the roofs and *tapia pisada* to build the walls.

Unfortunately, nowadays, this plurality survives with great difficulty due mainly to the processes of globalization, which have devalued the local scale. The "*logic of the dominant scale* [italics in the original]*,"* as De Sousa Santos called it:

> (…) determines the irrelevance of all other possible scales. In Western modernity, the dominant scale appears under two primary forms: the universal and the global. (...) Globalization is the scale that, in the last twenty years, has gained unprecedented importance in the most diverse social fields. [Architecture is one of these fields.] (2010, p. 23)

Nevado del Ruíz	Páramo de Sumapaz	Lago de Tota	Boyacá

Selva Amazónica	Llanos Orientales	La Guajira	Sierra del Chiribiquete

Glacial	≤6°C		≥4000m
Paramo	6°C to 12°C		3000m
Cold	12°C to 18°C	Tunja 12,9°C / Bogotá 14,2°C	2000m
Mild	18°C to 24°C	Manizales 20°C / Medellín 22°C / Bucaramanga 23°C	1000m
Hot	≥24°C	Barranquilla 27,7°C	0m
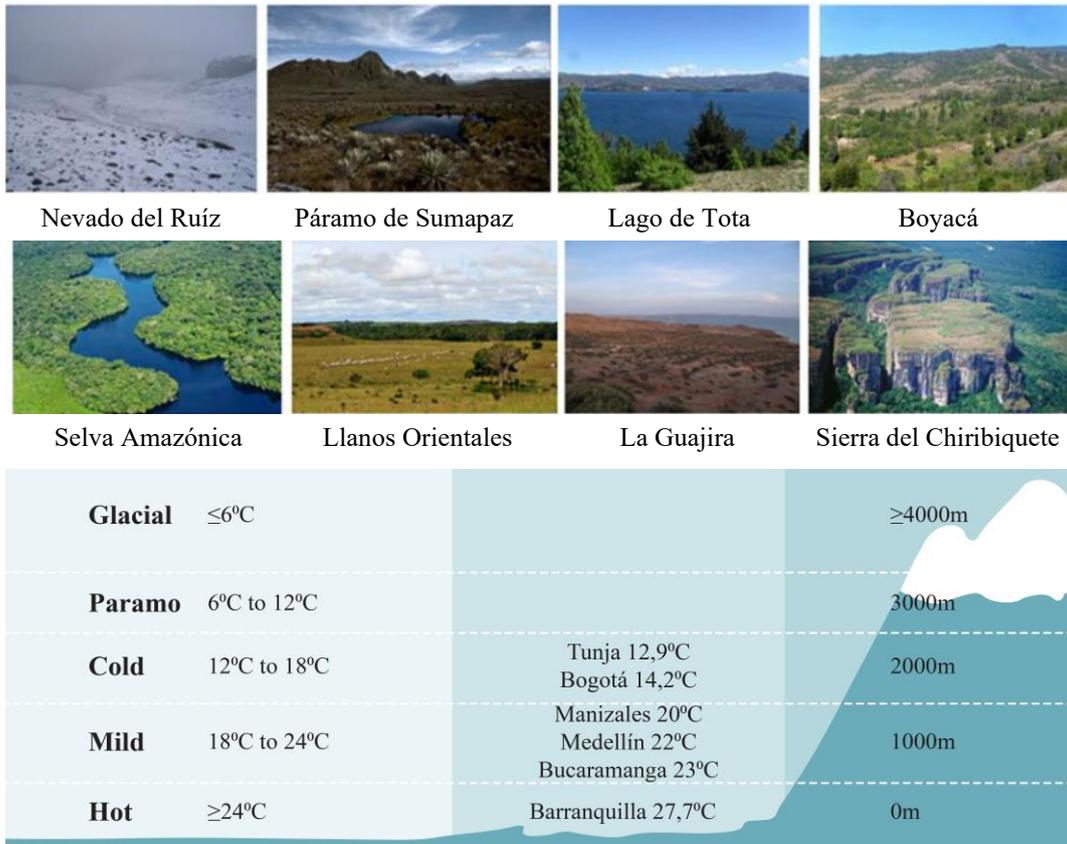
Figure 43. Landscapes (top) and thermal levels (bottom) in Colombia.
Source: Martín Díaz, 2016, p. 23 (top); Instituto de Hidrología Meteorología y Estudios Ambientales, *Atlas Climatológico Nacional. 2005*, pp. 1-184, as cited in Osma-Pinto et al., 2015, p. 124 (bottom).

Colombia's proximity to the Equator makes it a country with no marked seasons. However, there are rainy periods (April-May and October-November) and dry periods (December-January and July-August) that may vary according to the region of the country. In fact, 26% of the Colombian area is seasonally flooded (Bermúdez and Bermúdez, 2018). Colombia is also visited by two natural and transitory events, *El Niño* and *La Niña*. The consequences of these phenomena are not the same in all Latin American countries. For instance, El Niño is characterized by heavy rains in Ecuador, Chile, and Peru. In Colombia, there are heavy rains in some parts of the country, while in others, there is a drastic decrease in rainfall. This last one increases the probability of fires and the proliferation of viruses such as *sika* and *chikungunya*. (Martín Díaz, 2016, pp. 89-94). Although the El Niño event has a periodicity of 2 to 7 years, in recent years, Colombia has experienced an increase in both the frequency and intensity of rainfall, which has generated serious problems both in rural and urban areas (**Figure 44**).
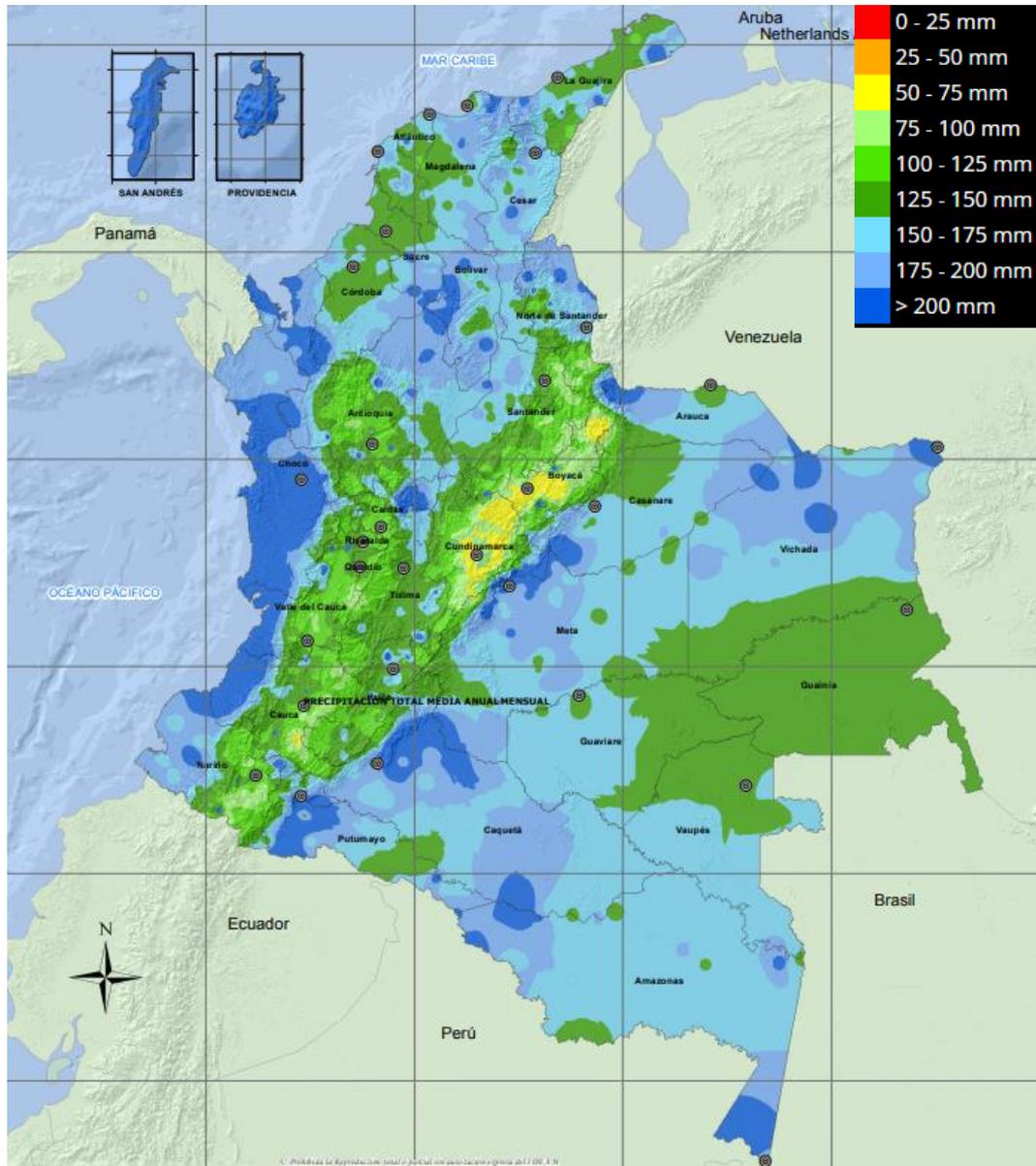
Figure 44. The Most Extreme 24-Hour Rainfall Records in Colombia from 1981 to 2010. Source: http://atlas.ideam.gov.co/visorAtlasClimatologico.html. Accessed on June 17th, 2022.

Another aspect to consider is that a large part of the Colombian territory is "exposed to natural and anthropogenic risks" (Baratta et al., 2016b, p. 362). It is worth remembering that, in Colombia, the Andes Mountains are divided into the *Cordillera Occidental*, the *Cordillera Central,* and the *Cordillera Oriental*. The three *cordilleras* are characterized by more significant seismic activity. Moreover,

t it is in these that the country's largest urban areas are located and, consequently, where most of the population lives (**Figure 45**).
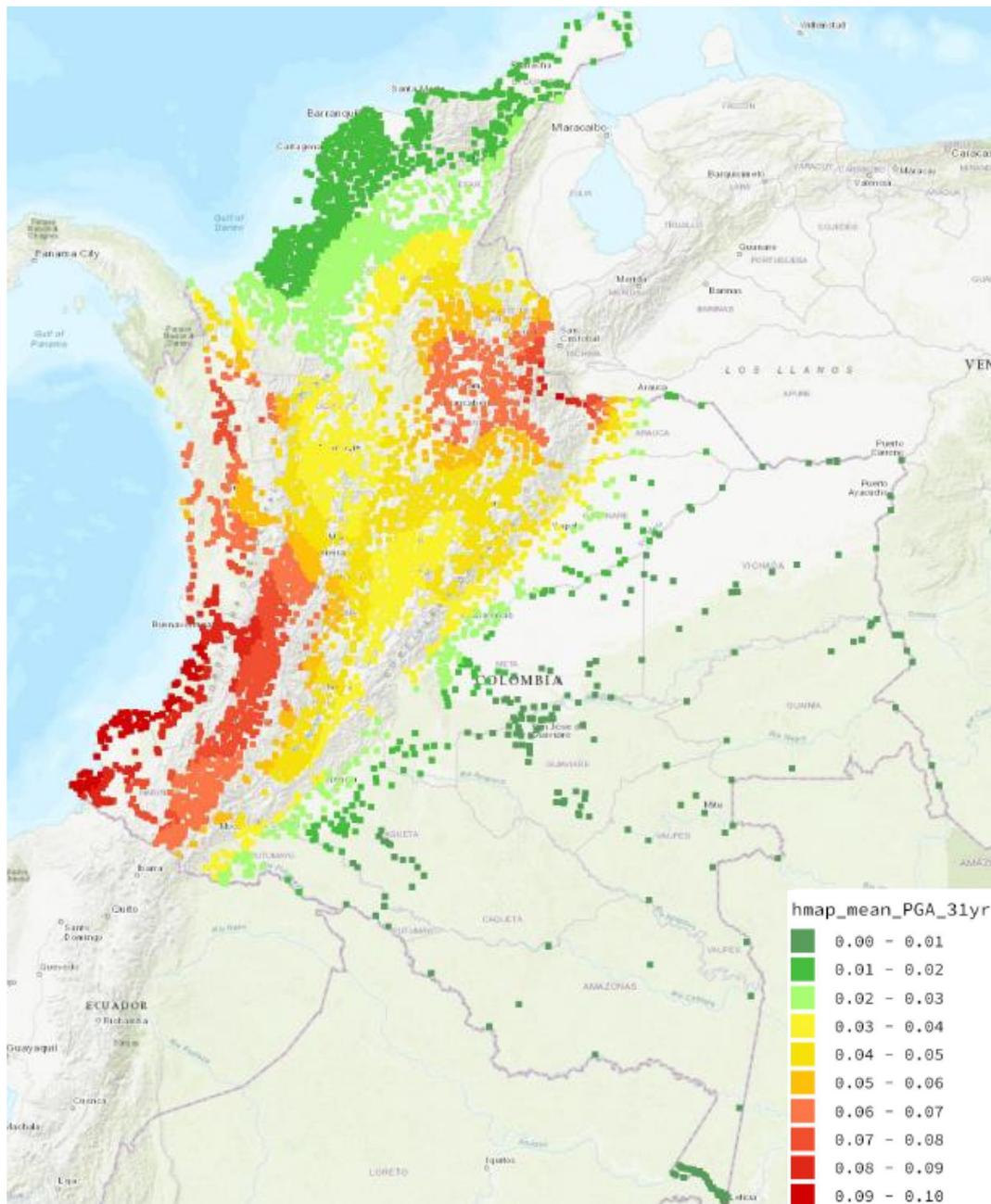
Figure 45. Seismic hazard in populated areas of Colombia. PGA, meaning Peak ground acceleration, is a Macroseismic magnitude scale.
Source: Sistema de Consulta de la Amenaza Sísmica de Colombia. https://amenazasi-smica.sgc.gov.co/map/co18_results_rock_sites/#5/4.956/-73.230. Accessed on May 26th, 2022.

In the XIX century, the most populated cities were located mainly in the Cordillera Oriental. However, this situation changed after the colonization of the Cordillera Central by large landowners and their extensive coffee plantations, as well as by the arrival of peasants looking for work in these areas (Bernard & Zambrano, 1993, as cited in Baratta et al., 2019, p. 20). Naranjo Botero points out that "the origin of the contemporary Colombian city is found in the countryside" (2017, p. 169), which is proven by analyzing the origin of many informal neighborhoods. These began their formation process in marginalized areas between urban and rural peripheries, mainly due to the civil war that has afflicted the Colombian population for almost a century. Such violence has been catalyzed by problems such as corruption, social and economic inequality, discrimination, and exploitation, among others. In addition, since the '80s, the drug culture has managed to take over many public and private structures: political, economic, legal, etc.

As a result, this situation has exacerbated the social and armed conflict between different groups that wish to have control of the producing areas (Gouverneur, 2015), law enforcement, and civilians. Guerrillas, paramilitary groups, auto-defense groups, criminal gangs, and even the government have contributed since the last century to the violence in rural areas and the expulsion of their population (Naranjo Botero, 2017). Today, the danger that still represents for many peasants living in their places of origin continues to add new and impoverished inhabitants to the cities. Moreover, land tenure in rural areas and land expropriation —legal and illegal[104]— remain at the heart of the conflict in Colombia.

Even after the signing of the Peace Agreement between the Colombian State and the Revolutionary Armed Forces of Colombia (FARC) guerrilla in 2016, rural violence and internal migration continue[105]. In recent years, this country, with an agricultural tradition, has increased its urban areas and population. The latter is significantly composed of residents and self-builders of large informal settlements: real cities inside cities. According to official figures, more than 74% of the Colombian population lives in urban settlements, of which 130 have more than 50,000 inhabitants, and 12 have more than 500,000. (Bermúdez and Bermúdez,

---

[104] An example of legal but unfair expropriation is what happens with "agribusiness and mining concessions that attempt to dispossess ancestral communities of their territories and cause waves of new urban settlers" (Naranjo Botero, 2017, p. 162).

[105] Additionally, there has been an influx of foreign population, especially from neighboring countries such as Venezuela, always for reasons related to poverty, violence and lack of opportunities.

2018). Among the latter, four are located in the Caribbean region, in the country's north: Barranquilla, Cartagena, Soledad, and Santa Marta. This particular region is precisely the country's most important area in terms of tourism. On the one hand, it has brought economic benefits to the population. Conversely, the enormous environmental pressure resulting from the tourist boom has unbalanced these cities' ecological and social richness.[106] (Bermúdez and Bermúdez, 2018). For instance, uncontrolled urban sprawl has negatively impacted the environment: the occupation of protected and essential agricultural areas, the contamination and destruction of ecosystems, the misappropriation of fragile areas such as river basins and the margins of water bodies, filling of wetlands, among others. Likewise, the rapid urban growth and poor planning in many cities have contributed to the devastating consequences of natural events such as those described above. (**Figure 46**).

Figure 46. Compilation of news about floods in the Colombian Caribbean region
Dates: 28/09/2010; 21/06/2013; 13/022019, 15/07/2022.
Source: https://www.eluniversal.com.co/. Accessed on May 27th, 2022.

---

[106] Chapter 6 will further elaborate on the subject, describing one of these cities.

In fact, in Colombia, it is common to find news about floods, avalanches, or landslides hitting vulnerable populations that have built their homes in high-risk areas, usually out of necessity. Sadly, the inhabitants of spontaneous settlements are part of the number of victims that annually fill the national press headlines[107].

Internal migration has also profoundly influenced how informal dwellings are built. Although it is no secret that multiple architectural, structural, and urban problems aggravate the housing situation in spontaneous urban settlements, part of the resilience of the communities that build them derives precisely from their peasant past. According to Arango Escobar, the internal migratory crisis in Colombia witnessed since the 1940s has been "a circumstance that forced the newcomers to act on their own, without any guidelines and with their peasant experience as their only heritage" (2004, p. 64). Naranjo Botero agrees with this description when she says that "the contemporary Colombian city" has been "mostly self-built by informal workers and artisans in 'subnormal' neighborhoods, also in the present century" (Naranjo, Botero, 2017, p. 162).

Legalizing illegally established neighborhoods in many Colombian cities has been a slow and problematic process due to the complexity of the situation and the multiple actors that play a role in it. Baratta et al. point out that: "the new territorial organization requires an adequate infrastructure renewal. This radical change is not without conflicts, like the internal one between the landowners and the *campesinos* for land ownership" (2019, p. 20, italics in the original). According to Hernández Correa et al. (2018), in the 1960s, urban informality began to be addressed, and political and institutional debates regarding how to adequately resolve it arose. A decade later, several public policies promoted by the government of the then president Misael Pastrana Borrero were defined. These were part of the framework of the Economic Mission sent to Colombia in 1970 by the World Bank, which demanded reforms in the whole structure of the State to diminish rural poverty and support the development of the country and its cities through "housing plans using the private sector" (Hernández Correa et al., 2018, p. 288). In this case, Bogotá, the country's capital, was the reference for urban planning at the national level, with social justice and civic culture as the main objectives.

---

[107] One example involves the "pirate developers" that illegally appropriate "private or public land for 'planned' squatter occupations" (Gouverneur, 2015, p. 70). Often, these areas are not suitable for construction or are protected environmental areas such as wetlands.

Illegal settlements can acquire legal status regardless of whether they were built in an urban or rural area and their type of origin —an invasion or a "pirate neighborhood." [108] To start the process, the inhabitants must follow a process conducted by competent authorities, which can take more than three years. They also must respect some conditions, being the first to have at least ten years of possession of the property[109]. However, every rule has exceptions. For instance, when a community invades public properties, it will never be able to obtain property titles or legalize its housing. Therefore, the only solution is to relocate the inhabitants to areas suitable for construction. Examples of this type of land are "protected areas, areas for the construction of public services infrastructure, areas of development and general functioning" (EL TIEMPO, April 11th, 2022). According to official figures, as of April 2022, 1,657 settlements have been legalized in Bogotá, including both urban and rural settlements. Today, all of these "have the right to be supplied with services by the city and to be included in infrastructure plans" (EL TIEMPO, April 11th, 2022)[110].

4.2 Commodification modifies architecture

Although many neighborhoods of illegal origin have been legalized and have thus gained the right to be part of the city and enjoy its benefits, is this actually true?

In Colombia, the answers to simple questions such as "Where do you live?" or "What neighborhood do your parents live in?" can make the difference between getting a job or not and even between making friends or being ignored. In this scenario, the inhabitants in the lowest strata are being excluded from places, opportunities, and even their rights, among them the right to the city. It is worth remembering that De Sousa Santo defines this as "the fascism of social

---

[108] According to Grupo de Investigación "Procesos Urbanos en Hábitat, Vivienda e Informalidad" (2007):

> It is convenient to distinguish between two types of informal neighborhoods: pirate neighborhoods and invasion neighborhoods: pirate neighborhoods are those in which the inhabitants have made a commercial transaction with the lots they illegally occupy. The invasion neighborhoods, on the other hand, are those that arise from the de facto occupation of public or private property of third parties. (p. 41)

Moreover, based on data presented in Torres and Castillo de Herrera, 2011, Baratta et al. (2019) stated that "in Colombia, about 31% of the informal settlement lots are the result of occupation, while 61% are the result of a sale and the remaining 8% of inheritance or other causes" (p. 24).

[109] The time is reduced by half in special situations, for instance if social housing has been built.
[110] Source: https://www.elespectador.com/bogota/asi-va-la-legalizacion-de-barrios-in-formales-en-zonas-rurales-de-bogota/. Accessed on May 27th, 2022.

apartheid,"[111] which expresses "a contemporary political regime that operates with an apparently 'democratic' State, but in which large social sectors of its population are excluded and deprived of the right to have rights" (Naranjo Botero, 2017, p. 162).

It is necessary to clarify that legalized neighborhoods do not lose their informal character since the latter is represented in their social and economic form. For instance, many inhabitants of these settlements do not have formal jobs that guarantee them essential social benefits. Others, less fortunate, must "scrape a living" through informal activities —street vending, home-based small businesses, etc.— or illegal ones —drug-related or prostitution. The gap between formality and informality in Colombia is exacerbated by the clear divisions between social classes based on economic wealth, social status, and even ethnicity. These distinctions are reflected in the official demographic categories used in Colombian cities and rural areas. In 1994, Law 142 established the "*Régimen de los Servicios Públicos Domiciliarios en Colombia*" (Domestic Public Services Regime in Colombia). According to the country's National Administrative Department of Statistics (DANE), the so-called socioeconomic stratification is the classification of residential properties at the national level according to this regime and based on the characteristics of the dwellings and their urban or rural environment[112].

Urban residential properties and the resident population are divided into six socioeconomic levels: level 1 is integrated by people with lower income and, therefore, more at risk, while level 6 is composed of those with higher income and better quality of life in general. This means that the cost of public services increases in relation to the strata, thus allowing the lower classes (1, 2, and 3) to receive some economic support. On the other hand, the strata are only two for the rural area. They are based on two criteria: the characteristics of rural dwellings and the productivity of the land expressed in the number of Family Agricultural Units (UAFs)[113]. Although this methodology has helped to organize and control payments for public services, it has proved to be a double-edged sword, as it has contributed to

---

[111] See section 3.1.

[112] Source: https://www.dane.gov.co/index.php/servicios-al-ciudadano/116-espanol/infor-macion-georreferenciada/2421-estratificacion-socioeconomica-preguntas-frecuentes. Accessed on May 27th, 2022.

[113] Source: https://www.sdp.gov.co/gestion-estudios-estrategicos/estratificacion/metodologias. Accessed on May 27th, 2022.

accentuating urban marginalization, social inequality, and territorial segregation (Carrión and Erazo, 2016).

Figure 47 shows the annual electricity consumption per strata and the percentage of the total consumption in GWh/year. Meanwhile, **Figure 48** illustrates the average monthly consumption per user for each stratum in KWh. Both consider only residential energy use. This public service is part of the right to decent housing, contemplated in article 51 of the Colombian Constitution of 1991. However, today there are still homes that do not receive this service.
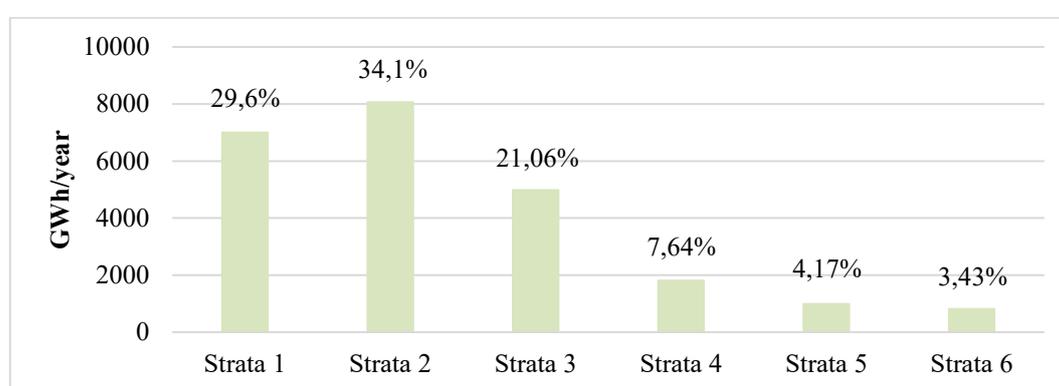
Figure 47. Annual electricity consumption of all residential users by socioeconomic level.
Source: Osma-Pinto et al., 2015, p. 124.
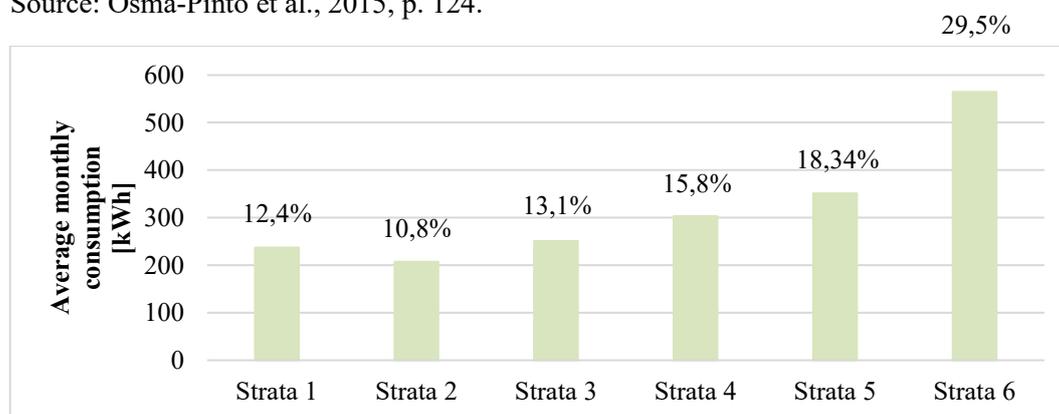
Figure 48. Average monthly energy consumption per capita according to socioeconomic level.
Source: Osma-Pinto et al., 2015, p. 124.

When comparing this information, it can be seen that while the total number of users in level 2 consumes more electricity per year, each user in level 6 consumes more than double the amount of energy per month compared to the consumption

per capita of level 2. In households where the three daily meals are not assured, it is easy to understand why they do not consume as much energy.

The rivalry between these two worlds —formal and informal— and the passive and subordinate role that architecture has played in recent years have generated a progressive loss of quality in favor of quantity, both in the built and the self-built environment. At the same time, this scenario where the economic sphere prevails has contributed to the proliferation of substantial real estate projects that continue to promote the "privatization of life" (Arango Escobar, 2004, p. 71) through disconnected and exclusive spaces. Arango Escobar refers to the "*arquitectura de mercado*" (p. 72), that is, "commodification of architecture," to describe the situation of the formal city in Colombia in which:

> The street has become an almost exclusive space for vehicular traffic. The boundary separating private from public has become a wall, a screen, or a barrier, preventing contact between inside and outside. The entrances have been modified into guarded and impassable gates with no access. Fragments of collective space are shared only among members of the same class and only in protected territories, isolated from the rest of the public. (2004, p. 71)

The informal city degradation has also been due to the economic interests that regulate the cities and to which their "ephemeral, market-oriented" (Mellano, 2018a, p. 33) culture obeys. This type of urbanization does not receive as much public investment as the formal city does since the former does not contribute to generating as many fiscal taxes as the latter. The lack of usable public spaces, green areas, trees, playgrounds for children, parks, squares, and urban furniture, among many other features required for the definition of a human city (Gehl, 2017), are consequences of the limitation to that right. This imbalance is present even when informal settlements are consolidated. Consequently, they never reach the conditions of formal city areas (Gouverneur, 2015).

That is why self-built housing has an even more important value for the inhabitants of these spontaneous settlements, as it represents a process of individual and collective resistance that has "involved millions of individuals, each of whom, in his own way, has had to react through his own daily actions to the process of homologation generated by a simple piece of cement replicated infinite times" (Potenza, 2017, p. 128). This personalization of housing is seen mainly in the internal and external ornaments but not in the actual construction of the house. In fact, the dominant and standardized models have impoverished the architectural

language used in the self-construction processes and "in the design of Colombian residential habitat" (Arango Escobar, 2004, p. 60).

It is interesting to see how the right to the city continues to be a privilege for a large part of the urban population. Meanwhile, those who can have it waste it by letting the market and the economic factor determine how they should inhabit it. With all these challenges, it continues to be difficult to stop relating architecture to profit and start seeing it as a social engine. As Slavoj Žižek points out in the formal city, "(…) seems easier to imagine the end of the World than a much more modest change in the production model, as if liberal capitalism were the real thing that will somehow survive, even under a global ecological catastrophe" (Žižek, 2012 [1994], as cited in Boano and Vergara Perucich, 2016, p. 39). This is also true in Colombia, where the building sector regulations are based primarily on economic considerations. These standards:

> (…) are written, considering that the construction sector is driving Colombia's Gross Domestic Product, accounting for about one-sixth of it. It will continue to be so since the sector's growth between 2014 and 2015 was twice that of the mining and commercial sectors, three times that of the financial sector, and even five times that of the energy sector (DANE source for the year 2015). This fact influences its character, aiming to avoid imposing limits that could halt the sector's growth (such as those related to land consumption) and to legalize and consolidate the spontaneous construction practices that characterize Colombia's building tradition. (Baratta et al., 2016b, p. 364)

The commodification of architecture also has consequences on public policies that, in the last decades, have focused on the notion of housing as a product. This has caused the economic resources to be directed to supply the quantitative deficit in these settlements. In fact, in 2016, Colombia's GDP of the building sector increased by 8.1%, while the country's total GDP grew by just 2% (Adler et al., 2018, p. 295). In Colombia, urban social housing projects are realized through public-private partnerships and are known as *Vivienda de Interés Social* (VIS) and *Vivienda de Interés Prioritario* (VIP)[114]. The VISs are destined for people living in poverty and have a maximum value of 135 monthly minimum wages (for the year 2020, they are less than €27,000). The VIPs are intended for people living in extreme poverty and those who have lost their homes due to natural, political,

---

[114] In rural areas they are known as *Viviendas de Interés Social Rural* (VISR).

social, or violent causes. They have a maximum value of 70 legal monthly minimum wages (for the year 2020, they are less than €14,000).

In 1983, Schön stated something perfectly applicable to social housing in Colombia: "professionally designed solutions to public problems have had unanticipated consequences, sometimes worse than the problems they were designed to solve" (chapter 1). Since these dwelling types do not represent a dynamic real estate commodity, private builders prefer not to invest large amounts of money in their construction. This is why the new social housing projects are built with the logic of maximum profitability and are characterized by reduced spaces and non-existent finishes. In addition, cheap and poor-quality materials are used, as well as repetitive and standardized designs that do not consider the context's characteristics (**Figure 49**). In some cases, the low quality and poor hygiene and sanitary conditions of these new constructions are even comparable to that of many self-built houses (Baratta et al., 2019).

Figure 49. Water body in the informal neighborhood of El Pozón, affected by the works of the *Ciudadela La Paz* VIS project.
Source: https://www.eluniversal.com.co/cartagena/sector-nuevo-horizonte-de-el-pozon-afectado-por-obras-de-ciudadela-la-paz-JF4153092. Accessed on May 30th, 2022.

As explained in chapter 1, the housing deficit in many Latin American countries, including Colombia, is more qualitative than quantitative. Therefore,

these VIP and VIS initiatives are not solving the real problem. According to Baratta et al., these types of subsidized housing were "neither able to mitigate the lack of housing nor to limit the spread of *barrios informales*" (2016a, p. 143, italics in the original). Due to this mercantilist vision of housing and, therefore, architecture, the improvement programs of existing residential buildings have been relegated, obtaining few resources for their execution. Moreover, those implemented, focus on improving outdoor spaces —streets, green areas, and facilities— while the houses must settle for a change in the color of the façade (**Figure 50**).
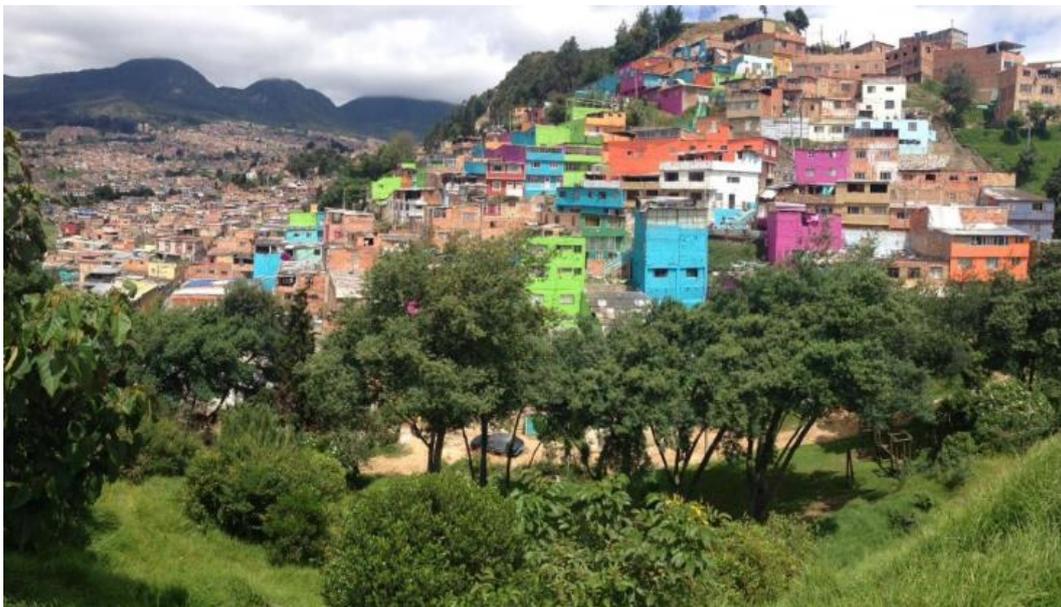
Figure 50. Façades painted by the inhabitants through the "*Habitarte*" program of the Bogotá Mayor's Office.
Source: https://www.habitatbogota.gov.co/pagina/habitarte-2017. Accessed on May 30th, 2022.

While public areas are essential to satisfy the right to the city, indoor and residential spaces are equally necessary[115]. The COVID-19 pandemic, which since 2020 has changed how we live and relate to each other, has also highlighted the great necessity we have for quality indoor spaces, something that the commodification of architecture has deprived citizens of, especially in the most

---

[115] In fact, according to the National Human Activity Pattern Survey (NHAPS), at the beginning of the 21st century, people spend most of their time indoors (86.9%). The time spent in residential environments contributed the most to this high figure (68,7%) (Klepeis, Nelson, Ott, Robinson, Tsang, Switzer, Behar, Jern and Engelmann, 2001, p. 239).

impoverished communities[116]. As powerfully stated by Fry, "gestural egocentric architectural statements and master planning fictions measured against the scale of imperative [climate change and generalized unsettlement] are not merely misplaced, they are crimes against the future" (2015, 48, as cited in Escobar, 2018, p. 40, square brackets in the original).

This problem is partly a reflection of the commodification of knowledge, which makes professionals merely uncritical vehicles that direct their knowledge toward economic progress. Academic institutions have been subjected to the political and economic interests of a few who benefit from this lack of criteria. This has led to the simplification of "professional knowledge as the application of scientific theory and technique to the instrumental problems of practice" (Schön, 1983, chapter 2) and the dissociation of academia from society. As Lanzavecchia affirmed more than 20 years ago: "It would be appropriate, therefore, for both sectors of engineering and design to become aware of their own strength and responsibilities and accordingly distance themselves from the stresses of the market as it is conceived today" (2000, p. 51).

Currently, this is especially relevant if we consider the consequences of climate change on our cities, for which we cannot continue building with the same logic we have used in the last decades. We must prioritize viable strategies and approaches that minimize the vulnerability of populations living in informal settlements through more coherent relationships between them, nature, and culture. Furthermore, instead of carrying out VIS projects with inappropriate materials, we could focus on enhancing the expansion of a pluriverse through *Viviendas de Interés Cultural* (VIC) (Pradilla, 2010, vol. 3).

An excellent example of how this change could take place is the Quinta da Malagueira housing project by Alvaro Siza in Évora, Portugal (**Figure 51**). Although it is a project carried out in another latitude, another context, and the previous century, it is still relevant today. In fact, for many architects, it is "perhaps the last great 'social housing project.' That is, it is the last great architectural contribution to the city in which architecture plays a fundamental role."[117]

---

[116] See https://uniandes.edu.co/es/noticias/gobierno-y-politica/cuando-la-vivienda-no-logra-ser-un-refugio?fbclid=IwAR1AdqajVHQIpSiskTOeciWwgRULiJ46uVxL2RikjKbXiec5yd-or8mM1t0. Accessed on May 30th, 2022.

[117] Aureli, Pier Vittorio (DOGMA), as cited in James Taylor-Foster. "Reflections On Álvaro Siza's Seminal Quinta da Malagueira Housing Scheme" 29 Jan 2015. ArchDaily. Accessed May
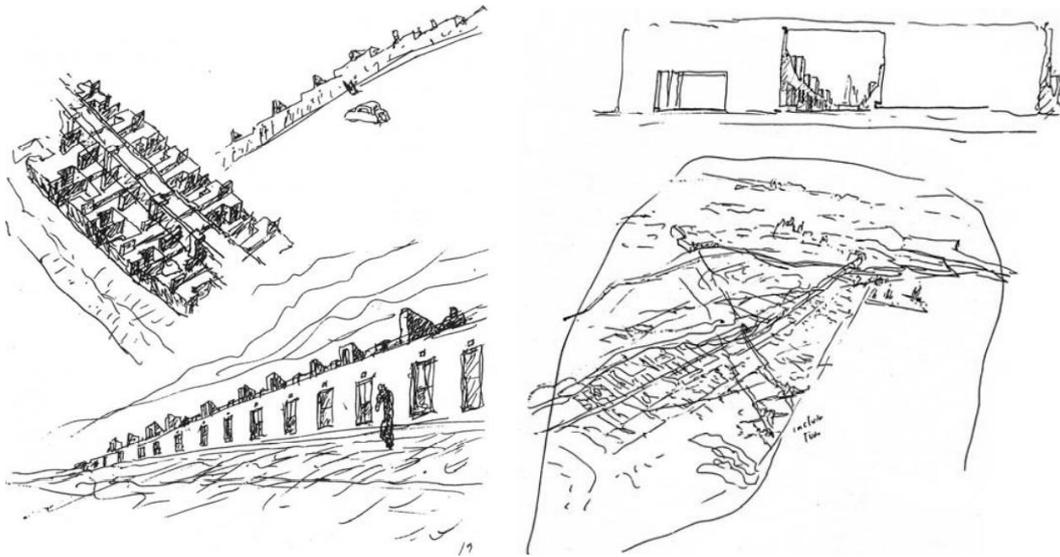
Figure 51. Study of the project. Sketches made by Alvaro Siza.
Source: Álvaro Siza, *Imaginar a evidência*, pp. 102,119, as cited in a Rodrigues, 2018, pp. 4-5.

The project was designed between 1974 and 1975 as part of a public housing plan. Quinta da Malagueira began its construction in 1977. It included the development of 1,200 low-cost housing units on 27 hectares of expropriated agricultural land that precarious informal dwellings had invaded. Through critical regionalism and avoiding the tabula rasa approach, the architect chose not to build high-rise buildings, the predominant typology in those years. Instead, Siza decided to relate better to the slope of the land through a complex of two-story row houses that formed the streets and established different neighborhoods. This way, he achieved the high housing density he was looking for.

The project was based on a participatory and experimental process that took into account the existing informal housing and understood the real needs of the inhabitants. This social sustainability and the characteristics of flexibility and progressiveness of the house design were essential for the project's success as it was a way to continue the city and be part of it rather than just a marginalized place for impoverished people. The architect himself stated that:

> The first problems concerning the choice of a single typology were manifested during a discussion with the inhabitants and then turned into a

political issue. It was spread the idea, which had arisen inside the assembly or had come from outside, that building only courtyard-houses in a part of the city was inhuman and unacceptable. This fear of monotony is a challenge to the search for difference that cannot be solved in an aesthetic question, because if it were, the result would appear artificial, caricatured or invented. The discussion was conflicting, as it should be in a participatory process, and yet it never compromised the dialogue. Twenty years later I continue to have the support of the populations and Cooperatives. (Siza, Álvaro, *Imaginar a evidência*, Edições 70: Lisboa, p. 117, 2000, as cited in Rodrigues, 2018, p. 5)

Something interesting about this project is the importance that Siza gives to the inhabitant's identity and their connection with the past, memories, and history. Siza expressed that:

(…) the patio, which certainly depends also on clear historical influences, is explained by the need to create a transitional microclimate between outdoor and indoor climatic conditions that could not be sufficiently protected by the materials used then. Ignoring these factors, one does not understand the meaning of the project. On the other hand, it should be noted that the first 100 dwellings were intended for people coming from the countryside who still retained rural models in the spirit. Thus, the elaboration of the patio-house is something much more complex and articulate than the dichotomy between vernacular model and Modern Movement, references always present, but among many others. (Siza, Álvaro, *Imaginar a evidência*, Edições 70: Lisboa, p. 117, 2000, as cited in Rodrigues, 2018, p. 7)

Figure 52. Quinta da Malagueira housing project.
Source: Amirjani, 2017, p. 17.

Through a critical reading of the territory in Quinta da Malagueira, Alvaro Siza achieved a compromise between the rooted architectural culture of Évora and some modern influences (**Figure 52**). This mix resulted in a hybrid language and composition that conveyed the genius loci: the sense of place and community.

Unlike Quinta da Malagueira, a famous low-cost progressive social housing project that has had some shortcomings in the long term is Quinta Monroy by the Chilean group ELEMENTAL, already discussed in section 3.1. One factor differentiating the quality of the results achieved in these two cases is how the concept of "perfectibility" determined the design and construction of the projects. Paricio (2000) defined perfectibility as "the reduction of the dwelling to its essential elements for a first occupancy, so that its subsequent improvement or extension is foreseen"[118] (2000, as cited in Morales and Mallén, 2012, p. 43). Although it can be said that both projects are based on a type of "perfectible house," in Quinta da Malagueira this possibility of improvement starts from what is necessary. In contrast, in Quinta Monroy, it starts from the minimum needed. In fact, Boano and Vergara Perucich (2016) reproach ELEMENTAL for its scarcity of theory due to: "the speed, when designing without diagnosing; the scale, which privileges the global over the local, and the design that has gone beyond Mies' view of less is more." They added, "in matters of social housing, less is less, less is little, little is scarce, and this is insulting to the alleged beneficiary" (p. 39).

The increase of diseases related to urban lifestyles, as well as the vulnerability in which millions of people live, victims of a development model designed only for the benefit of a few (Attaianese and Acierno 2017) are just some of the features that unfortunately continue to characterize the Colombian city. Unfortunately, this liquid modernity (Bauman, 2006) has given way to environmental and social problems to which we must respond as professionals but not as total experts[119]. The loss of natural and cultural diversity, the excessive use of non-renewable resources, the current consequences of climate change, and the future scenarios we may face are transdisciplinary challenges in which architectural technology and environmental design can and must play an integral part.

In the current Colombian scenario, the protocols of environmental certification[120], such as Leadership in Energy and Environmental Design (LEED)

---

[118] See PARICIO, I. and SUST, X. *La vivienda contemporánea. Programa y tecnología*. Barcelona: Instituto de la Tecnología de la Construcción de Cataluña (ITeC), 2000.

[119] See sections 2.4 and 2.5.

[120] Mentioned in section 2.1.

developed by the U.S. Green Building Council, are used only in formally constructed buildings. However, as described in this chapter, Colombia is a country of self-construction, informal housing, and popular habitat. This is why authorities such as the Colombian Council for Sustainable Construction (CCCS) cannot focus only on the formal city and must contribute to improving the self-built urban environment (Baratta et al., 2016b). Likewise, in this same perspective of sustainability, pluriversality, and decoloniality, it is necessary to deepen and understand better popular architecture, whether traditional or modern.

4.3 The unpopular popular architecture

In a 1972 "Design Q & A" short film, French curator Madame L'Amic asked Charles Eames: "To whom does Design address itself: to the greatest number? to the specialists or the enlightened amateur? to a privileged social class?" to which he answered: "Design addresses itself to the need."[121] This simple yet significant answer fits perfectly into the popular habitat that characterizes the predominant forms of residential architecture in Colombia and in most of Latin America, where there are many needs, one of them being the need for housing.

Popular architecture is, in fact, part of our cultural heritage. More than 60 years ago, it was how our grandparents built when they still lived in the countryside. Then, for many who moved to the city, it was the only way to have their own house. Today, popular architecture continues to generate a large part of the urban built environment (**Figure 53**).

As Certeau said, "the operational models of popular culture cannot be confined to the past, the countryside, or primitive peoples. They exist in the heart of the strongholds of the contemporary economy" (1984/1980, p. 25).[122] Many houses in Colombia are the result of empirical practice and popular knowledge. However, it is necessary to distinguish the two types of popular architecture present in the Colombian territory: informal or spontaneous urban architecture and vernacular or local regional architecture. These, in turn, are divided into two: the informal can be legal or illegal, while the vernacular can be rural or urban. (**Figure 54**).

---

[121] Source: https://www.hermanmiller.com/stories/why-magazine/design-q-and-a-charles-and-ray-eames/. Accessed May 31st, 2022.
[122] See sections 2.4 and 3.3.

10's 0,24%

Africa	0%
Latin America	0%
Asia	0%
Europe	100%
USA and Canada	0%

30's 2,71%

Africa	0%
Latin America	18,1%
Asia	0%
Europe	63,6%
USA and Canada	18,1%

50's 2,96%

Africa	0%
Latin America	57,1%
Asia	0%
Europe	14,2%
USA and Canada	28,5%

1920 ● **1940** ● **1960** ●

1910 **1930** **1950** **1970**

20's 0,49%

Africa	0%
Latin America	5%
Asia	0%
Europe	50%
USA and Canada	0%

40's 0,74%

Africa	0%
Latin America	0%
Asia	0%
Europe	33,3%
USA and Canada	66,6%

60's 12,34%

Africa	0%
Latin America	35,7%
Asia	0%
Europe	60,7%
USA and Canada	3,5%

70's 22,46%

Africa	0%
Latin America	48,7%
Asia	12,8%
Europe	35,8%
USA and Canada	2,5%

90's 14,81%

Africa	0%
Latin America	76%
Asia	0%
Europe	24%
USA and Canada	0%

10's 2,22%

Africa	0%
Latin America	50%
Asia	0%
Europe	50%
USA and Canada	0%

1980 ● **2000** ● **2020** ●

1990 **2010**

80's 21,48%

Africa	0%
Latin America	71,1%
Asia	11,1%
Europe	15,5%
USA and Canada	2,2%

00's 19,50%

Africa	7,8%
Latin America	60,5%
Asia	2,6%
Europe	26,3%
USA and Canada	2,6%

Figure 53. Percentage of progressive housing projects worldwide by decade.
Source: Martín López, 2014, p. 55.

Figure 54. Types of self-construction: Informal-illegal dwellings (top left); Informal-legal (or controlled) dwellings (top right); traditional rural house (bottom left); traditional urban house (bottom-right).
Sources: https://www.eltiempo.com/archivo/documento/CMS-16405564 (top left); https://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0718-83582013000200005 (top right) Accessed on May 23rd, 2022; Arch. Alberto Saldarriaga Roa, as cited in Corona, 2015, cover (bottom left); Juan Carlos Dávila, as cited in Mosquera Torres, 2014, p. 165 (bottom right).

As discussed in Chapter 3, the contamination between the urban and rural worlds has caused each to acquire certain characteristics of the other. In popular architecture, the same occurs, and both types share similarities (**Figure 55**). For instance, just as many rural dwellings are beginning to be modified using "urban" materials [123], on the outskirts of cities, many dwellings preserve the spatial characteristics of peasant houses. Furthermore, some inhabitants of informal areas have adopted and adapted vernacular ways of life.

---

[123] Some native natural materials and recycled materials are used for non-load-bearing elements -for instance, palma amarga leaves for the roofs, *palma de corozo* for walls, partitions and furnishings- while conventional materials -concrete, metal structures, cement, bricks- are incorporated as load-bearing elements (Anzellini and Garcia-Reyes Röthlisberger, 2015).
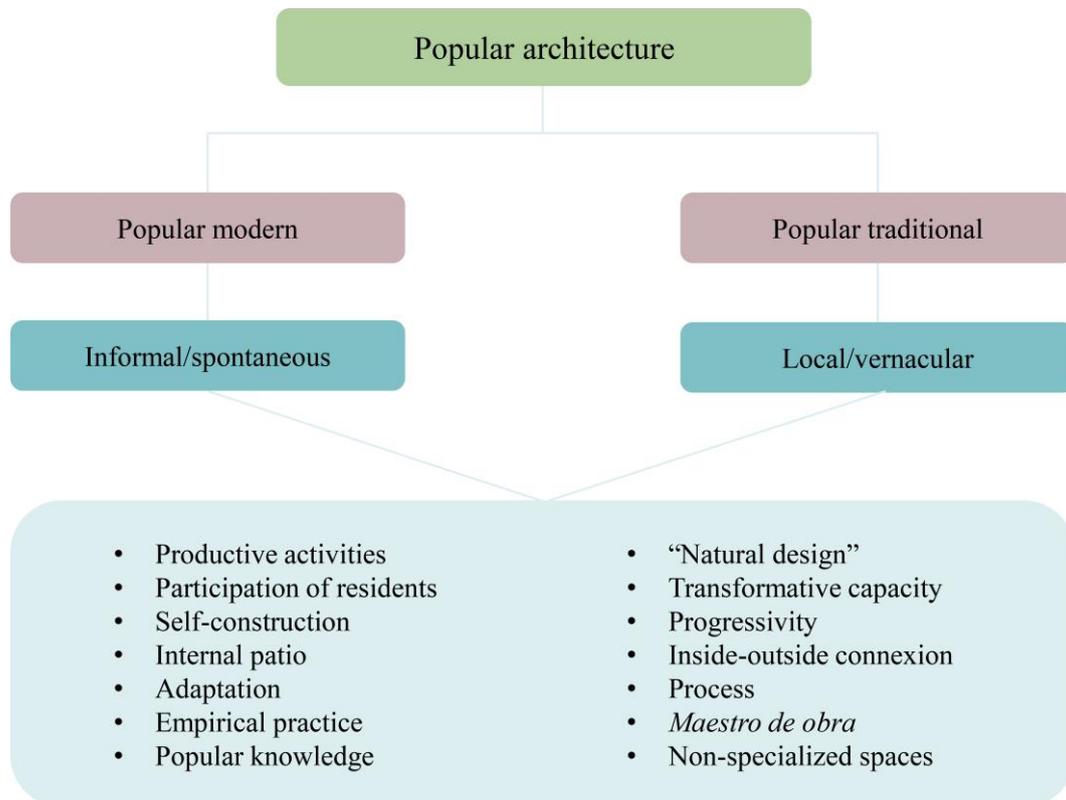
Figure 55. What popular architecture enclose.

According to Heidegger, building is not only using construction techniques and materials. It is also "the way in which man takes physically possession of the world and asserts his presence and belonging to it."[124] In Colombian popular architecture, the sense of belonging to the place, the collective production of space, and a permanent "natural design" are intrinsic factors. These define the form of inhabiting or dwelling of several communities through self-construction practices (Arango Escobar, 2004) that, whether by tradition or by necessity, emerge "organically under a different order, a complex set of rules" (Anzellini and Garcia-Reyes Röthlisberger, 2015, p. 22).

Popular modern architecture[125], that is, the informal one, has changed the rigidity of conventional design and planning models for flexibility based on the relationship with the user, who is directly involved in the construction process (Tessari, 2020). Unlike the formal city, this "transformative capacity" manages to

---

[124] M. Heidegger, Basic Writings, San Francisco, harper Et Rot, 1977, p. 236, as cited in Tessari, 2020, p. 253.
[125] See section 3.2.

assimilate a "multiplicity of lifestyles" (Gouverneur, 2015, p. 122). For instance, it is almost impossible to find large lots in the informal city to build as in rural areas. This difficulty is either because of the cost of land or the problematic characteristics of the ground. As a result, the street becomes a fundamental place for the development of daily life[126]. The importance of public space makes:

> Ingenious design and technological strategies to connect the inside of the house with the outside, with the street, make the facade a spatially rich micro-universe of complex domains shared among neighbors. Double sidewalks, bridges, exterior stairs, balconies, and terraces shape a variegated web of physical, spatial, and visual connectors, turning the street into a privileged setting for collective life, a clear expression of a living social aesthetic. (Arango Escobar, 2004, p. 71)

Inside the house, informal self-builders generally manage to recover some of their "sense of memory" and their history, even when they have to adjust to the constraints of necessity. For instance, as in traditional housing, informal dwellings often manage to introduce autonomous productive activities in the same internal spaces that, depending on the time and day, change their function. Another characteristic of both popular housing types is the internal patio, where families sometimes grow plants to ensure food. In other cases, it is in this place where the bathroom is located and where the inhabitants store the materials collected for future expansion or maintenance of the house. Taking advantage of the progressiveness that connotes the process of self-building, when the resources allow increasing the number of house levels, another internal space appears: the terrace. **Figure 56** shows examples of this type.

In traditional housing, "the most important factor for the success of a self-built architecture is the use of well-known and available technology" (Sauquet Llonch, 2013, p. 5) which contributes to its ability to adapt to local environmental conditions. Meanwhile, a similar situation occurs in informal housing but with entirely different connotations. This is because urban self-builders must adapt to precarious local conditions. Thus, self-built housing in the informal setting and its strong correlation with poverty, poor sanitary conditions, and illegality end up being the antithesis of traditional self-construction, which is intended as a virtuous practice of sustainability (Baratta et al., 2019).

---

[126] On the contrary, in the formal city the street has lost its collective and social value, becoming today mainly the connection between point A and point B.

Figure 56. Houses under consolidation and transitional terrace.
Source: Martinelli, 2020, p. 90.

While informal housing is far from a paradigm of bio-architecture, sustainable architecture, or eco-architecture, it deserves attention "for its resilience, for its spirit of adaptation, for its unique form of resilience" (Potenza, 2017, p. 122). In fact, some "'tactics' articulated in the details of everyday life," as Certeau calls them, as well as certain "(…) clandestine forms taken by the dispersed, tactical, and makeshift creativity of groups or individuals (…)" (1984/1980, p. XIV) can be found in spontaneous settlements. For instance, the reuse of materials is a daily practice in these communities. From using pieces of wood to fence the house to plastic containers for planting plants, the house becomes an "experimental place" that the inhabitants —many of whom are maestros de obra or work in the construction sector— can modify according to their resources. This "anti-discipline" can be called a "circular economy by necessity" (**Figure 57**).

Figure 57. Informal solution to protect street lighting (left) and a fence made of pallets (right).
Source: Caterina Dadati, 2020.

Unfortunately, this reuse of materials and the misuse of others has caused most of the informal dwellings in the national territory not to comply with the standards of quality and construction safety, making them vulnerable to any possible earthquake. Furthermore, due to the spatial characteristics of these buildings —area, height, and the number of levels, among others— self-constructed urban dwellings are not required to comply with the current Colombian seismic-resistant construction regulations (Baratta et al. 2016b). It is important to remember that the first regulation of this type in Colombia was issued in 1984 in response to the tragic earthquake in Popayán on March 31, 1983. This catastrophe left a toll of 267 victims and significant property damage in the city and nearby municipalities (**Figure 58**). It is worrying to think about what would happen in today's informal settlements if an earthquake of this magnitude struck them.

Currently, the debate on informal architecture continues in architecture academies: "does it have formal qualities or aesthetic expressions that can contribute to professional architecture, or is it simply the socio-spatial expression of underdevelopment, in which aesthetic concerns are not important?" (Arango Escobar, 2004, p. 59). Unfortunately, reductionist approaches often prevail. These consider informality a pathological phenomenon that generates mere shelters where to stay, undermining the importance of the popular building-inhabiting process (Tessari, 2020) in Colombian society.

Figure 58. Buildings partially or totally destroyed by the earthquake. Popayán, 1983. Source: https://www2.sgc.gov.co/Archivos/Sismo_31_03_1983%20(11).pdf. Accessed June 1st, 2022.

The problems we are facing today in our cities have shown us that the separation of the discipline of architecture and the community must be replaced by a new paradigm. A system that knows how to take advantage of the richness of the positive experiences that informal architecture has been able to produce (Lanzavecchia, 2000). It is not a question of banalizing our profession, much less of advocating for "architecture without architects." It is about making the "informality part of the solution to the urban challenges of the developing world, while acknowledging that informal settlements require proper assistance" (Gouverneur, 2015, p. 265). This dissertation considers that the conception of the house as a dynamic element/process —shared among traditional and informal architecture— could be a starting point for rethinking the genius loci of the informal

place [127]. For this purpose, it is essential the collaborative work between the professional architect "who became part of society permanently in the middle of the last century" (Arango Escobar, 2004, p. 63) and the "collective architect" that has shaped the cities in our last decades.

This pluriversal and counter-hegemonic approach is "neither insurgent nor populist" (Boano and Vergara Perucich, 2016, p. 45). It is simply the introduction of variables long present and hitherto ignored to generate adaptive, unfinished, open, and flexible design and construction processes. These projects should not be based on "historical variables, but in the face of possible future scenarios" (García Garcìa, 2017, p. 132), on the possibility of the unexpected. Traditional architecture, in this case, must actively fulfill its function, not as "an intransigent attachment to the past" but as "a living memory directly connected to the ability to envision a different future —a 'futurality'" (Fry 2012, as cited in Escobar, 2018, p. 71).

Sustainability and adaptation in vernacular architecture

Vernacular architecture provides us with characteristics that may be suitable for transduction and resignification —if not already present— in the conceptual and physical catalog of informal neighborhoods. According to Mijares:

> It seems (…) imperative to recognize that it is equally possible to create an extraordinary piece of architecture with adobe or bricks, as well as with marble or stainless steel. It is just as feasible to achieve poetic expression in a simple group of houses as in a sophisticated museum. That good architecture is not necessarily attached to expense, nor does it depend on spectacle. It is not anchored in the positions of actual or presumed avant-garde[128]. (2002, p. 84, as cited in Pradilla, 2010, vol. 3, p. 25)

Like Certeau's example shown in section 3.3 on the American Indians' use of some elements of the colonizing Spanish culture, in Colombia, traditional architecture is still connected to the territory and the ancestral wisdom of the local communities that live and build their habitat. Pre-Columbian indigenous, Spanish and African are the three primary cultural sources that, blending together, resulted in the architectural richness now enjoyed but threatened by development and hegemonic progress (**Figure 59**). This traditional architecture is not only beautiful but is, first and foremost, effective and highly functional (Pradilla, 2010) as it

---

[127] See section 2.3.
[128] Mijares Bracho, C. (2002). *Tránsitos y demoras. Esbozos sobre el quehacer arquitectónico*. Instituto superior de arquitectura y diseño, México.

relates the identity of the place with good management of its resources (García García, 2017) (**Figure 60**).

Figure 59. Examples of vernacular architecture: Archetype of a rural house, Nariño, 1979 (top left); Palafitic housing: house in transition to modern in Buenaventura, (top right); *Pueblito Chairama* - *Tayrona* National Park, (bottom left); Coffee Cultural Landscape - *Cocora* Valley, (bottom right).
Source: Saldarriaga Roa, 2016, p. 27 (top left); Mosquera Torres, 2014, p. 100 (top right); Rojas Parada, 2019, p. 24 (bottom left), pp-20-21 (bottom right).
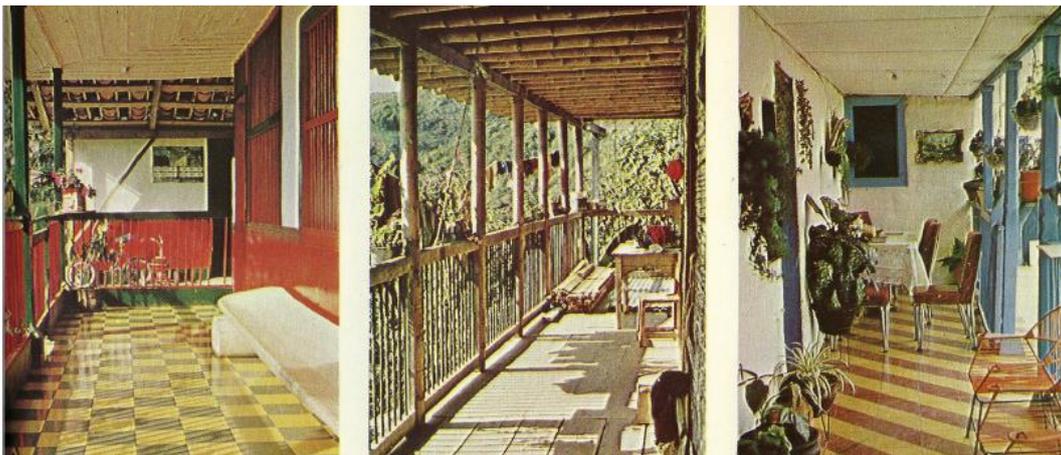
Figure 60. Corridors in campesinas houses: passage for connection and, at the same time, protection and sun control (bottom).
Source: Fonseca Martínez and Saldarriaga Roa, 1984, p. 189.

Table 17, for instance, shows the average monthly solar radiation in different areas of the country, which has determined the different architecture's shapes and materials. According to Osma-Pinto et al. (2015), "Colombia shows a monthly average global solar radiation uniformly throughout the year approximately from 4,0 kWh/m^2 to 4,5 kWh/m^2" (p. 126). **Figure 61,** instead, shows the different typologies used in a traditional *casa cafetera*, the name given to rural houses built in areas of Colombia where coffee is grown. These typologies are modified by taking into account factors such as solar radiation.

Table 17. Average monthly global solar radiation in different Colombian regions. Source: Unidad de Planeación Minero Energética and IDEAM, Mapas de radiación solar global sobre una superficie plana, in Atlas de Radiación Solar de Colombia, 2005, pp. 25-40, as cited in Osma-Pinto et al., 2015, p. 126.

Departments or Regions	Insolation [kWh/m^2]
Arauca, Casanare, Meta, Boyacá, Vichada, and the Caribbean Coast, including San Andrés and Providencia Islands	5,0 – 6,0
Orinoquía, Santander and Norte de Santander, Cundinamarca, Tolima, Huila, Cauca and Valle del Cauca	4,5 – 5,5
Chocó, Nariño and Putumayo	3,0 – 4,0

Linear without corridor

Linear with central space

Linear with corner space

Linear / corridor

Linear / corridor and central space

Linear with two corridors

Linear with L-shaped corridor

Linear with corridor on three sides

Linear with corridor on all sides

L without corridor

L with linear corridor

L with L-shaped corridor

Two buildings in linear distribution

C without corridor

C with linear corridor

C with C-shaped corridor

Two buildings in parallel distribution

T without corridor

T with linear corridor

T with invert L-shaped corridor

Two buildings in perpendicular distribution

Figure 61. Typological system of rural housing in coffee growing areas (top).
Source: Fonseca Martínez and Saldarriaga Roa, 1984, p. 18.

Traditional architecture has been incorporated into the academy in recent decades due to its bioclimatic characteristics (**Figure 62**). However, this type of project remains a minority, with occasional and specific interventions carried out by specialized professionals. As stated by Arango Escobar, rural, village, or small-town architectures have "technological, spatial, formal, landscape, bioclimatic qualities that not long ago the modern hegemonic imperative in architectural thought prevented seeing or simply dismissed their importance" (Arango Escobar, 2004, p. 62).

Figure 62. Examples of traditional earthquake-resistant construction techniques: *Quincha[129]* wall, used in Chile and Peru (left); *Bahareque* wall, used in Colombia and Venezuela (right).
Source: Andrés Aninat, in https://www.fundacionaltiplano.cl/post/es-la-quincha-una-alternativa-posible-para-atender-la-demandamundial-por-vivienda (left); Pedro Bravo, Sofia Hernández Francisco Martínez, in https://www.archdaily.com/944293/a-construction-strategy-for-socially-organized-housing-in-latin-america/5cbe1637284dd16b11000145-a-construction-strategy-for-socially-organized-housing-in-latin-america-photo?next_project=no (right).

Unfortunately, one of the difficulties in Colombia is the limited availability of "academic records or scientific compilations that have registered this knowledge in texts or drawings, ensuring their preservation" (Anzellini and Garcia-Reyes Röthlisberger, 2015, p. 24). This information is indispensable to developing Social Innovation projects and Tecnologías Sociales based on the re-signification of architectural traditions. Escobar stated, "the pathologies of modernity have already proven to be more lethal than the pathologies of traditions; ecologically at least" (2018, p. 104). However, the tradition-modernity fusion that has so far generated a

---

[129] For more information about *quincha*, please refer to the M.Sc Thesis "*El derecho de los invisible a la sustentabilidad. Un caso studio per Santiago del Cile*" completed by student Greta Morano in 2021 and of which the author was co-supervisor.

sort of "unevolutionary process" (Gonzalez, 2006) of informal architecture in Colombia offers all the potential to be the starting point for its improvement.

In this scenario, the so-called "emerging heritage" can manifest in order to propose sustainable housing solutions. This term refers to the cultural and environmental heritage of communities, which has been relegated by the predominant model and forgotten by the upper socioeconomic classes but remains a reality for many. It is the heritage hidden in subaltern contexts: informal, poor, abandoned, rural, etc. In relation to this, it is interesting the work done by the Escuela Taller of Cartagena, in which people are trained through a constant process of action-reflection (Schön, 1983) with a Learning by doing approach.

According to Navarro Morales, "the Escuela Taller of Cartagena is tasked with keeping the traditional artisan craftsmanship of various regions of the country alive" (2018, p. 329). On several occasions, the Escuela Taller has collaborated with Colombian universities, including the Pontificia Universidad Javeriana of Bogotá and the *Universidad de Los Andes*. Through activities between students, artisans, and professors, small-scale social appropriation projects have been carried out to familiarize the inhabitants with Cartagena's emerging heritage (**Figure 63**). As Hernández Correa et al. explained, in 2016:

> PEI [*Proyecto Educativo Institucional* (PEI) of the PUJ] proposed organizing a wood architecture workshop to the Heritage Directorate and the Vocational School, since there are still some wooden houses standing in Cartagena, Bocachica and Barú. These houses are part of the heritage that spans the Caribbean and examples are found in Jamaica, Cuba, Curacao, and other islands. (2018, p. 302)

Figure 64, for instance, shows four wooden houses located in an informal neighborhood in *Barú*, Colombia. Although they are remarkable examples of residential architecture of the Colombian Republican Period, the precarious economic conditions of their owners have led to their reduced maintenance and, thus, to their current condition. An approach that considers this emerging heritage and its re-signification could improve these dwellings and generate social innovation projects that, like the workshop school, reverse the involutionary process of popular architecture in informal neighborhoods.
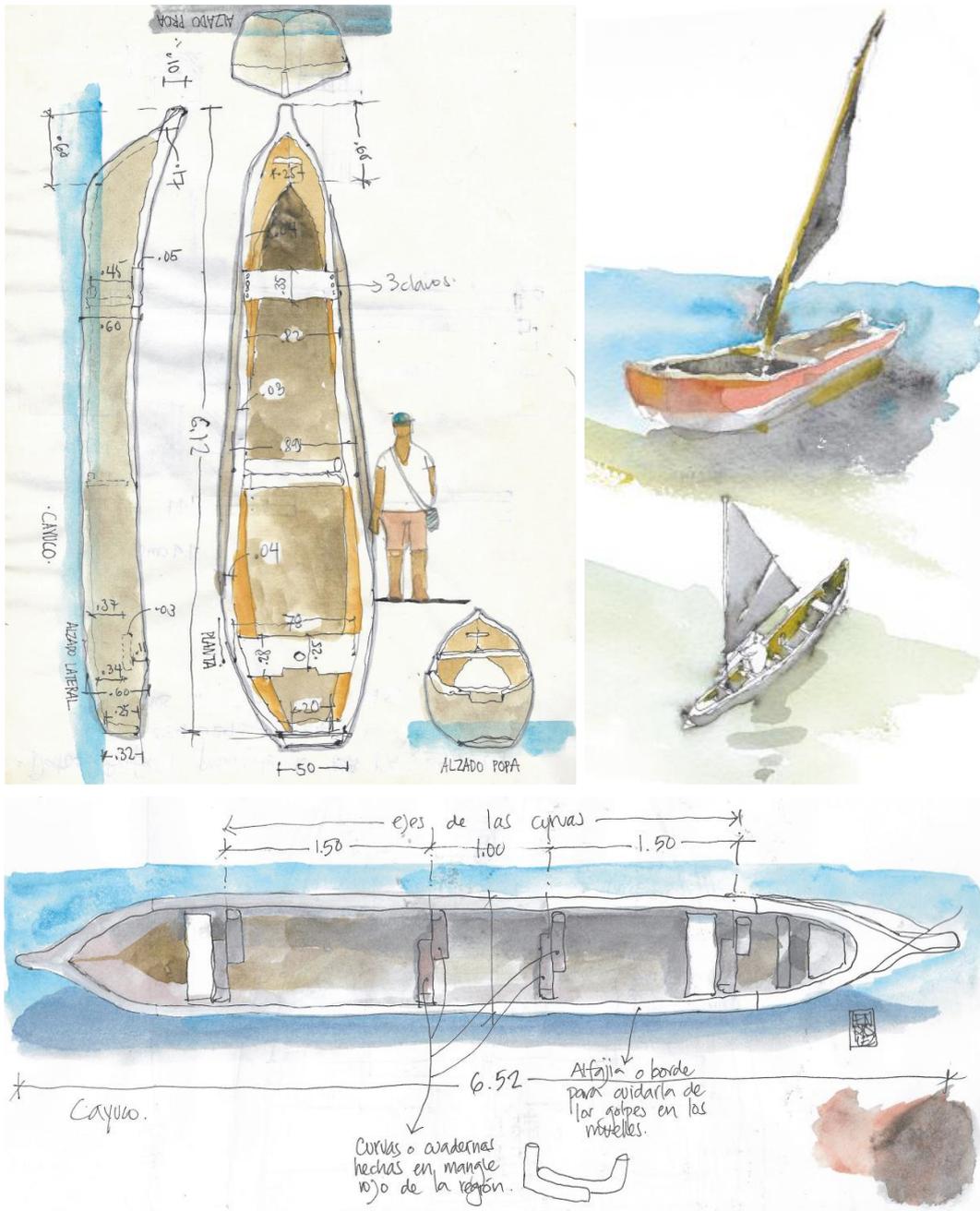
El cayuco

La chalupa

La canoa

Figure 63. Emerging heritage: Carpentry Workshop of *Ribera* in Tierra Bomba Island.[130] Source: Alejandro Henríquez Luque, http://patrimonio.mincultura.gov.co/Documents/carpinter%C3%ADaderibera.pdf. Accessed June 1st, 2022.

---

[130] It was organized by the Ministry of Culture, the Institute of Anthropology and History (ICANH), the Directorate of Heritage, the Escuela Taller, and the Office of the Mayor of Cartagena. According to Hernández Correa et al., "this workshop trained more than 20 people in Bocachica with the objective to build models and sell them at the Fort and in the future to build wooden sailboats to navigate and reach Cartagena" (2018, p. 302).

Figure 64. Emerging heritage: Residential architecture of the Republican period in Barú, Colombia. Present conditions.
Source: PEI fieldwork, PUJ.

4.4 The tools

As in chapters 2 and 3, **Table 18** shows the instruments identified to be part of the toolbox, classified according to their nature.

Table 18. Classification of tools identified in Chapter 4 and adopted in the toolbox.

Dimension	Tool
Theoretical and analytical	Secondary Sources and propaedeutic material: bibliography and sitography
Participative and collaborative	Workshops
	Fieldwork
	Inventario aleatorio
Software and digital	Information Sharing
	Data visualization
	Drawings
Practical and material	Eco-compatibility standards a regulation
	Database of traditional techniques and materials
	Drawings
	Circular economy map: availability of local and recyclable materials

Third part: The inform(al)ed design toolbox

> From the point of view of theory, theoretical bricolage never qualifies as a theory. From the point of view of practice, *a posteriori* theorizing is mere parasitism.
>
> (De Sousa Santos, 2010, p. 18, italics in the original)

De Sousa Santos once stated: "the struggle for global cognitive justice will not be successful if it is only based on the idea of a more egalitarian distribution of scientific knowledge" (2010, p. 52). As described in chapter 2, the author also harshly criticized the idea of epistemicide. In other words, the murder of alternative and subordinate knowledge that modernity and its scientific knowledge have systematically carried out over time.

In line with these affirmations, the third and last part of this dissertation wants to evidence the importance of a design paradigm shift toward pluriversality and decoloniality through the concepts of collective intelligence, critical regionalism, Social Innovation, and Tecnologías Sociales analyzed in Part I. Chapter 5 will address a specific *modus operandi* conceived for sustainable interventions in the informal city. This methodological framework is enriched by the experiences and outcomes of several best practices and disciplinary approaches focused on communities worldwide (**Figure 65**). The narrative/descriptive system chosen to learn from what has already been done and has produced good results comprises analysis cards/windows, one for each relevant practice. Through a reading framework based on the concepts outlined in Chapter 2, the analysis of international cases —not only in Latin America— helped construct an operational toolbox

designed to support and facilitate the work of a new architectural professional figure specialized in sustainable participatory design in informal neighborhoods.
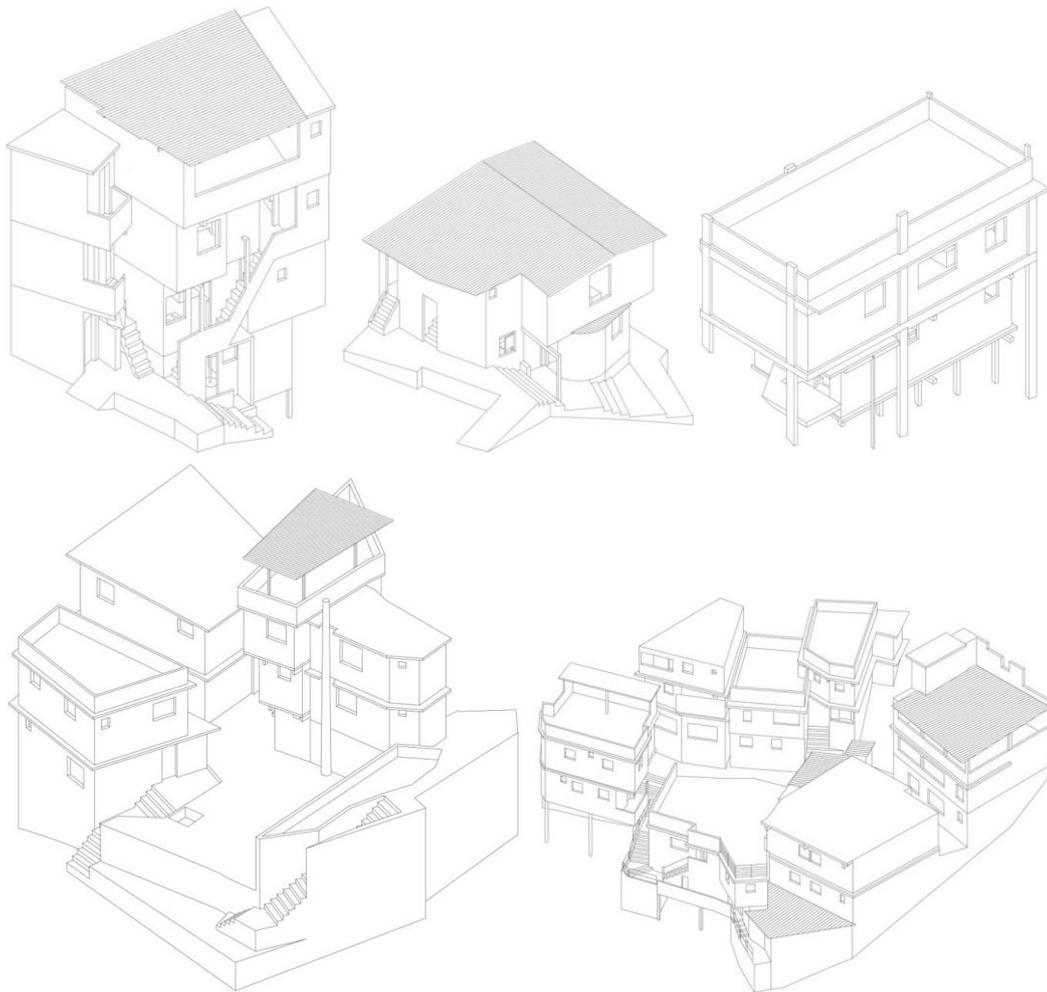
Figure 65. Progressive housing in the *Santa Marta* favela of Rio de Janeiro, Brazil. Illustrations included in the book resulted from the international research project of Alessandro Tessari. It was awarded the best Ph.D. thesis on Architecture and Urbanism for the 2016-2018 three-year period from the Brazilian "*Associação Nacional de Pesquisa e Pós-graduação em Arquitetura e Urbanismo*" (ANPARQ PRIZE 2018). Source: Tessari, 2020, pp. 122, 134, 144, 152, 174.

The graphic guide presented in section 5.3 will present the instruments that constitute the toolbox and that have already been introduced throughout the dissertation. Although the toolkit is one of the main results of the research work, it is not a finite and finished product. On the contrary, it is thought to be a necessary first step for defining innovative roles and modes of intervention for the requalification of informal dwellings. Following this, Chapter 6 will present the

toolkit's operational and applicative aspects based on recovering informal knowledge and building culture. For this purpose, the research considers two experiences centered on the case study: the work with the community of El Pozón and the analysis of the PEI Máquina Verde-El Arca prototype designed for this neighborhood. A particular emphasis will be placed on analyzing and describing the technological solutions brought to light by tapping into the "informed" design toolbox, which was partially implemented in the fieldwork.

The toolbox contributes to the evolution of current methods of approach to the technological design of informal architecture. As Lanzavecchia said: "it does not mean inventing from scratch a methodological approach yet to be tested. It is rather extending to the whole subject matter what is already available (albeit in far more circumscribed fields) and has already produced good results" (2000, p. 58, brackets in the original). The outcome of this thesis is expected to help professionals and future architects work more effectively toward the adaptive and dynamic improvement of informal housing.

Chapter 5: Design process innovation against the epistemicide

> (...) [our own thinking] is never neutral; what we take to be common sense is often informed by our own cultural background (...).

> (Riach, 2017, p. 13)

[EN] Chapter 5 proposes a methodological framework thought to be used in informal settlements and considered integrative to the current design methods. In formulating this proposal, some best practices of participatory architecture are analyzed: their contexts and geographic areas, as well as their scales and results. This analysis is followed by the definition of a new figure specialized in informal neighborhood projects, as well as the presentation of the collective-based method that would be an integral part of this practice.

[IT] Il capitolo 5 propone un quadro metodologico pensato per essere utilizzato negli insediamenti informali e considerato integrativo degli attuali metodi di progettazione. Per presentare questa proposta, vengono analizzate alcune buone pratiche di architettura partecipativa: i loro contesti e aree geografiche, così come le loro scale e i risultati. A questa analisi segue la definizione di una nuova figura specializzata in progetti riguardanti i quartieri informali, nonché la presentazione del metodo basato sul lavoro collettivo che sarebbe parte integrante di questa pratica.

[ES] En el capítulo 5 se propone un marco metodológico pensado para ser utilizado en los asentamientos informales y considerado integrador de los métodos de diseño actuales. Para formular esta propuesta, se analizan algunas de las mejores prácticas de arquitectura participativa: sus contextos y áreas geográficas, así como sus escalas y resultados. A este análisis le sigue la definición de una nueva figura especializada en proyectos para barrios informales, así como la presentación del método basado en la colectividad que sería parte integrante de esta práctica.

The integrative approach of the dissertation contributes to the evolution of methodologies used in academic and professional work aimed at improving Latin American informal neighborhoods. It is based on the recognition and valorization of popular knowledge in spontaneous architecture and the cultural background of self-help communities.

Pevsner (1943) stated that "the term architecture applies only to buildings designed with a view to aesthetic appeal"[131] (p. 10, as cited in Crysler, Cairns, and Heynen, 2012, p. 343). But to what kind of aesthetics is he referring? Are informal dwellings, therefore, not architecture? This research study supports Arango Escobar's point of view, as he examines aesthetics in a broad sense by distinguishing formal aesthetics from social aesthetics. He defined the latter as "the sensitive factor that goes along with the complex process of construction of popular housing" (2004, p. 60). Based on this statement, and as evidenced in the previous chapters, this dissertation considers the self-construction of spontaneous settlements as informal architecture in different levels of consolidation. Thus, as an architectural practice from which we can learn and to which we can contribute.

Today, physical violence continues to be one of the significant problems in informal settlements. This type of violence is directly related to what Spivak defines as epistemic violence since "the knowledge produced by the West about others both constitutes a form of violence (...) and has been used to justify real violence against others" (Riach, 2017, p. 83). It should be remembered that in the theoretical framework of this research, this "other" is linked to the "Center-Periphery model and is used to imply the marginalization, or exclusion, of the Other" (p. 86). In architecture, this epistemic violence or epistemicide (De Sousa Santos, 2010, p. 8) has silenced the past and dominated the current alternative constructive knowledge of the communities that build their own dwellings. Consequently, often imposed top-down projects are decontextualized, do not share the identity of the users, and do not meet their needs. This is why Tessari's question is valid: What kind of future do authorship and participation have in architectural and urban design? (Tessari, 2020, p. 13).

Moreover, in the built environment disciplines, such as architectural technology, there is a risk of arriving at answers through only pragmatic or deterministic approaches, leaving aside immaterial aspects and identity features. This can result in the simplification of a socially constructed practice as complex and multifaceted as architecture. Discussing the need to experiment with new

---

[131] Pevsner, Nicholas (1943) *An Outline of European Architecture.* London: Pelican Books.

design approaches at the beginning of the 21ˢᵗ century, Lanzavecchia pointed out that:

> In order to achieve a significant transfer of knowledge from one discipline to another, it would perhaps be necessary for each to invade the other's fields, not with arrogance but to help each other with the freshness of a new look, sometimes naïve but perhaps capable of arousing new ideas or identifying, in what seems to be a dead end, the existence of hidden paths. (2000, p. 65)

In recent years interdisciplinary approaches have become more relevant in architecture due to the evident need for social as well as environmental sustainability in contemporary human settlements. In fact, new design methods and tools with a sustainable perspective have emerged between disciplines that were usually considered distant. It is enough to take a look at Gunter Pauli's book "Blue Economy" (2009) to find a large number of projects based on industrial symbiosis with surprising results (**Figure 66**).

Figure 66. Fast-growing mushrooms from coffee beans waste.
Source: http://www.zeri.org/mushrooms.html, https://www.theblueeconomy.org/en/cas-106-clustering-coffee-food-and-equality/. Accessed on June 3ʳᵈ, 2022.

Many examples of participatory architecture also seek to reinforce the social fabric of cities and rural areas. As Perriccioli reminds us:

> An intellectual attitude is re-emerging in architecture, characterized by pragmatic realism seeking confirmation to its work in the real world and which gives a central role to the theme of social responsibility, environmental quality and awareness of the scarcity of resources, of economic limits and of typological and technological experimentation. (...) Architecture is recovering its social dimension in a renewed focus on the real needs of people, the habits of a community, the technical conditions and the material culture of a specific context, and identifies its main fields of application in peripheral and peri-

urban areas of large metropolises, in marginal and informal settlements (favelas, shanty towns, slums) and rural areas in many developing countries. (2017, p. 27)

For instance, in participatory architecture, the inhabitants' voices are considered. They have a significant role in the definition of strategies as well as in the project's development. However, the varied quality of outcomes highlights the importance of understanding the reason for the inhabitants' thoughts. Biases, preferences, tendencies, prejudices, influences, perceptions, impressions, and backgrounds, among others, are aspects that cannot be left aside. As Martí explains:

> In general, the context invites us to consume —and to produce for others— but not to decide and produce what allows us to develop our human potential. Therefore, giving a voice is not enough for individuals and groups to express their opinions and make decisions about the things that affect them: it is necessary to create the conditions for more participatory and egalitarian processes of reflection, self-education, programming, and social action (...). (2002, p. 102)

This process of reflection of the community —and the professional (Schön, 1983)— allows one to reorient or rethink the actions according to the reflections made. Pradilla (2010), for instance, points out some professional experiences of working with rural communities in Colombia. According to him, several participatory processes have generated:

> Urban and architectural plans that are rigid and alien to the place. The houses have other materials and spatiality, and it seems that they want to shout that nothing of what they had before was valid, that their architecture, customs, and culture, in general, are no longer a worthy option. The new houses, however, correspond to the people's imaginary of progress. (...) [Even if] the inhabitants themselves said this is how they wanted [their houses]. (...) we must learn to carefully design and guide the participatory processes. (vol. 1, p. 9)

As said before, this dissertation aims to contribute to the academic debate on the technological design of informal architecture through a hybrid approach based on a mutually beneficial symbiosis between the knowledge of the inhabitants and the skills of architecture students and professionals. The toolbox resulting from the dissertation does not undervalue or trivialize the profession or simplify the dynamics of informal neighborhoods. On the contrary, it facilitates both the resignification of popular references to the contemporary world and the proposal of

new discipline models. As described by Potenza about some of the winning projects in the last five versions of the International Architecture Exhibition at the Venice Biennale, they are not about "changing the way of thinking that produces those informal agglomerations but to enrich the understanding of the processes that shape them" (2017, p. 122).

In order to redefine our discipline in self-built settlements, it is necessary to move from an architecture of or for the community to an architecture with the community. The latter is understood as "an alternative path explored by architects especially committed to participatory methods focused on mutual learning between groups of inhabitants and design teams" [132] (García Ramírez, 2012, as cited in Garcìa-Reyes Röthlisberger and Anzellini Fajardo, 2018, p. 36). One example of the participation approach with the community applied to the education field is the "*Encuentro de saberes*" project at the University of *Brasilia* (**Figure 67**).

Figure 67. "Traditional Knowledge Arts and Crafts" course, offered by the University of Brasília (UnB).
Source: https://encontrodesaberes.tumblr.com/. Accessed on June 3rd, 2022.

Starting in 2010, Carvalho described it as a theoretical-political project that:

> (...) allows, for the first time in the history of Brazilian universities, that masters of traditional knowledges (shamans, artisans, indigenous architects, healers and specialists in medicinal plants, masters of popular cultures, such as music, dance, theatre, among others) enter now as professors of regular courses in the state universities. Cultural Studies, taken to be the critical study of culture, can provide the theoretical, methodological and political foundation of this innovative movement, so that Latin American universities, which were created as white, elitist, racist, and mentally colonized, and

---

[132] García Ramírez, W. (2012). "Arquitectura participativa: las formas de lo esencial". *Revista de Arquitectura*, No. 14, pp. 4-11.

entirely dedicated to reproduce the modern type of Eurocentric knowledge, may finally begin to transform themselves into the kind of institution they were supposed to be since their foundation centuries ago: multi-ethnic, multi-racial and multi-epistemic centers of studies, open to the incorporation of all the valid, original and contemporary knowledges created and reproduced in our continent – be they Western, Indigenous, African, Afro-American , Asian or of any other ethnic, racial, or traditional group. (2010, p. 231)

The methodological framework in this chapter aims to go beyond the simple participatory process that collects responses to questions asked by researchers through an integrative method that recognizes the cultural and social backgrounds that generated these reactions. Why do people build the way they do? Why do they choose materials that are not appropriate for the area where they live? Why don't they build with natural materials anymore? It is thought that the research design and methodological strategies proposed here can contribute to overcoming *ethnophagy*[133] in architecture.

Chapter 5 begins by illustrating some best practices of participatory architecture, already implemented in other Latin American contexts and beyond. These examples were based on a critical reading of the territory, the settlement, the typologies, and the technologies mainly used to propose an "effective implementation of inclusion" (Attaianese and Acierno, 2017, p. 78). They are divided into five categories, depending on the actors and the origin of the initiative: 1) toolboxes, 2) academic projects, 3) research, 4) collectives, and 5) networks. Moreover, analyzing these best practices has allowed the overall integrative approach to be enriched. This is followed by the characterization of a term chosen to name a possible new professional figure with specific qualitative and technical skills aimed at working in informal contexts. Finally, the methodological framework is presented based on the empiric approach built within the dissertation. It is composed of heterogeneous tools in order to guide the project — and, above all, the designer— toward a different development model for the sustainability of informal housing.

---

[133] According to Díaz-Polanco:

"Ethnophagy expresses the global process through which the culture of domination seeks to devour the multiple popular cultures. It does not seek their destruction through their absolute negation or the violent attack on identities, but their gradual dissolution through attraction, seduction and transformation." (2007, p. 19)

5.1 Epistemological scenarios: academic and professional experiences

A United Nations New Urban Agenda goal is to "enhanced cooperation and knowledge exchange on science, technology and innovation to benefit sustainable urban development (...)" (UN, 2017, p. 37).

The number of such initiatives has increased in recent years, both in Latin America and in other areas of the Global South. As a result, high-quality housing projects have begun to emerge aimed at low-income people and based on participative, inclusive, and efficient strategies. Referring to the social responsibility of the architect, Perriccioli stated:

> In the complex socio-technical system that social innovation contributes to create, the architect's social role is manifested in a responsible, strategic, and organizer approach that, rather than providing closed and formalized solutions, aims at innovating social demand by reformulating it in a performance key, according to a real and comprehensive view of the problems, which holds together the material culture of the contexts and communities with the technical, procedural, socioeconomic and energy-environmental aspects. An approach that creates an epistemological reversal: hopes, desires, people's needs again become the drivers of innovation, and technology has the task of finding the necessary correspondence between the real needs and the useful, necessary and appropriate resources to meet them. (2017, p. 30)

Two projects worth mentioning, both for their successes and mistakes, are the Brazilian experiences of "*Morar Carioca*" in Rio de Janeiro and "*Miha Casa Miha Vida*" at the national level. These were based on the idea of "improving favelas rather than replacing them" (Davis, 2006 as cited in Gallo and Romano, 2018, p.280), sharing as their primary objective the implementation of new models of urban livability that improve these urban marginalized and degraded areas.

The ambitious Morar Carioca, launched in 2009, aimed to upgrade the city's informal settlements in preparation for hosting two mega-events in the coming years: the 2014 Soccer World Cup and the 2016 Olympic Games. Although Morar Carioca managed to increase the infrastructure network in some favelas and construct buildings with high environmental standards, it did not meet the expectations of its promoters. Many of the criticisms the project has received focus

on the social aspect, as it has affected the community fabric and collective identity that characterize these neighborhoods (Derks, Koster, and Oosterbaan, 2020).

Miha Casa Miha Vida (PMCMV) was also established in 2009 under the government of former President Luiz Inácio Lula da Silva. From that year until 2016, when Brazil hosted the Olympic Games, the Brazilian government opted to invest large sums of money in public transportation and social housing projects. During this period of rapid economic growth and international events, the Miha Casa Miha Vida program managed to build more than 4.5 million low-cost homes in different cities across the country. Thus, reducing the national housing deficit historically hit the most vulnerable population was possible. However, this program, like Morar Carioca, has been criticized for its aesthetic, urban, social, and quality results[134]. One of the strongest criticisms is the repetition of old and inefficient models of "development" and urban growth, which ended up affecting the quality of life of those it was meant to help: *The Nobodies*[135].

While projects like those mentioned above have had difficulties in implementation or maintenance over time, others have significantly impacted the communities involved and have been seeds of positive change. The following is a taxonomy of good practices related to participative research methods oriented toward the co-production of knowledge (Visconti, 2017). The sample gathers 15 projects with interesting socio-technical perspectives for improving vulnerable, impoverished, and/or marginalized populations' quality of life. It includes community-based design actions and stories of success in critical areas. It should be clarified that the chosen experiences were not classified based on the level of empowerment according to Arnstein's Ladder of Citizen Participation (**Figure 68**). Instead, they are clustered according to the origin and type of entity(s) involved in the implementation. The questions that guided the choice of projects are:

- Of what are they representative?

- Of what approach?

- Of what practices?

---

[134] See https://www.urbanet.info/brazil-social-housing-shortcomings/. Accessed on September 22th, 2022.

[135] Term masterfully used by Eduardo Galeano in his famous poem "*Los Nadies*" (1940). See http://www.rizoma-freireano.org/poema2727/los-nadies-eduardo-galeano. Accessed on September 22th, 2022.
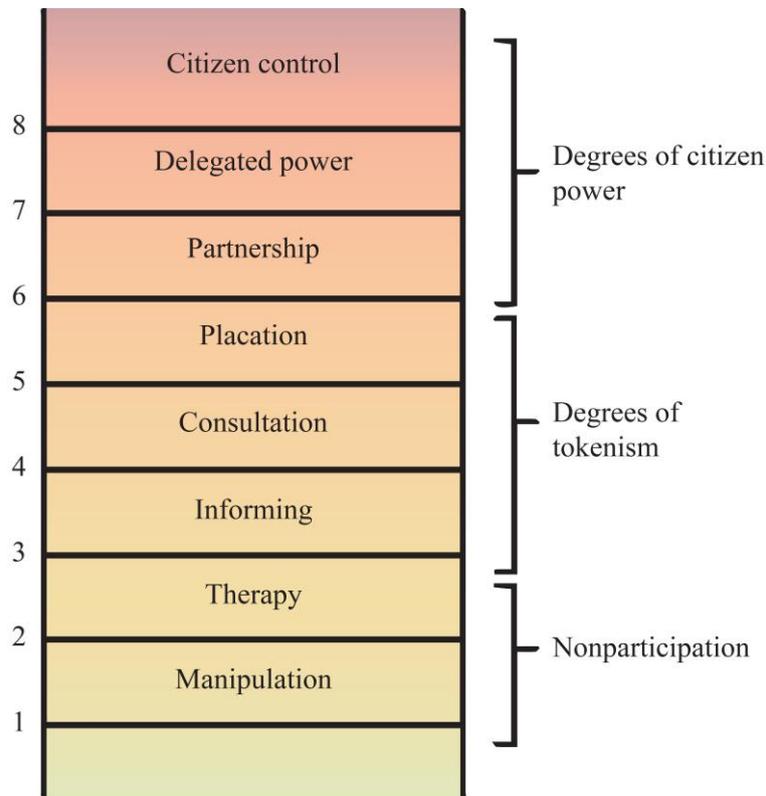
Figure 68. Arnstein's Ladder of Citizen Participation.
Source: Elaborated by the author based on a figure presented in Arnstein, 1969, p. 217.

Each selected case was summarized through an interpretative analysis grid. This grid presents its most relevant elements, concepts, and characteristics according to the theoretical and cultural framework constructed in the first part of this thesis. Some of the selected initiatives involve the participation of architecture students. The importance of using academic references is given by their flexible and experimental character. Moreover, these types of projects are developed in short periods of time, so it is easier to test them in other locations (Gouverneur, 2014). As Mellano reminds us:

> The ideas of students are often very courageous because they are rapidly processed (in a few weeks) and, perhaps, especially because they are designed by young professionals who are still neither shrewd nor impaired by professional practice. In any case, they are ideas that have the great merit of stepping outside established patterns, of urging one to design new landscapes that are formally innovative, and also to make use of cutting-edge materials and construction technologies. (2018a, p. 43)

This selection is only a concise exemplification of initiatives that stimulate the search for solutions to urban and architectural problems based on grassroots practices, Tecnologías Sociales, and Social Innovation. Despite their focus on small-scale activities, they have proven to be benchmarks of sustainability, collectivity, viability, and circularity at a global level in which technical systems are connected to social practices (Visconti, 2017). Moreover, being counter-proposals to the common paternalistic vision of state projects and the rigidity of top-down impositions, each selected project emerges as an adaptive scenario "where the community became the agent for built environment shifting" (p. 356) (**Figure 69**).

Figure 69. Taxonomy of collective and collaborative knowledge.
Sources: These will be specified in each analysis grid.

The cases included in this section provided emergent models for rethinking architecture culturally and ontologically, with a "balance between inward (informal) and outward (formal) forces" (Gouverneur, 2015, p. 130). The analysis

of these interesting and useful paradigms was relevant for enriching the methodological framework proposed, defining some tools, and describing the profile of the architect for whom they are intended. It is important to clarify that projects promoted by local and regional authorities were not considered[136]. For each best practice selected, six specific factors were identified. In addition, four key analysis criteria were adopted to identify appropriate points of comparison through analytical comparison. **Figure 70** shows the interpretative analysis grid configuration that summarized the specific factors and criteria considered.

		Name		
Specific factors	**A**	Type of practice (manual/toolbox, network, collective, academic project, or research)	**B**	Timespan of implementation
	C	Scale(s) of the intervention	**D**	Actors involved besides the community
	E	Approaches and methods based on	**F**	Instruments and strategies used
Criteria	**G**	Effectiveness in meeting its objectives		
	H	Relevance to current and eventual needs		
	I	Coherent relationship with the context		
	J	Significant social and cultural impacts of the actual outcomes		

Figure 70. Interpretative analysis grid configuration with the factors and criteria considered in the analytical comparison.

The colors in the analysis grids (from **Figure 71** to **Figure 85**) are associated with the taxonomic groups presented in **Figure 69**.

---

[136] Although there are very good examples such as the Urban Living Labs defined by Joint Programming Initiatives Urban Europe. For more information see https://jpi-urbaneurope.eu/.

Human-Centered Design (HCD) Toolkit				

Specific factors	**A**	Toolbox	**B**	First edition:2013 Second edition: 2015
	C	Global: the manual presents projects carried out in the Global South, but individuals and organizations can use it in any context	**D**	• Bill and Melinda Gates Foundation • IDEO: design consultant for innovative and creative projects • David Kelley, Founder, and Tim Brown, CEO
	E	• Design Thinking: a collaborative and multidisciplinary approach, a promising process for addressing complex sustainability challenges • Design for social innovation • Ethnographic research and empathy • Designing with communities (co-design between institutions, local businesses, and research centers) and for communities (identifying strengths and weaknesses and taking action to make them more favorable)	**F**	• 52 methods and tools to be used with the help of sheets and pens, cameras, post-it notes, stencils, etc. Among them: • Secondary research • Interviews • Conversation starters • Card sort
Criteria	**G**	To achieve the objectives, it takes into account three work phases: • Inspiration space: identifying problems and opportunities • Ideation space: from ideas to prototyping • Implementation space: production to deliver		
	H	• Improving social conditions in marginalized communities • Importance of the design process in social innovation		
	I	It focuses on three aspects: desirability, viability, and feasibility		
	J	• It is a mental approach to design by placing humans at the center of the design process • It facilitates the realization of Social Innovation projects		

Figure 71. Analysis grid. Human-Centered Design (HCD) Toolkit
Sources: IDEO, 2015; Katoppo and Sudradjat, 2015; Manzini, 2015; Marseglia, 2018;
https://www.ideo.com/post/design-ki. Accessed on June 3rd, 2022.

Community toolbox				
Specific factors	**A**	Toolbox	**B**	Under continuous development since 1994
	C	Global: It has reached those working in over 230 countries around the world • It can be adapted to the conditions and needs of each community	**D**	• KU Center for Community Health and Development of the University of Kansas. • National and international partners, including the McArthur Foundation and World Health Organization (WHO)
	E	• Community-Based Research • Participatory Action Research	**F**	• Community-building skills • Toolkits • Troubleshooting Guide • Models • Databases of best practices • Training
Criteria	**G**	It allows researchers to learn new skills, plan their work or intervention, troubleshoot problems, and connect with others who are conducting similar projects: • Learn a skill: Practical, step-by-step guidance in community-building skills • Get help taking action: Examples, models, and database for general guidance		
	H	• Need to promote community health and development by connecting people, ideas, and resources • Making it easier for people to take action to ensure healthier and more just communities throughout the world		
	I	Technical assistance: It provides a variety of services, such as training and participatory evaluation of community-based efforts		
	J	• Social change • Build healthier communities It is a free online resource with tips and tools for taking action in communities. Thought as a public service, anyone can use it in teaching, training, and technical support		

Figure 72. Analysis grid. Community toolbox
Sources: Balcazar, 2003; https://ctb.ku.edu/en. Accessed on June 3rd, 2022.

Manual de Mapeo Colectivo				

Specific factors	A	Manual	B	Since 2008
	C	Local: It collaborates in the construction of a territorial diagnosis	D	Iconoclasistas
	E	• Metodologías, recursos y dinámicas de pedagogía crítica • Participatory methodology	F	• Visual resources (pictograms, use of icons, symbols, and images) • Maps • Senses, perceptions, and territories • Systematize popular knowledge and experiences • Workshops

Criteria	G	• It stimulates participation for collective and community responses • It encourages different ways of understanding and signaling space through various types of language, such as symbols, graphics, and icons, which stimulate the creation of collages, phrases, drawings, and slogans
	H	• Maps are one of the main instruments that the dominant power has historically used for the utilitarian appropriation of territories • Usually, the maps result from the gaze that the dominant power recreates on the territory, producing hegemonic representations • The need to generate narratives and representations that dispute and challenge those installed from different hegemonic instances
	I	• Support for the collective production of complex perspectives against the processes of colonization and privatization of the public domain • Critical cartographic resources for territorial processes of collaborative production
	J	• Mapping is a practice for breaking down barriers and frontiers. • It is a dynamic through which new paradigms of interpretation of reality are constructed and disseminated. • Collective construction of territorial views that promote and facilitate collaborative and transformative practices

Figure 73. Analysis grid. Manual de Mapeo Colectivo.
Sources: Risler and Ares, 2013.

Inteligencias colectivas				(ic)
Specific factors	**A**	Network	**B**	Since 2010
	C	Global: It is an open research and design platform for sharing and versioning construction details, objects, architectures, and non-standardized tactical urbanisms	**D**	• Promoted by the Zoohaus collective. Zuloark is a distributed architecture and urbanism open office founded in 2001 • It is a project in collaboration with a diverse network of local agents, cultural institutions, museums, universities, embassies, citizen collectives, artisans, architects, students, etc.
	E	• Transdisciplinary • Participatory design • Collective knowledge • Critical regionalism	**F**	• Online Design Platform • Hybrid solutions • Cultural mixing
Criteria	**G**	Creating a free database and a registry of collective construction details from real examples of non-standardized and intelligent constructions		
	H	Every part of the world has its collection of construction techniques. The coexistence of different levels of industrialization and economic development allows the old artisanal techniques that survive to mix with semi-industrial products.		
	I	• By learning from what already exists • By broadening the collective imagination of design as an engine of change in the social, technological, economic, or political realities		
	J	• Understanding the internal dynamics of popular traditions and technologies • Architects and urban planners should work together with local stakeholders rather than impose their designs and projects • A sustainable architecture that takes into account building practices developed by inhabitants and that adapts to their contexts		

Figure 74. Analysis grid. Inteligencias colectivas.
Sources: Dameri et al., 2018; https://inteligenciascolectivas.org/es/inicio/; https://zuloark.com/es/inteligencias-colectivas-es/; https://www.arkitectureonweb.com/en/-/zuloark-profile. Accessed on June 3rd, 2022.

Transition Town Initiative				
Specific factors	**A**	Network	**B**	Since 2016
	C	Global: Since 2017, the Hubs Group has been a defined international network with an agreed purpose, constitution, and ways of working	**D**	• Over 20 Transition Hubs Groups • Supported with funding from the Tudor Trust and with excellent coaching and accompaniment from the team at Université-du-nous
	E	• Transition movement • Local action • Participatory methods	**F**	• Peer-to-peer support • Community-led Transition groups • Grassroots-led Hubs
Criteria	**G**	It facilitates the sharing of inspiration and learning, identifies common needs and exciting possibilities, and curates and develops tools, training, and resources		
	H	Local acts for global improvements. The world's enormous challenges (climate change, social inequality, economic decline, etc.) feel more manageable if addressed at the local scale)		
	I	Transition Network is a support organization to the international Transition Hubs Group and is exploring with that network how to develop new models of leadership, share power and resources, and collaborate across distance		
	J	Community-led Transition groups are working for a low-carbon, socially just future with resilient communities, more active participation in society, and caring culture focused on supporting each other		

Figure 75. Analysis grid. Transition Town Initiative.
Sources: https://transitionnetwork.org/; https://transitiongroups.org/. Accessed on June 3rd, 2022.

Arquitectura Expandida				
Specific factors	**A**	Collective	**B**	Since 2010
	C	Global: Open to students, researchers, professionals, and academics from all over the world Local: Works mainly in Bogotá	**D**	Colombian social collective. It was born from the idea of architects Ana Ortego and Harold Guyaux
	E	• Participatory design • Collaborative design • Knowledge exchange	**F**	• Urban Research • Collective self-construction • Data visualization • Activist art
Criteria	**G**	• With collaborative urban interventions that move between the need of the inhabitants, the political sphere, the high symbolic content, the pedagogy, and the understanding that culture is the main factor of territorial planning • As a ThinkTank, raising issues that transcend specific actions to become scalable proposals for participation		
	H	• A distrust of many formal and institutional approaches to city building that are not adapted to local needs and practices • On the recognition of citizen and cultural potentials for city building		
	I	• It is a citizen laboratory • It collaborates with grassroots urban movements in the exploration and creation of alternative spaces for citizen participation and self-management in peripheral areas of the city		
	J	It articulates diverse urban "languages" with those of urbanism and architecture as a way to bring decisions about the city closer to those traditionally excluded from this debate		

Figure 76. Analysis grid. Arquitectura Expandida.
Sources: https://arquitecturaexpandida.org/; https://www.labiennale.org/it/architettura/2021/emerging-communities/arquitectura-expandida; https://www.lifegate.it/arquitectura-expandida-potocinema; https://mapeoalpedazo.wordpress.com/. Accessed on June 3rd, 2022.

URBZ				urbz

Specific factors	A	Collective	B	Since 2008
	C	Global: It has offices in Mumbai, Bogotá, and Geneva	D	• Matias Echanove, Rahul Srivastava and Geeta Mehta • They work with citizens, associations, local governments, and private clients
	E	• User-generated approach • Collective knowledge • Interdisciplinarity • Participation and action	F	• Information sharing • Workshops with various actors • Live projects • Exhibitions • Storytelling • Informal dialogue

Criteria	G	• It is an experimental action and research collective specialized in participatory planning and design • Innovative models in architecture, planning, and policy-making
	H	• Cities are complex entities that don't lend themselves to generalizations • The best way to improve the future of cities is to empower their inhabitants through design
	I	• By understanding the incremental developmental processes and daily practices that define the identity of big cities. • The practice of "urbanology" relies on understanding and documenting urban ecosystems through direct engagement with people and places • This quasi-anthropological approach towards the observation of urbanity derives mainly from the belief that designing for informal contexts must necessarily occur with the involvement of its inhabitants, the end users
	J	• Understanding the internal dynamics of the informal settlements • Architects and urban planners should work together with local stakeholders rather than impose their designs and projects • A sustainable architecture that takes into account building practices developed by inhabitants and that adapts to their contexts

Figure 77. Analysis grid. URBZ.

Sources: https://urbz.net/; https://www.architectural-review.com/archive/urbz-dirt-is-fertile-mess-is-more; https://www.domusweb.it/en/architecture/2012/02/13/urbz-crowdsourcing-the-city.html; https://issuu.com/andressanchez82/docs/architecture_inverse_english. Accessed on June 3rd, 2022.

Arquitectxs de cabecera				AC

Specific factors	**A**	Academic project	**B**	Since 2013
	C	Global: Open to students, researchers, professionals, and academics from all over the world Local: Organization of international workshops focused on neighborhood-scale projects	**D**	• Escuela Técnica Superior de Arquitectura de Barcelona (ETSAB) of the Univesitat Politécnica de Catalunya • National and international partners, including other universities
	E	• The "family doctor" concept applied to architecture and the role of the architect • Participatory design • Social innovation • University-society link	**F**	International workshops and collaborations, such as the 2017 Workshop in Cartagena, Colombia, with the PEI team of the PUJ. It aimed at enabling the social appropriation of heritage as well as the activation and improvement of public spaces in the neighborhood and Fuerte de San Bernardo
Criteria	**G**	• Enabling students to act in and with the existing city • Intersection of social movements and architecture		
	H	• Lack of contact of the academy with reality and its problems • Social and housing emergency • Insufficiency of the traditional tools and methods to respond to the new challenges of cities • A new one: health crisis due to COVID-19 and the economic crisis linked to it		
	I	• New forms of architectural pedagogy • Free citizen service office		
	J	This academic group and association envisage a more active role of the architect in the city's social structure. Their habitat project stems from the close knowledge of the citizen		

Figure 78. Analysis grid. Arquitectxs de cabecera.
Sources: Dameri et al., 2018; https://arquitectosdecabecera.org/. Accessed on June 3rd, 2022.

PEI Proyecto Nuevos Territorios				**pei**

Specific factors	**A**	Academic project	**B**	Since 1996
	C	Global: Open to students, researchers, professionals, and academics from all over the world. • It is part of the "Inteligencias Colectivas" network Local: Organization of international workshops	**D**	• PEI, Faculty of Architecture and Design, PUJ • National and foreign collectives, institutions, and universities
	E	• Social innovation • Collective intelligences • Participatory design • Learning by Doing • Project-Based Learning (PBL) • Multidimensional thought • Complex thought • Interdisciplinarity	**F**	• Academic workshops: - B.Sc. interdisciplinary course "Proyecto Nuevos Territorios and Cartografías Emergentes" • Internacional workshops: - 2017 Workshop "Patrimonio y Apropiación Social" – Cartagena de Indias y Bocahica" (Colombia)
Criteria	**G**	Space where research and interactions between professors and students meet • It recreates different scenarios and proposals and encourages an overall fundamental and complex perspective		
	H	• The need to improve the quality of life of Colombia's most vulnerable populations through concrete solutions • Low participation of the affected communities • Absence of mechanisms to guarantee inter-institutional coordination		
	I	• Urban settlements understood as a permanent laboratory • Engagement of the communities that face the challenges		
	J	• It seeks to contribute to the social fabric by constructing a dialogue between existing knowledge and complex project knowledge • It goes beyond the traditional work of the architect and challenges it to assume the role of promoter and facilitator of spatial solutions derived from the communities' own needs and problems		

Figure 79. Analysis grid. PEI Proyecto Nuevos Territorios.
Sources: Guattari, 1996; Hernández Correa et al., 2018; https://peilab.wixsite.com/peilab; https://issuu.com/arqcarloshernandezcorrea/docs/pei_book_english. Accessed on June 3rd, 2022.

Universidad al barrio				
Specific factors	**A**	Academic project	**B**	Since 2019
	C	Global: Open to students, researchers, professionals, and academics from all over the world • Organization of international Seminars and Conferences Local: Focused on Bogotá's informal neighborhoods	**D**	• Universidad Nacional de Colombia sede Bogotá, Faculty of Arts • National partners, including other universities
	E	• Tactic Urbanism • Participatory design • Multidisciplinarity	**F**	• Workshops and seminars • B.Sc. course "Arquitectura en el territorio y la ciudad, prácticas académicas desde la arquitectura"
Criteria	**G**	• Integral improvement of housing: Progressive development of self-built housing based on physical-spatial and socio-cultural characteristics • Integral improvement of neighborhoods: An experimental program for integral neighborhood improvement focusing on public space and community services. • Technical assistance and accommodation of housing: A pilot program that aims to contribute to community know-how in technical, regulatory, and legal issues		
	H	• It started as an initiative of the "Research Group on Urban Processes. Habitat, Housing and Informality" • Need for reflection and exchange of knowledge on a specific problem: the integral improvement of neighborhoods and the dignification of informal housing in Colombia		
	I	Bringing the academic and professional experience of students of different levels and teachers closer to the realities of the cities		
	J	It supports local community processes through collective work with a simple language, easy to understand for people outside the academic world		

Figure 80. Analysis grid. Universidad al barrio.
Sources: Grupo de Investigación "Procesos Urbanos en Hábitat, Vivienda e Informalidad," 2007; Torres Tovar, 2009; https://ualbarriounal.blogspot.com/. Accessed on June 3rd, 2022.

Informal rooting, An open Atlas (Italia-Brasile)				

Specific factors	**A**	Research	**B**	From 2010 to 2020
	C	Local: It analyzes the morphology of the urban structure of four favelas in Rio de Janeiro, Brazil	**D**	Alessandro Tessari
	E	• Urban morphology • Type-morphological analysis	**F**	• Fieldwork • Observation • Surveys • Mapping • Drawings • Photographs
Criteria	**G**	• A territorial scale analysis explores the process that consolidated these settlements in the city and their physical and cultural evolution and transformation through time		
	H	• The need to overcome the classic attitude towards urban informality, which is full of prejudices that do not let us appreciate the qualities of the urban forms and spaces of these settlements, such as their progressive character, adaptability, and organic solutions • The importance of highlighting the dynamics and processes of change of the informal settlement phenomenon to foresee future developments		
	I	• An atlas as a tool for reading these territories, providing a fresh look at and from the favelas		
	J	• An investigation that lasted more than four years, the study gathers the fundamental elements of the informal territories studied		

Figure 81. Analysis grid. Informal rooting, An open Atlas, Ph.D. Thesis and book. Sources: Tessari, 2016; Tessari, 2020; http://www.informalrooting.com/; https://www.artwort.com/2018/10/09/architettura/informal-rooting-intervista-alessandro-tessari-etb-studio/; https://www.etbstudio.com/. Accessed on June 3rd, 2022.

Técnica y Tradición. Laboratorio de Técnicas Vernáculas para Soluciones Arquitectónicas Contemporáneas (Colombia)				
Specific factors	**A**	Research	**B**	2019
	C	National: Thesis in which techniques and materials of 23 vernacular construction archetypes of Colombia are analyzed	**D**	• Sebastián Rojas Parada • Artisans
	E	• Critical regionalism	**F**	• Fieldwork • Laboratory tests: solar radiation control, acoustic quality, and permeability • Analysis of costs, feasibility, and availability
Criteria	**G**	• Collection of fabrics typical of many regions in Colombia were collected • Laboratory tests to understand their physical characteristics and to know if they were suitable for use in the façade • Implementation of one of the prototypes -*seje* palm knitted- in the PEI Máquina Verde-El Arca housing prototype for the Solar Decathlon Latin America & Caribbean 2019 competition		
	H	• The erroneous idea that Traditional knowledge means beautiful objects of past times • The need to propose an articulation between tradition and artisanry on the one hand, and industrialization and mass production on the other		
	I	• Traditional knowledge for constructive solutions to contemporary problems • A catalog with information on materials and construction techniques		
	J	• By going beyond this nostalgic vision through experiential study to understand the properties of the materials and what they can offer • It seeks to demonstrate the viability of using vernacular techniques in contemporary architecture		

Figure 82. Técnica y Tradición. Laboratorio de Técnicas Vernáculas para Soluciones Arquitectónicas Contemporáneas, (B. Sc thesis).
Sources: Anzellini and García-Reyes Röthlisberger, 2015; Rojas Parada, 2019.

		Técnicas Vernáculas (Colombia)		
Specific factors	**A**	Research	**B**	2015
	C	National: It is part of a larger nationwide initiative that seeks to ensure the conservation, management, and sustainable use of these native palms • Useful in future Participatory design pilot projects for the Development and Peace Programs of the Post-Agreement	**D**	Martin Anzellini Garcia-Reyes and Maria Inés Garcia-Reyes Röthlisberger • With the support of the United States Agency for International Development (USAID) • Within the framework of the Conservation Landscapes Program (PPC), implemented by the Natural Heritage Fund
	E	• Collective knowledge • Critical regionalism	**F**	• Fieldwork •Categorization of the information
Criteria	**G**	• Approaching the informal artisans and master builders, the artisans and their work, and inquire about their methods, inputs, and processes • Cataloging 64 chosen techniques into four groups of technical elements: 1) roofs and roofing, 2) envelopes and facades, 3) structures, and 4) objects and details		
	H	• To promote the preservation of knowledge inherent to our culture • To show construction techniques and integrative solutions practical to self-builders in informal urban settlements and remote rural areas		
	I	• Through a trip to the northern part of Colombia, a wide variety of demonstrations of vernacular architecture were highlighted. In particular, five types of palm trees typical of that area were studied: 1) palma amarga, 2) palma corozo de lata, 3) palma de vino, 4) palma estera, and 5) palma sará • A catalog of building systems and techniques that use native palms of the Colombian Caribbean as their main component		
	J	• Working methodology that seeks to recover techniques, typologies, and environmental adaptations of vernacular architecture and bring them to the disciplinary exercise as a palette of available appropriate solutions • Useful for future adaptation to current standards (particularly seismic resistance and accessibility)		

Figure 83. Técnicas Vernáculas.
Sources: Anzellini, 2014; Anzellini and Garcia-Reyes Röthlisberger, 2015; Anzellini, 2016; García-Reyes Röthlisberger and Anzellini Fajardo, 2019.

Cartografías Emocionales (Colombia)				

Specific factors	**A**	Research	**B**	2010
	C	National: This methodology was applied in 8 rural localities and three capitals of municipalities in the Colombian tropical forest	**D**	Santiago Pradilla
	E	• Participatory design for contextualized solutions • Social Innovation • Vivienda de Interés Cultural (VIC) • Different types of local knowledge • Critical regionalism	**F**	• Fieldwork • • Maps, drawings • Photographs • Workshops
Criteria	**G**	The book is divided into three volumes: • Volume 1: it illustrates the methodological proposal • Volume 2: it presents the results of the work with communities through workshops • Volume 3: it collects concluding reflections on the study		
	H	• The foreign imaginary of progress has contributed to the homogenization of self-building practices in urban, informal, and rural contexts • The importance of highlighting Colombia's environmental and cultural diversity • To find the point where the imaginaries of progress are articulated in the best possible way with the environmental, cultural, and economic aspects		
	I	• A methodological tool designed to encourage art as a way to allow each community to visualize local knowledge and build their own reflections about their habitat and housing • This approach to the profession is also applicable both in the peripheries of large cities and in small settlements		
	J	• The cultural aspects become evident, essential to propose housing solutions consistent with the culture and practices of each place • Support a sustainable architecture that takes into account building practices developed by inhabitants and that adapts to their contexts		

Figure 84. Cartografías Emocionales, MSc thesis and book.
Sources: Pradilla, 2010.

Participatory action research (PAR) as a tool in solving desert vernacular architecture problems in the Western Desert of Egypt				

Specific factors	A	Research	B	From 2008 to 2013
	C	Local: A project developed in the Western Desert of Egypt	D	• Marwa Dabaieh • Local authorities and agencies • Ph.D. course from Lund University in Sweden
	E	• Critical regionalism • Participatory Action Research • Case study and qualitative methodology	F	• Questionnaire and interview survey with 60 Balat inhabitants • Introduction to analyzing elements • Slideshow and video

Criteria	G	• It aims to help prevent further loss of desert vernacular architecture knowledge in the Western Desert of Egypt • The result was the construction of a flexible housing model design that takes into account problems in traditional mud brick houses and accommodates the modern living facilities that the young generation sought
	H	• Locals in Balat who moved out of the old town to live in the modern concrete houses are losing parts of their cultural and traditional • Vernacular settlements in the Western Desert of Egypt are facing dramatic problems: abandonment and deterioration; demolition and replacement • Advanced technical facilities in the new concrete houses have formed a new cultural barrier • Need to encourage vernacular know-how in becoming a living part of future building practices
	I	Keeping the essence of sustainable aspects of desert vernacular building knowledge while incorporating residents' desires for modern amenities and reducing housing maintenance
	J	• Identifying people with valuable knowledge about crafts that they have been perfecting from generation to generation. E.g., thatched roofs, adobe walls, doors, and windows, among others • Assisting desert local inhabitants and researchers in Balat town in Dakhla Oasis in tackling vernacular problems. It is a free online resource with tips and tools for taking action in communities. Thought as a public service, anyone can use it in teaching, training, and technical support

Figure 85. PAR for desert vernacular architecture, Ph.D. Thesis.
Sources: Dabaieh, 2013.

The analytical comparison presented in the analysis grid of the selected best practices was fundamental for gathering tools that will help the architect or architecture student interested in working in Latin American informal neighborhoods. The following synoptic table (**Figure 86**) highlights the approaches and methods, as well as the instruments and techniques founded on the best practices. It should be clarified that the thesis adopts the semantic distinction between strategy and tactics: "strategy refers to the overall research plan or structure of the research study (...) tactics refer to a more detailed use of specific techniques" (Groat and Wang, 2013, p. 10). As for the analysis grids, the colors are associated with the taxonomic groups presented in **Figure 69**.

	Approaches and methods	Instruments and techniques
Theoretical and analytical	The "family doctor" concept	Secondary research
	Social innovation	Type-morphological analysis
	University-society link	Urban Research
	Collective intelligences	Residencies
	Multidimensional thought	Talks
	Interdisciplinarity	Peer-to-peer support
	Multidisciplinarity	
	Urban morphology	
	Critical regionalism	
	Collective knowledge	
	Vivienda de Interés Cultural	
	Knowledge exchange	
	User-generated approach	
	Collective knowledge	
	Interdisciplinarity	
	Transdisciplinary	
	Collective knowledge	
	Critical regionalism	
	Transition movement	
Participative and collaborative	Community-Based Research	Training
	Participatory Action Research	Community-building skills
	Design Thinking	Visual resources
	Design for social innovation	Interviews
	Ethnographic research	Conversation starters
	Co-design	Card sort
	Participatory design	Senses, perceptions, and territories
	Collective design	Systematize popular knowledge and experiences
	Tactic Urbanism	
	University-society link	Workshops

	Participation and local community involvement	Seminars
		Courses
	Inhabitants' empowerment	Observation
	Participatory design for contextualized solutions	Surveys
		Fieldwork
	Case study and qualitative methodology	Questionnaire
		Interviews
	Participatory design	Workshop
	Collaborative design	Introduction to analyzing elements
	Participation and action	Slideshow and video
	Participatory design	Systematic restitution
		Activist art
		Public participation
		Workshops
		Live projects
		Storytelling
		Informal dialogue
		Exhibitions
		Cultural mixing
		Grassroots-led Hubs
		Community-led Transition groups

Software and digital	Urban morphology	Databases of best practices
		Models
		Drawings
		Type-morphological analysis
		Photographs
		Data visualization
		Information Sharing
		Online Design Platform

Practical and material	Learning by Doing	Troubleshooting Guide
	Project-Based Learning (PBL)	Visual resources
		Maps
		Drawings
		Laboratory tests
		Analysis of costs, feasibility, and availability
		Categorization of the information
		Maps
		Photographs
		Urban Research
		Collective self-construction

Figure 86. Working tactics identified in the analytical comparison.

5.2 The Informed architect

According to Kellet, "informal settlements are, by definition, unfinished projects in which the agency and creativity of the occupant-builders are central."[137]

The examples analyzed in the precedent section are also unfinished projects "that is to say, open, flexible, modular, capable of adapting to new conditions." (García García, 2017, p. 132). These are not advocating for "architectural socialism" (Boano and Vergara Perucich, 2016, p. 41) but understand, first of all, that in self-built contexts, adaptive design processes are more successful than closed models. Second, that "one rarely arrives at new and innovative solutions if one always knows precisely where one is going" (IDEO, 2015, p. 13). Moreover, the best practices established that certain combinations between self-construction and "formal construction" could be generators of good quality architecture.

The success of the informal-formal union results analyzed has been partly due to the architects' "background in the social sciences and the humanities" (Escobar, 2018, p. 3). This has led to a shift away from Certeau's idea of the "design expert" to advocate instead for the concept of the architect as facilitator and mediator who conceives "design as eminently user-centered, participatory, collaborative, and radically contextual" (1984/1980, p. 34). It is important to emphasize that the participatory principle risks falling into Spivak's criticism[138] of "speaking for them" (Riach, 2017, p. 75). It may also contribute to the misrepresentation of what she calls the subalterns, which, in this thesis case, are the inhabitants of informal urban areas. As explained by Boano and Vergara Perucich, as well as by Blas, citizen participation and democratization of design processes (Blas, 2015, p. 86) do not ensure a better architecture. In fact, according to the latter, "a large part of the strategies for the placement of products in the market respond to participatory processes of consultation and market research" (p. 41).

Another important aspect to clarify is that involving users in the design process does not mean transferring the responsibility for the project to them, replacing the work of the architect. Pradilla points out that "participation in the first place allows to provide fundamental design tools." Therefore, users cannot be held responsible for "the defects (technical and spatial) resulting from decisions made by a community that does not have the technical information, nor did it carry out the

---

[137] P. Kellet, *Constructive Journeys: Dwelling Consolidation and Social Practices in a Squatter Settlement,* Durham, Univeristy of Durham, 2008, p. 11, as cited in Tessari, 2020, p. 104.
[138] See section 2.2.

necessary reflection of the case" (2010, p. 13). In the scenarios analyzed, the professionals have recognized the message of the different communities rather than speaking for them. Moreover, they know how to motivate participants to intervene, increasing the inhabitants' awareness of the situation in which they are immersed (Pradilla, 2010) and giving an opportunity to what already exists. The selected best practices not only "work with the locals" but are based on the implementation of the community's agenda and not that of the professional (Mignolo, 2011, p. 143).

Regarding the three collective academic projects, the role of universities in relation to Design for Social Innovation has been positive since they have managed to give space to the grassroots cultures "for whom conventional education has meant only the devaluation of their forms of knowledge and lives" (Escobar, 2018, p. 223). Thanks to this "enabling education," architects in formation have acquired notions based on pluriversality and decoloniality. The first is the collective and collaborative knowledge "to walk hand in hand with those who are protecting and redefining well-being, life projects, territories, local economies, and communities worldwide" (p. 6). The second is transdisciplinarity and the beneficial relationship between research methods used in architecture and those used in the social sciences (Groat and Wang, 2002, 2013; Katoppo and Sudradjat, 2015). This makes it possible to develop better communication channels between the academy and the community as well as between the formal and the informal city. The third is the "executive capacity," which, according to Ander-Egg, defines the transition to action and is based on the following qualities (2003, pp. 106-107):

- To know how to concretize ideas.

- To know how to connect with reality and establish action strategies in accordance with that reality.

- To know how to organize and make the best use of time.

- Flexibility and sensitivity to react to new situations and good response speed.

- Creativity to give concrete answers to concrete problems in concrete situations.

- Ability to make decisions and take risks.

- Ability to turn mistakes into expertise

- Ability to motivate oneself; tenacity and perseverance at work

These notions take on particular importance if we acknowledge that we academics often make the mistake of talking and listening to each other without considering that if the discourse does not leave our scientific sphere, it will have little influence, even if its theoretical basis is unquestionable. In fact, the construction of our own vocabulary has increased the separation between academia and society. As De Sousa described: "scientific knowledge is not socially distributed equitably (…) was originally designed to turn this side of the line into a subject of knowledge, and the other side into an object of knowledge" (2010, p. 52). Likewise, the modern radicalism that rejects any tradition has made the architect become a kind of monological artist who "ends up talking in a language with which his audience has no contact. His art becomes unique, indeed, in the sense that its world is totally closed and it does not contain any possibility for communication" (Pallasmaa, 2017, p. 32).

Other times, we spend "more time discussing one's own methods than actually doing something, and to refuse to commit to a plan of action" (Riach, 2017, p. 77). Throughout this thesis, it has already been evidenced that the work of the architect in informal contexts, as well as "great works of art and architecture cannot arise from cultural ignorance" (Pallasmaa, p. 34). However, as the Brazilian sociologist Pedro Demo explained, the importance of "social diagnosis" in which one "knows in order to act" cannot be simplified into "a lot of research for no solution, a mere study without practical application, a simple academic exercise, as a matter of method, not of reality" (DEMO, Pedro, op. Cit, as cited in Ander-Egg, 2003, p. 95). This "hit and run" model should absolutely be avoided since it:

> (...) had led in many projects to frustration and annoyance among community members, as researchers gave advice about their problems and then left without showing practical solutions for how to solve them (Stokols, 2006). Sommer has pointed out that a researcher cannot tell people that they are mistaken and go away and expect them to change their actions or behaviors. (Sommer, 1977)[139]

Considering the abovementioned analysis, the need to characterize a "new breed of architects" (Escobar, 2018) became evident. Professionals specialized in the "language" of the informal, bearing in mind the importance of what is said as

---

[139] Stokols, D. (2006). Toward a science of transdisciplinary action research. *American Journal of Community Psychology*, 38, 63–77; Sommer, R. (1977). Perspectives on environment and behaviour: Theory, research, and applications. In D. Stokols (Ed.), *Action research* (pp. 195–203). New York: Plenum Press. As cited in Dabaieh, 2013, p. 289.

well as how it is said. In other words, practitioners who learn how to learn from the informal and promote subaltern speeches while developing new ways of hearing them (Riach, 2017). Just as Spivak asked, how can we learn to listen? —referring to listen all groups considered subaltern— the research questions presented at the beginning of this dissertation [140] try to stimulate the debate about the role of architects in informal settlements. This is how the concept of "informed architect" came to be.

Groat and Wang (2013) referred to the "paradigm of the architect-as-cultivator" (p. 46) that overcomes the dilemma between the architect-as-technician and the architect-as-artist. The figure proposed by them is the architect who cultivates environmental values centered on the common good to confront the essence of cultural life. Moreover, the architect-as-cultivator promotes innovation and community participation, interdisciplinary design, and culture as the soul of design (**Figure 87**).

Levels of Organizational Consciousness	Levels of Environmental Consciousness		
Society	Ecological Wholeness	(7)	
Community	ContextualConnectedness	(6)	
Organization	Internal Connectedness	(5)	
Transformation	Transformation	(4)	
Self-Esteem	Goal-Oriented Quaility	(3)	
Belonging	Emotional Welfare	(2)	
Survival	Health + Safety	(1)	
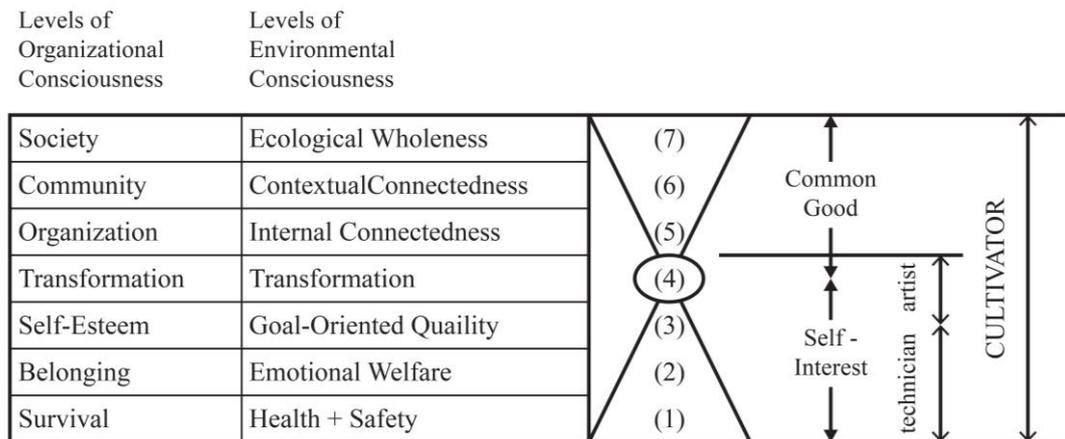
Figure 87. Groat's adaptation of Barrett's levels of "consciousness" (from self-interest to global concern) for the architect-as-cultivator's design agenda. Use of original Barrett diagram courtesy of John Wiley and Sons.
Source: Groat and Wang, 2013, p. 47.

Based on this consideration, the informed architect is conceived as an academically formed figure who possesses the relevant information —a technical, cultural, and social body of knowledge— to intervene correctly, specifically in informal neighborhoods.

---

[140] See section 1.1.

A similar concept appeared during the 1980s and 1990s at a time when academia and public funding were focused on the formal city. As Gouverneur explained, "a group of researchers was focused on how to upgrade informal settlements. They were called '*barriologos*' a rather derogative manner, implying that their work was not design oriented" (2015, pp. 47-48). In the case of the informed architect, this adjective is not intended to be used in a derogatory manner. On the contrary, this comprehensive notion is believed to encompass the best of the formal-informal duality directed towards a common goal:

Formed (theory)

+

Informed (fieldwork)

+

Informal (context)

=

Informed Architect

The work of the informed architect will therefore be the sum of reflexive actions[141] "where the project becomes a dialogue between theory and practice" (Schön, 1993, p. 118, as cited in Marseglia, 2018, p. 127). Although they share similar characteristics, each informal neighborhood is a microcosm of its own. This is why the informed architect must have the ability to adapt to different informal contexts and their complex local conditions. Likewise, he/she must have a flexible design approach to address them from multiple aspects (Marseglia, 2018). As Schön said:

> Complexity, instability, and uncertainty are not removed or resolved by applying specialized knowledge to well-defined tasks. If anything, the effective use of specialized knowledge depends on a prior restructuring of situations that are complex and uncertain (1983, chapter 1).

---

[141] Schön stated that (1983):

> (...) when someone reflects-in-action, he becomes a researcher in the practice context. He is not dependent on the categories of established theory and technique, but constructs a new theory of the unique case (chapter 2) (...) Here the professional recognizes that his technical expertise is embedded in a context of meanings. (...) He recognizes that his actions may have different meanings for his client than he intends them to have, and he gives himself the task of discovering what these are. (...) The tensions inherent in the bureaucratization of professional work tend to amplify when professionals seek to become reflective practitioners. (Chapter 10)

Through a reflective practice articulated with a critical regionalism focus, the informed architect can respond to a concrete informal context's unique environmental, social and cultural characteristics. The main tasks of the architects and architecture students who want to contribute to the improvement of spontaneous settlements must be:

- To understand the particular popular patterns related to the resident communities' ways of living over time.

- To comprehend how these can be reintegrated, resignified, and recontextualized in the contemporaneity of the informal settlements themselves: materials, forms, and essential elements of architecture.

According to Ander-Egg, these tasks are summarized as "research must be done on what must be known in order to be able to act" (2003, p. 71). The informed architect may even be the curricular definition of a professional figure that, as Perricioli explains when referring to open-source architecture, has the responsibility:

> (...) to structure the process, start and end the collaboration and orchestrate action and interaction rather than create objects. A non-anonymous but "choral" architect whose authorship will not be eliminated but contextualized, penetrating the complex relational fabric (Ratti, 2014). (...) The role of the designer will be to produce a socio-technical environment more conducive to achieving the goals of a particular community by encouraging listening, discussion and conversation with the users and stakeholders involved. It takes shape a new form of Design for Social Innovation that shows up as a co-design activity (Sanders, 2008) based on the methods of Design Thinking (Brown, 2009). (2017, p. 29)

The informed architect's work is therefore based on a more hands-on approach: from being a professional of the field to being a professional in the field. Through this, he/she can stimulate the "social conversation" (Escobar, 2018, p. 162) and generate opportunities for "social learning" (Marseglia, 2018, p. 49) in which different stakeholders participate and provide their competencies, knowledge, and skills. Its theoretical basis "must 'illuminate' concrete problems, not 'muddle' and confuse people with unintelligible terminology" (Ander-Egg, 2003, p. 69) and should function as a development of the practice and not as a distraction from it (Schön, 1983).

The following section explains in more detail the methodological framework this thesis proposes for informed architects. Moreover, it presents the toolbox resulting from the research work in the interest of moving from a traditional professional-client relationship to an inform(al)ed epistemology of practice.

5.3 The integrative collective-based approach

Designing with the community is not a new idea. By the 1930s, social psychologist Kurt Lewin coined the term "action-research" based on his work on the notion of field theory which states that: "theoretical knowledge and practical knowledge must inform each other in a concrete context for the creation of a true domain —field— of action" (Groat and Wang, 2013, p. 44). Less than a decade later, Lewis concluded that "No action without research; no research without action," which was the basis for the methodology that would later be called Participatory Action Research (PAR) (Ander-Egg, 2003).

Although PAR is mainly used in the field of social sciences, some authors have brought it closer to urban planning and architecture[142]. For Donald Schön, an author already cited throughout this thesis, the design process is a reflection-in-action activity (1983) that results in "the sum of the reflective actions taken in response to the factors unique to the concrete context" (Groat and Wang, 2013, p. 43). These definitions —from Lewis and Schön— make it clear that architecture is a social practice, a "comprehensive method of thinking and action" (Katoppo and Sudradjat, 2015, p. 118). It is also a political one "in a good sense of believing that it should be emancipatory and empowering" (p. 123)[143]. Thus, its contextualization allows it to be legitimized by the final users.

Furthermore, architecture is also critical and active when it gives answers motivated by the deep study and understanding of the genius loci in the reality where it operates. Some fundamental questions that the informed architect must ask

---

[142] Like the "learning by doing" or "service learning" methodologies. For more information see Visconti, 2017, p. 354.

[143] According to Visconti:

> The empowering concept as "to give power, to enable to", is used in the resilience frame-work with regard to local communities to express a process of knowledge-transfer that stimulate and support local practices, strengthening the responsiveness and the preparedness to stresses as natural disasters, emergency situations and climate changes impacts (UNISDR, 2012). (2017, p. 360)

himself to start working are based on the initial phase of the Participatory Action Research methodology (Ander-Egg, 2003). The list, of course, can be much longer:

- What are the needs and problems we face in our reality?

- Which are the most urgent and should be solved as a priority?

- What are the centers of interest that motivate and mobilize our people?

- What are the obstacles and difficulties we may encounter in solving our problems?

- What resources do we currently have?

- What potential resources can we access in the short, medium, and long term?

- How many organizations are active in the area?

- What do they do?

- What do they want to do?

- What are the real possibilities of carrying out joint activities or coordinating the tasks being carried out?

As discussed in the preceding sections, generic answers to local problems usually lead to mediocre results. This is why architecture needs to be complemented by other disciplines and thus avoid self-referential results. For instance, adopting some social science —sociology, anthropology, geography, and ethnography, among others— methodologies have contributed to the empowerment of communities. This, in turn, has favored the development of significant projects for marginalized communities. The integrative collective-based approach built in this dissertation was motivated by the need to direct the technological field of architecture, the environmental awareness and effectiveness of tradition and vernacular architecture, and the community and collaborative sphere of urban self-construction towards a common goal: the improvement of informal neighborhoods.

Some informal features, such as progressiveness in urban self-construction, have enormous potential. However, these are considered synonymous with degradation due to the conditions of necessity in which they are produced. However, as Prof. Emerito Rosario Giuffrè clarified when he spoke about environmental design, paraphrasing Mies Van der Rohe: "technique, if it reaches its real fulfillment, transcends into architecture" (2014, p. 3). In this case, the

popular techniques in informal settlements fulfilled the primary function of giving shelter —avoiding value judgments— to the neediest people. Therefore, decolonial and pluriversal dialectics between different spheres —formal and informal, traditional and modern, rural and urban, and low-tech and high-tech— can strengthen the design process of informal architecture (**Figure 88** and **Figure 89**).

Industrialized construction

VIS, VIP Non-desirable Viable Feasible / Low - Intermediate tech Bad quality	Gated communities Desirable Viable Feasible / High - intermediate tech Good / bad quality
Informal and illegal neighborhoods Non-desirable Non-viable Feasible / Low-tech Bad Quality	Traditional, vernacular architecture Non-desirable Non-viable Feasible / Low-tech Good quality

Informal and social housing (left axis) — *Formal housing* (right axis)

Self-construction

Figure 88. How housing is built in the contemporary Latin American city.

Industrialized construction

Modern and contemporary low-cost architecture | Modern and contemporary high-cost architecture

Informed architecture

Informal and social housing

Formal housing

Popular modern architecture | Traditional, vernacular architecture

Self-construction
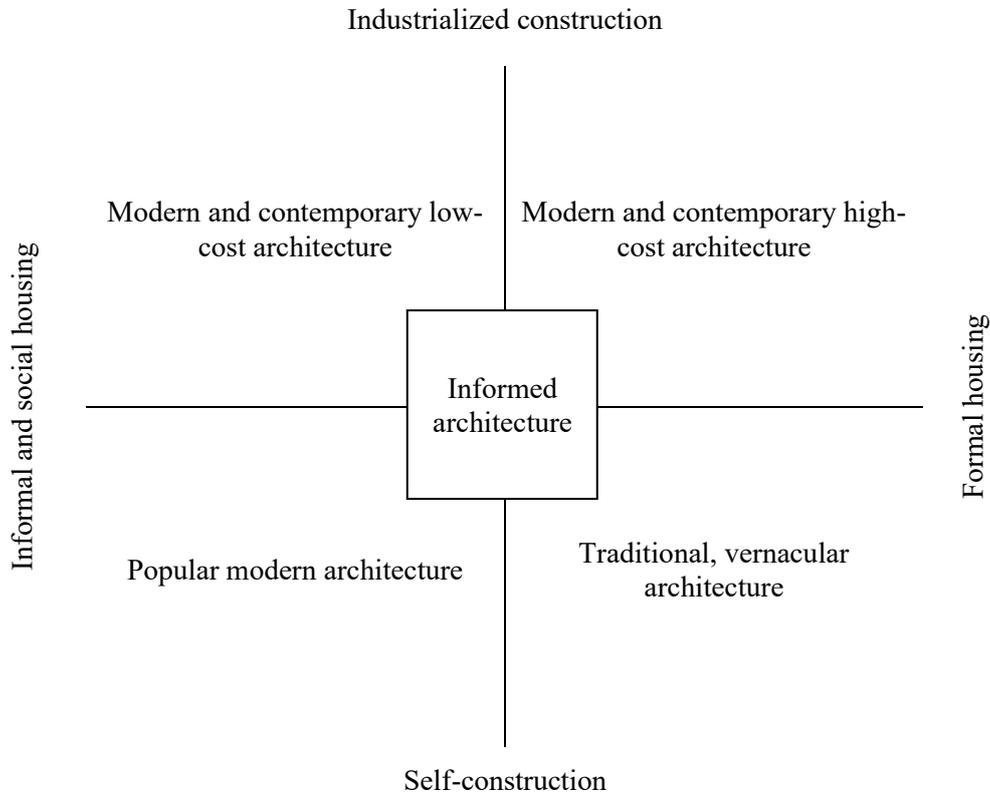
Figure 89. How a decolonial and pluriversal dialectic between different spheres could emerge.

Although subjectivity is a fundamental part of the integrative collective-based approach, it has a determined academic as well as social value. It is to contribute to the forms of knowledge production [144]. This "operative container" (Lanzavecchia, 2000, p. 75) acts "beyond scientific rigor, geometry and rules, in favor of a slightly blurred thought that is more consistent with the situation of non-consolidated"

---

[144] Colmenares explained that:

Habermas (cited by Cifuentes, 2011), in order to explain the ways of producing knowledge, has proposed a classification that he calls interests, namely: technical, practical and emancipatory. Each of them enables the development of various research alternatives, allows defining the sense or perspective with which research is carried out, prioritizes some categories of knowledge of reality, defines the intentions, conceptions and methodological path of the study. (2012, p. 103)

(Mellano, 2018a, p. 41). That is why it is possible to use the three paradigms proposed by Colmenares to produce knowledge (2012, p. 103) (**Figure 90**):

- The Empirical-analytical: with a technical interest, with the purpose of predicting and controlling.

- The Historical-hermeneutic: of practical interest, with the intention of locating and orienting.

- The Social-critical or Socio-critical: of emancipatory or liberating interest, which aims to unveil and break.
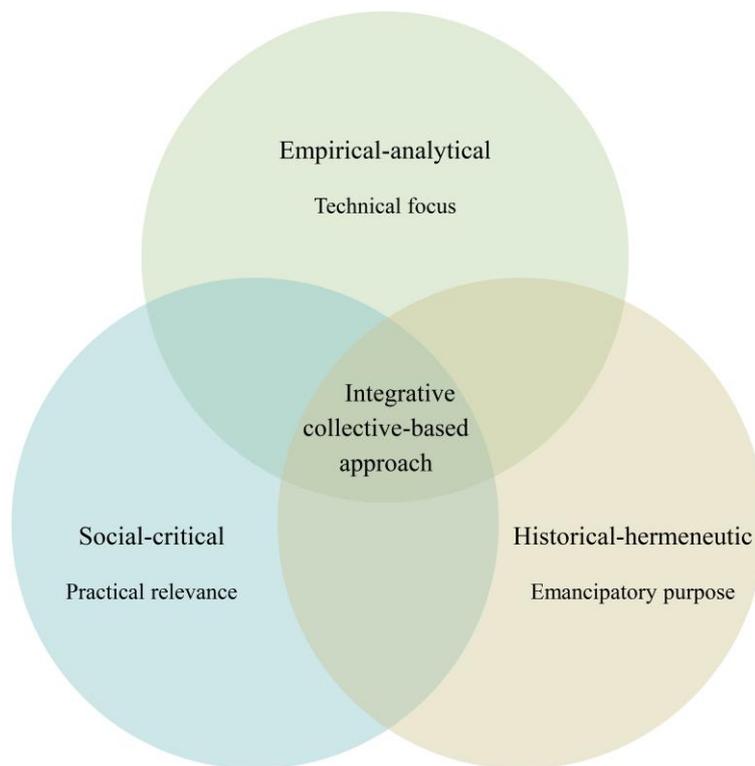
Figure 90. Paradigms for the production of knowledge.
Source: Elaborated by the author based on the information presented in Colmenares, 2012, p. 103.

The integrative collective-based approach is based on community and critical analysis of its reality. As seen throughout the dissertation, it reconsiders the usual hegemonic interpretations of architects in favor of integrating into the design process the voices of the inhabitants who experience the informal environment daily. In addition, it proposes taking into account the memory, history, and tradition implicit in these contexts, which currently speak but are not heard (Spivak, 1988)

to rediscover a forgotten past that can be the key to a better future: the informal genius loci.

As well as the Critical Regionalism school of thought [145], the integrative collective-based approach does not take the notion of tradition as "an alternative to individual invention." Instead, it considers "the essence of tradition and identity, as necessary preconditions for meaningful creativity" (Pallasmaa, 2017, p. 34). It relies on empathy, non-judgmental listening, and the importance of knowing how to ask questions about the discussed topics in the design process because "there's nothing worse than answering the wrong questions well" (Aravena, 2016). It tries to democratize and socialize knowledge by articulating the community's experiences and the professional's theoretical and technical knowledge. Therefore, the relationship between the informed architect and the inhabitants who give their testimony is crucial. Furthermore, since the aim is to arrive at a contextualized response, it is necessary to work on a small scale: a neighborhood, a rural community, an organization, etc.

The informed architect will have at his/her disposal transdisciplinary, multidimensional, and multiscale tools with which to work in a "dialogic balance between the various project domains" (Marseglia, 2018, p. 76). In contrast to the expert discourse criticized by Certeau and considering that "to impose participatory research on people, as is sometimes done, is to deny the essence, the substance of participation" (Ander-Egg, 2003, p. 64), the toolbox can facilitate dialogue between the informed architect and the inhabitants. It allows them to share experiences, and traditions, express ideas and needs, share forms of problem-solving, and communicate desires and aspirations. Moreover, it can enable dialogue between identified local knowledge and other cultural models, strengthening creativity and democratizing innovation.

As Tim Brown stated, design "has become too important to be left to designers." Escobar complemented this phrase by claiming the need for "new methods, approaches, and ways of thinking—a novel 'design thinking'" (T. Brown 2009; Cross 2011, as cited in Escobar, 2018, p. 2). It is essential to understand that even though the tools and channels of horizontal communication are "clear, understandable, applicable and appropriable" (García-Reyes Röthlisberger and Anzellini Fajardo, 2018, p. 45), there is never an absolute consensus. However, it is expected that the toolbox and, in general, the approach of the thesis will help to

---

[145] See section 2.3.

unveil the "spirit of the place" and the "spirit of the collectivity" The latter is understood according to Latour's definition (1993): human and nonhuman together[146].

The integrative collective-based approach is part of "an optimistic vision for a future where informality is the driving force of the majority of cities of the developing world" (Gouverneur, 2015, p. 267). Based on methodological pluralism and the context in which the informed architect works, it was decided to maintain this margin of informality in the empirical approach that the thesis develops. Thus, it does not contemplate a methodology but a methodological framework, rigorous but flexible: informed. This framework combines methods without locking the research into any one of them. It is considered that this lack of commitment to a one-and-only methodology is a strength in this case since fixed processes do not fit the informal.

The integration of different sources in each chapter has resulted in identifying the elements that compose the toolbox. Considering the best practices analyzed in this chapter, some used social sciences methodologies such as Participatory Action Research. For instance, the research on Egyptian vernacular architecture is an excellent example of transdisciplinary to overcome the focus on the inhabitants as passive objects of study. In PAR, in fact, inhabitants "become active subjects, on which the achievement of the goals set by energy strategies depends (Janda, 2011, as cited in Attaianese and Acierno, 2017, p. 80). Although chapter 2 did not discuss PAR, one of the tools identified during the research on collective intelligence is the collective recovery of history, memory, and knowledge, which is a fundamental part of the PAR methodology. Likewise, the Manual de Mapeo Colectivo, chosen as a best practice, uses the systematization of experiences and popular knowledge as well as systematic restitution as a working tactic. These are also pillars of PAR. A more detailed explanation of these three comprehensive tools will be given below.

The collective recovery of history, memory, and knowledge

In the text "*L'Architettura come spartito della memoria*," architect Emilio Faroldi introduces a phrase by Ernesto Nathan Rogers as follows:

> On the apparent dichotomy between the value of history understood as
> the guardian of memory and identity and the architectural project as an

---

[146] See section 2.5.

instrument of innovation Ernesto N. Rogers argues the following: "The present work serves as a bridge between the past and the future; it is not a moment of pause but the obligatory point of the passage of history from yesterday to tomorrow. The guarantee of the validity of present work is precisely in obliging history to pass through new inventions so that they can never again be dispensed with when considering the facts of men to transform them in their ineluctable evolution". (Rogers, 1964, as cited in Faroldi, 2017a, p. 113)

The project, therefore, owes itself to history and memory, and these can be read in the project. Unfortunately, the opposite happens in many initiatives for improving informal neighborhoods. The projects that have wanted to erase their history and collective memory have not been "validated" and have failed. This is why the proposed methodological framework considers the collective recovery of history, memory, and knowledge as a tool, or better, a group of tools that can assist the work of the informed architect. Through these, the inhabitants become the main methodological resource to restore memory's —or *mémoire* [147] — plural and timeless value.

The collective recovery of history, memory, and knowledge is one of the main processes of PAR. It is based on the idea that people, through "knowing," begin to participate in "doing." The aim is to enable people to become aware of the experiences they have had by "noting the 'traces' and searching for their roots, highlighting and re-evaluating the protagonism of what the people themselves have done to improve their situation" (Ander-Egg, 2003, pp. 32-33). Likewise, its purpose is to revalue the relationship between the cultural system that has legitimized the transformations of the territory, and the environmental and geographic system, the scenario of life of diverse cultures. From a decolonial and pluriversal perspective, the collective recovery of history, memory, and knowledge acquires even greater importance if we consider that for many communities —such as those living in informality— "their own history of exploitation and alienation does not allow them to take the initiative to transform their reality" (Balcazar, 2003, p. 67).

This collective practice of equally collective consciousness recognizes the potential accumulated in popular knowledge. According to the Colombian sociologist Orlando Fals Borda, who is one of the essential referents of PAR in

---

[147] According to Certeau, "'Memory,' in the ancient sense of the term, wich designates a precence to plurality of times and is thus not limited to the past" (Certeau 1984/1980, p. 82, 218).

Latin America, "one of the characteristics of this method, which differentiates it from all others, is the collective form in which knowledge is produced, and the collectivization of that knowledge" (Fals Borda and Rodríguez Brandao, 1987, p. 18). This form of knowledge production can destroy negative preconceptions and promote innovative thinking and creativity to improve the reality in which the community finds itself.

An example in the informal settlements may be the collective recovery of history, memory, and knowledge related to vernacular know-how. Through this process, constructive traditions could be recovered and incorporated into present and future building practices. This information would help explore possible applications of Tecnologías Sociales for different architectural elements. It is worth remembering that Colombian vernacular architecture continues to be part of the landscape and culture of rural areas and many historic urban centers. According to Anzellini & Garcia-Reyes Röthlisberger:

> Vernacular architecture, which does not require architects and is the result of centuries of experimentation through the integration of indigenous and European techniques, is the most traditional way of building in many rural and urban areas of the Colombian Caribbean. (...) For example, the use of palma amarga leaves on house roofs successfully creates comfort in interior environments (bioclimatic solutions) by adding aesthetic and cultural values as an example of our identity, tradition, history, and cultural heritage. (2015, p. 8)

The reality of everyday life is a rich repertoire of ideas, practices, knowledge, intuitions, and resourcefulness unknown to the inhabitants themselves and forgotten by professionals. Moreover, oral descriptions of places, materials, or techniques represent an immense heritage of spatial, physical, and social relationships. As Certeau brilliantly stated: "everyday stories tell us what one can do in it and make out of it. They are treatments of space" (Certeau, 1984/1980, p. 122). Therefore, using the tools for the collective recovery of history, memory, and knowledge, the informed architect can find models and archetypes that come from collective memory, arriving at answers that innovate the design process in informal settlements.

In this process, care must be taken with the vocabulary used with and by the communities. De Sousa Santos poses a very pertinent question for these cases in which the success of the result depends on an excellent job of "translation" done by the professional —in this case, the informed architect. He asks, "how to make sure

that intercultural translation does not turn into a new version of abysmal thinking, a soft version of imperialism and colonialism?" (2010, p. 61). To give a possible answer to this question, the integrative collective-based approach proposed with the toolbox contemplates a transcultural dialogue with a vocabulary based on the ecology of knowledge and the collective construction of knowledge.[148] For this purpose, the researcher must provide "logistical support based on his or her experience and prior knowledge" (Balcazar, 2003, p. 64). Moreover, it is crucial to promote the development of critical consciousness (p. 67) through dialogue and authentic communication "in which outside researchers demonstrate their ability to listen to community members, and community members can effectively communicate and listen to each other" (Balcazar, 2003, p. 68).

Systematization of experiences

The information obtained through the collective recovery of history, memory, and knowledge must be analyzed and interpreted to remove it from "the objectivist paradigms of description, information, and document" (Mellano, 2018a, p. 39). "Analysis" means "to study the aspects, phenomena, facts, and elements that are related to the problem investigated," while "interpretation" is given meaning to the data (Ander-Egg, 2003, p. 93). According to Ander-Egg:

> It is imperative that in this phase, the promoting team or external agents make a more outstanding contribution of theoretical elements (...) This theoretical-interpretative contribution aims to provide people with details to judge "why the things that happen are happening." (2003, p. 93)

One method that can be used to do this is data triangulation. Through this, the informed architect can broaden his vision of the problem he/she is facing. The sources can not only be secondary; it is also convenient to triangulate the discourses of the inhabitants with others made by individuals on the other side of the spectrum, with different points of view, stories, and experiences. The importance of the decolonial and pluriversal approach to the project should never be forgotten. The informed architect can collect information through observation, individual or group interviews, workshops, etc. It must also be transcribed, coded, and categorized to search for unique themes. Moreover, it is essential to define the terminology used in the research (popular, formal, informal, traditional, vernacular, etc.), which should be understandable to all and not designed to confuse people simply for the

---

[148] See section 2.4.

vanity of the practitioner. What is crucial here is that the knowledge of the informed architect and the community should be equally important and valid.

Systematic restitution

It is not only important to obtain responses from the inhabitants and arrive at results that are useful to the researcher: to write an article, design a project, get a diploma, etc. Above all, it is vital to systematize people's experiences and knowledge and return the information to the inhabitants themselves through systematic restitution. The latter is essential for the inhabitants to make a critical reading of their reality from new points of view and for the informed architect to be able to modify opinions and preconceptions. Therefore, the informed architect is responsible for giving meaning to the information so it can become the basis for new knowledge and future projects contextualized and related to the community.

In the academic community, we are used to writing long reports with complicated language: the more, the better. In Italian academia, for instance, each disciplinary sector —as the different disciplines are known— uses vocabulary in a specific way to communicate among its followers. Even this thesis has been written with the idea that it will be read and evaluated by a jury specialized in Architectural Technology. However, as already pointed out in section 5.2, the language must be adapted to the audience with which it interacts. It is beneficial to adopt the following guidelines (Ander-Egg, 2003, p. 94):

- Brevity, clarity and simplicity, practicality, and personal reflection are essential.

- Do not use specialized terminology.

- Every sentence must expose one or two ideas.

- Avoid the use of fancy words.

- It is better when using expressions and words that people use to explain an idea.

- Adjectives and adverbs: the less, the better.

- Use of words that have a concrete meaning.

An excellent example whose methodology can be helpful as a working tool for the informed architect is the interdisciplinary project "My House My Body: Forced Migration, Memory and Collective Creation" (2006-2014) by Colombian Prof. Oscar Moreno Escárraga. He intersects Visual Arts with Cultural Studies research

practices to tell the stories of three families from the *Bellavista Parte Alta* neighborhood located in the eastern hills on the outskirts of Bogotá, in the municipality of Soacha. They all share a common reason why they live there today, as they all migrated from their places of origin due to violence and forced displacement. My House My Body is an inventory of housing that analyzes the temporal, physical, and geographical changes in the ways of living of the interviewed families. It considers three moments:

- The house of memory refers to the most significant place they lived in before the forced migration.

- The house of Bella Vista is where and how they live now.

- The house of imagination is where and how they would like to live.
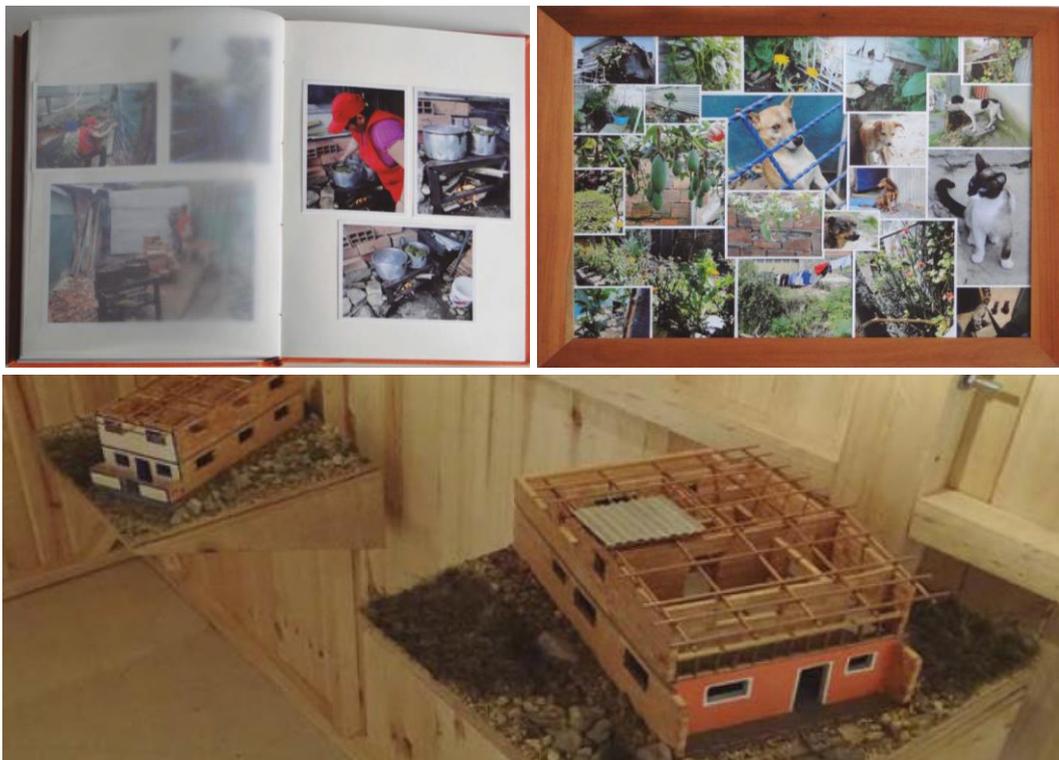
Figure 91. *El álbum fotográfico: familia Plaza-*Sánchez (top left); El *atlas fotográfico: "Plantas y animales"* (top right); *Las casitas posibles* (bottom).
Source: Moreno Escárraga, 2019, pp. 106-107.

The project uses different tactics "(...) to recreate, in words and images, the stories of a house that stretches through time, that probes memory to open paths to the imagination (...)" (Moreno Escárraga, 2019, p. 106). These include: oral stories

(*Los Relatos de la Piel*), photographic images (*El Album Fotográfico* and *El Atlas Fotográfico*), and the construction of scale models (*Las Casitas Posibles*) (**Figure 91**). According to the author, the project was designed to show that:

> People in a situation of forced migration have a whole universe of possibilities of being and inhabiting the new spaces, expressed in their traditional knowledge and beliefs, in their capacity to resignify the events that have occurred and to find dignity in their way of managing their interests. (p. 107)

Another interesting example is the result of the work carried out by the students of the Nuevos Territorios course at the Pontificia Universidad Javeriana and guided by Arch. Santiago Pradilla. They developed the "*Inventario aleatorio. Autoconstrucción en Villagarzón*" (2019). For this exercise, the group traveled to Villagarzón, a town in the Putumayo Department of Colombia. Through observation, photography, drawing, and interviews with some of the inhabitants of self-built informal housing, the students could collect information and systematize it into a publication available to anyone who wants to know about this reality, including the inhabitants themselves (**Figure 92**). The Inventario was a quick exercise; hence systematic restitution was not possible.

In this case, an inventory could analyze the housing as a non-static state to highlight which technological, architectural, and micro-urban elements were lost in the various historical passages of the inhabitants, which remain, which are detrimental, and which could be enhanced. According to Lucas (2016), "technological research on materials or the latest forms of sustainable construction (...) must respond to the history, society, and culture of which it is (part of)" (p. 189). The construction of the "house in time" could become a new reference for intervening in informal neighborhoods based on the "cultural values of building materials and building technologies" (Lucas, 2016, p. 189).

Finally, and always with the idea of pluralism, flexibility, and hybridization, the integrative collective-based approach is thought to be in a "middle ground" (Gouverneur, 2015, p. 175) that combines top-down and bottom-up initiatives together with horizontal and peer-to-peer practices. Considering each model's contributions and always through dialogue, no process in the approach becomes dominant or exclusive. This combination also minimizes "the disabling effect of expert-based systems" (Escobar, 2018, p. 161) and increases the potential for community consensus.

BICASA
BIHOUSE

Villagarzón, Putumayo.
Cra 2da.

casa sobre casa
house over house

ventana oculta
hidden window

anden de acceso
access platform

acceso lateral al patio
lateral access to patio

pilares en madera
wooden pilars
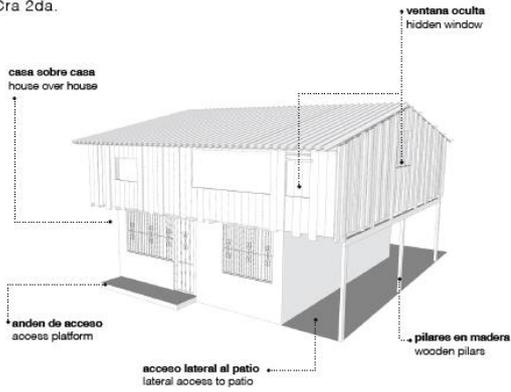
LA CASA BALCON
BALCONY HOUSE
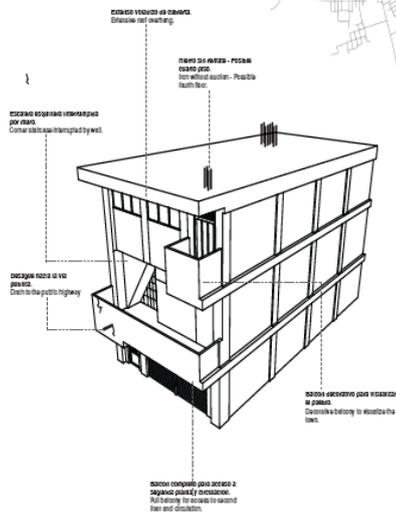
EL CASTILLO VERDE
THE GREEN CASTLE

Villagarzón, Putumayo
carrera 3 #41

Torres tipo castillo
Castle towers
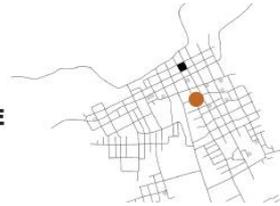
* Estructura sin terminar
Unfinished structure

* Balcón redondo dentro de vano rectangular
Round balcony inside a rectangular opening

* Ventana estilo puerta de garaje
Garage door style window
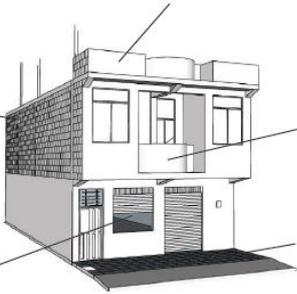
* Baldosa para diferenciar la propiedad
Tile to differentiate the property

CASA PLURIMATERIAL
PLURIMATERIAL HOUSE

Villagarzón, Putumayo
Unnamed Road.
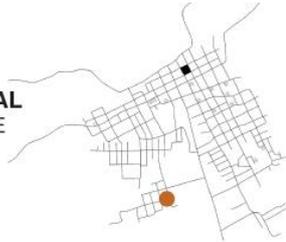
PATIO TRASERO
Back patio

*MURO EN TEJA
Rooftail wall

*Muro en concreto
Concrete wall

*Muro en madera
wooden wall

CASA AJIMEZ
MULLIONED HOUSE

Villagarzòn, Putumayo
Carrera 91 # 5

* Pared sin ventanas y dos puertas
Wall without windows

* Tuberia exterior
Outer pipe

* Rejillas decorativas
Decorative grilles

* Calado tradicional
Traditional draft

Figure 92. Some of the dwellings analyzed for the Inventario aleatorio Autoconstrucción en Villagarzón.
Source: PEI group 2019. Arch. Santiago Pradilla. Students: Jordi Barrantes, Laura Suarez, Juan Guillermo Bautista, Laura Durán, Lina Roballo, Manuela Duarte, Ivan Guerrero, Carlos Guatame, Andrés Felipe Perez, and Margarita Florez.

5.4 The tools

Table 19 identifies what working tactics of the practices analyzed in the present chapter were adopted to develop the toolbox this dissertation work tries to build.

Table 19. Working tactics adopted in the toolbox, according to the best practices analyzed.

Dimension	Tools
Theoretical and analytical	Secondary research
	Transdisciplinary support
	Glossary and terminology
Participative and collaborative	The collective recovery of history, memory, and knowledge
	Visual resources
	Interviews
	Conversation starters
	Card sort
	Systematize popular knowledge and experiences
	Workshops
	Participant observation
	Surveys
	Fieldwork
	Questionnaire
	Introduction to analyzing elements
	Slideshow and video
	Informal dialogue
	Exhibitions
	The house in time
	Collective self-construction
Software and digital	Databases of best practices
	Models
	Drawings
	Type-morphological analysis
	Data visualization
	Information Sharing
	Online Design Platform
Practical and material	Troubleshooting Guide
	Maps
	Drawings
	Laboratory tests
	Categorization of the information
	Systematic restitution

5.5 The Informed Design Toolbox

Throughout the thesis, several tools were collected to facilitate and improve informed architects' work and students in (in)formation. It is important to note that not all tools have the same level of complexity and hierarchy. For instance, many are macro tools (Comprehensive tools) composed of others (Working tactics) to fulfill their objectives. Among the latter, there are propaedeutic literature to work in informal contexts, informatic instruments that contribute to the architectural project's environmental sustainability and the eco-compatible technological design, databases related to traditional materials and construction techniques, and qualitative operative processes, among others. This heterogeneous range oriented to the work of the informed architect is complemented by the methodological practices presented in this chapter. These working tactics help promote the conscious participation of the inhabitants, the collective and individual imagination, the articulation of stories and experiences with technical information, and the identification of commonalities between human and non-human stakeholders. They also help to overcome mental and behavioral barriers, abolish colonial patterns and models and enable Social Innovation and Tecnologías Sociales (Marseglia, 2018).

On the other hand, not all tools must be used on every project. The informed architect is who verifies the need to use one or another according to the purpose of the intervention, its scale, and the time and resources available, among other variables. **Figure 93** organizes all the tools identified in this thesis according to the dimension to which they belong, their complexity, and the hierarchy level. Additionally, to orient the reader, the table will show in which chapter(s) the tools were recognized. **Figure 94**, instead, shows the organizational scheme of the Informed Design Toolbox for the informed architect. The figure is followed by an explanation of each of the tools. It should be noted that the EURECA and EDGE software are not included in the description because they will be discussed in section 6.4.

To sum up, the purpose of this chapter is not to invent a new working methodology from scratch. It proposed the definition of an integrative approach for improving informal housing based on the many examples of collective and collaborative processes from different disciplines already present in various contexts and other parts of the world. The selection of representative tactics and instruments in this thesis configures an open, dynamic, critical, reflexive, decolonial, and pluriversal toolbox which, as will be seen in chapter 6, was partially tested in the selected case study.

	Comprehensive tools	Chapter	Working Tactics	Chapter
Theoretical and analytical	Secondary Sources and propaedeutic material	2,3,4,5	Bibliography	2,3,4,5
			Sitography	2,3,4,5
	Glossary and terminology	2,5		
	Transdisciplinary support	2,5		
Participative and collaborative	The collective recovery of history, memory, and knowledge	2,5	Interviews, surveys, and questionnaire	2,3,5
			Visual resources: Conversation starters, slideshow and video, card sort, introduction to analyzing elements	5
			Workshops	4,5
			Fieldwork: Informal dialogue, Participant observation	4,5
	Systematization of experiences		Inventario aleatorio: The house in time	4,5
			Exhibitions	3,5
	Collective construction	3,5		
Software and digital	Information Sharing	2,4,5	Type-morphological analysis	5
			Models and drawings	4,5
	Data visualization	3,4,5	Databases of best practices	3,5
			Online Design Platform	5
	Environmental and technological design tools	2	EURECA	6
			EDGE	6
Practical and material	Systematic restitution	5	Database of traditional techniques and materials: Laboratory tests, drawings	3,4,5
			Troubleshooting Guide	5
			Mapping: Circular economy map	2,4,5
			Categorization of the information	3,5
	Eco-compatibility standards and regulation	4		

Figure 93. Comprehensive tools and working tactics.
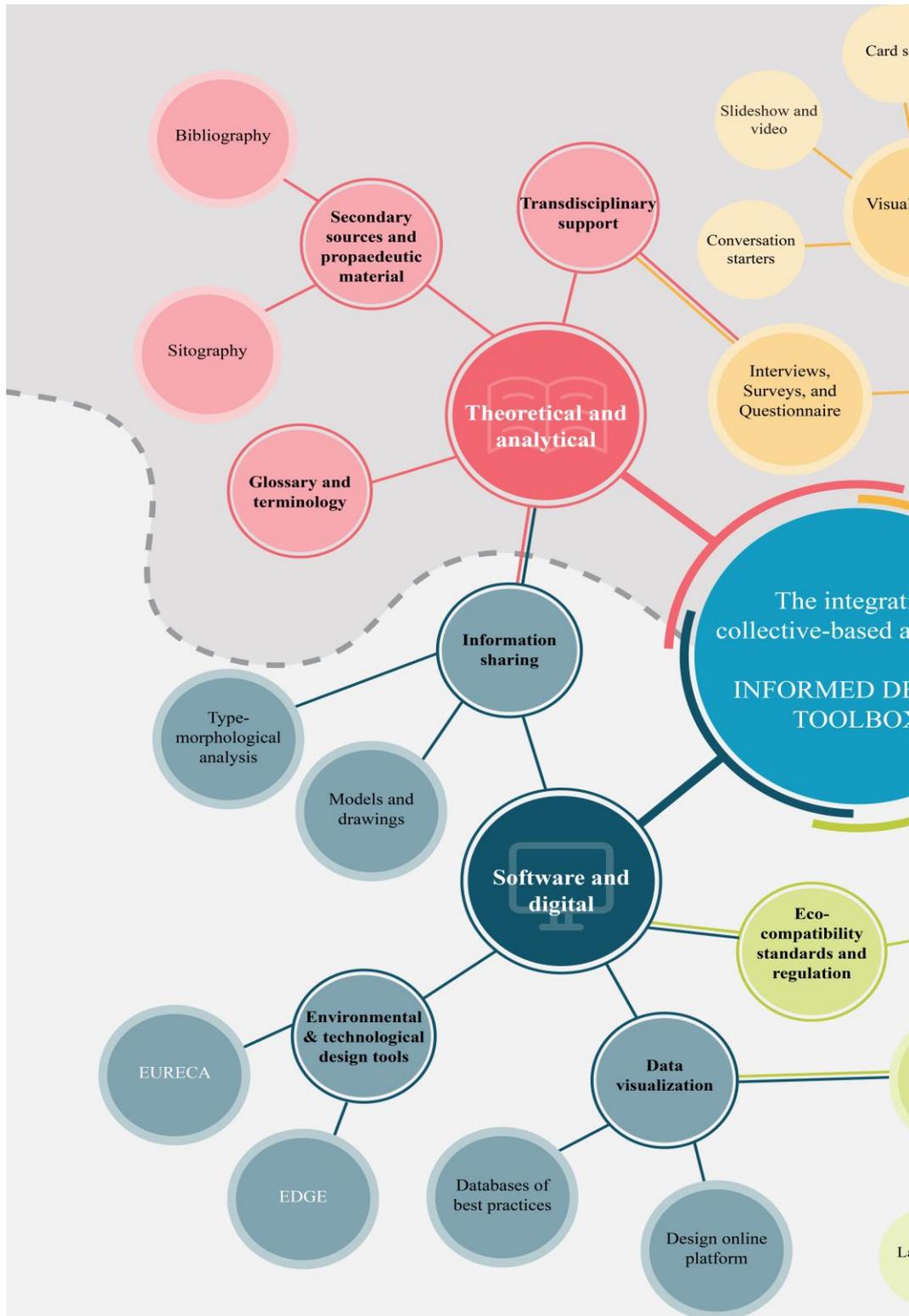
Figure 94. Informed Design Toolbox. Organizational scheme.
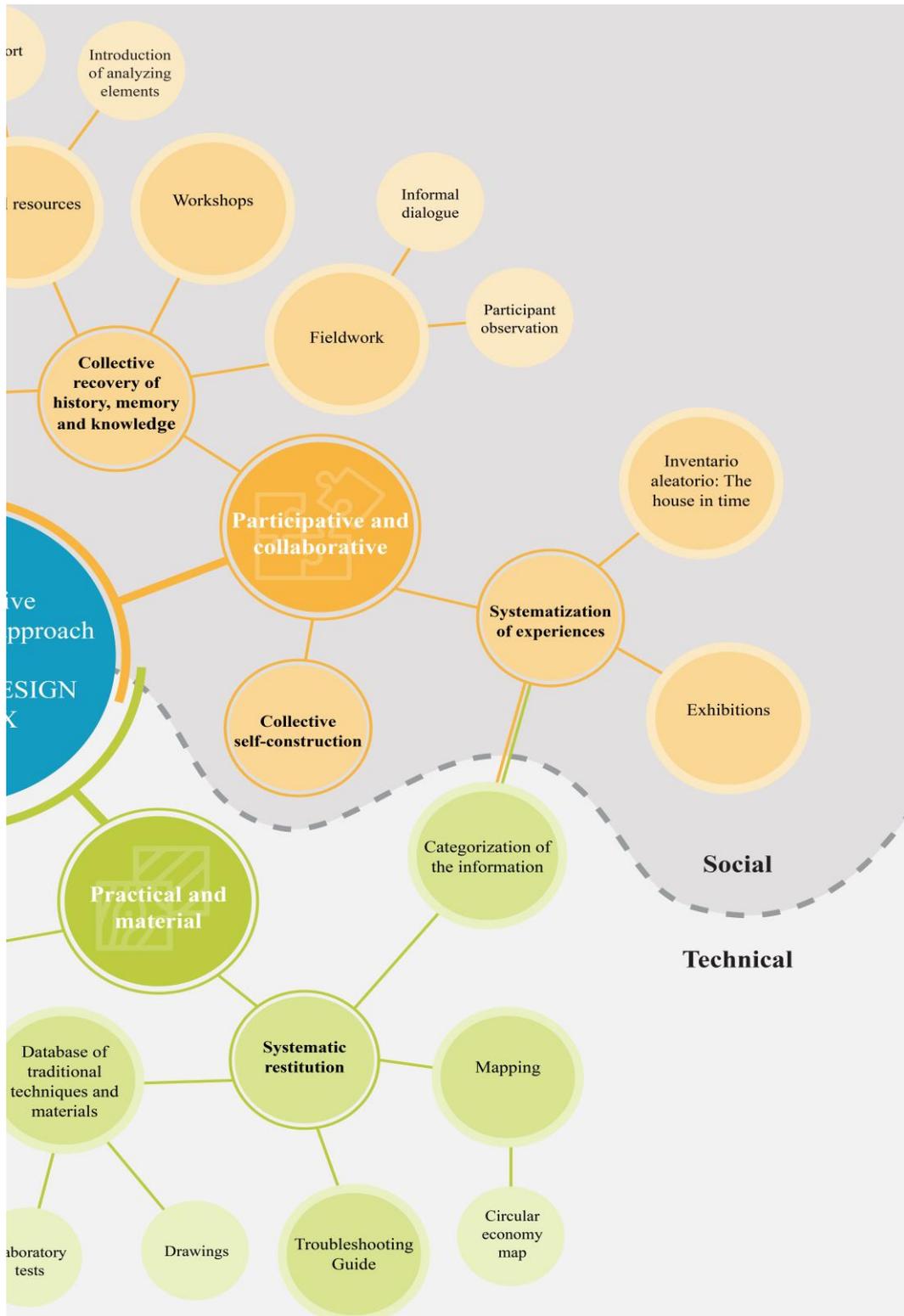
Theoretical and analytical tools

- **Secondary Sources and propaedeutic material:** allow research to be defined and contextualized. Moreover, they provide instruments to get into the study process with a more receptive mindset. One of the bibliographic sources that are part of state of the art is the work by Enzio Manzini, compiled in his book "Design, When Everybody Designs: An Introduction to Design for Social Innovation" (2015). In this, Manzini describes a series of participatory design experiences for social innovation, which are examples of what he calls "Visual Tools for Social Conversation (p. 133). As Escobar described, these "community-oriented" tactics:

   > (...) include tools for mapping collaborative encounters; heuristics for discussing types and degrees of involvement on the designer's part; collaborative scenario building; mapping and visual tools to facilitate social conversations; and the generation of metavisions of alternative, although as yet unrealized, forms of living. (2018, p. 162)

   - **Bibliography and sitography:** Although the informed architect is not limited to a specific methodology, and his actions go beyond scientific rigor, the organization of secondary sources is essential to maintain academic value. Moreover, through information sharing, these sources can become propaedeutic material for those who wish to work informed.

- **Glossary and terminology:** formulating a glossary and a conceptual alphabet with related terms as well as unknown and non-existent ones is important to develop an "informal" language. It is also helpful to understand local vocabulary to improve the communication between the architect and the inhabitants. Some academic concepts that have been explained throughout the thesis are:

Vivienda social	Appropriate technology	Epistemicide
Ecology of Knowledge	Grassroot Innovations	Critical Regionalism
Inteligencias Colectivas	Social Innovations	Dynamic repair
Pluriversality	Decolonial	Emerging heritage
		Encuentro de saberes

On the other hand, some local terms defined in the thesis are:

De material	Maestros de obra	Madres comunitarias
Pirate developer	Campesinos	
Escuela Taller	Casas campesinas	Quincha
Adobe	Guadua	Junta de Acción Comunal
Tapia pisada	Palma Amarga	
Bahareque	Casa cafetera	Pirate neighborhood

- **Transdisciplinary support:** the different disciplines of knowledge should not be understood as individual entities but as complementary to each other. As we have seen throughout the thesis, architecture cannot provide sustainable answers if a transdisciplinary approach does not support the design process. In the case of informal settlements, the social sciences must play an equally —or more— important role than the scientific sciences.

Participative and collaborative tools

- **The collective recovery of history, memory, and knowledge:** in informal settlements, this could be an enriching macro tool for resignifying popular and ancestral elements. The collection of information on the antecedents and background of the inhabitants could also allow the recognition of imaginaries and contradictions about tradition and progress. This is not with the idea of proposing to imitate the past but instead with the aim of "inherited intangible values in ways that respond to contemporary needs. (...) to build on the traces of the old vernacular tradition and map them onto the future" (Dabaieh, 2013, p. 293).

  o **Interviews, surveys, and questionnaires:** for instance, group interviews, discussion groups, focus groups, intervention groups, triangular groups, etc. (Martí, 2002, p. 92). The four most suitable types of interviews are the focused interview, the informal discussion, the free-form interview, and the semi-structured interview. These tools can enable "the memory of a culture" that forms the "popular *art of speaking*" (Certeau, 1984/180, p. 24, italics in the original). Moreover, they can help the informed architect understand the various inhabitants' different images of the "inhabited" area (Moravánszky, 2017, p. 8). It is important to remind not to formulate leading questions. It is also recommended to interview "in the field" in an informal way.

o **Visual resources:** are tools that allow more significant interaction among the inhabitants. With these, the participants can remember, share and analyze the different aspects dealt with in the workshops or the group and individual meetings. As stated by Marini, "participation requires an image, a vision that can shape the common ground to link its possible configurations with an idea" (2017, p. 47).

– **Conversation starters:** to suggest ideas related to essential topics, to provoke reaction even if it is the opposite of what you believed or wanted, and to encourage creative thinking and innovative problem-solving. An example may be themes related to using natural materials in architecture: What do they think about these houses? Which construction materials do they recognize? Do they like them? What would they change?

Figure 95. *Casa Munita* González (2010) - Photo Luis García - Mixed technique: *Quincha metálica.*
Source: https://www.archdaily.com/379734/casa-munita-gonzalez-arias-arquitectos-surtierra-arquitectura/51a6a847b3fc4b10be0002c4-casa-munita-gonzalez-arias-arquitectos-surtierra-arquitectura-photo?next_project=no. Accessed on June 20th, 2022.

Figure 96. Cultural Machine (2015) – Photo by PEI Team - Mixed technique: industrial and natural materials.
Source: https://www.behance.net/gallery/37018273/Solar-Decathlon-2015-Architecture-first-place-award. Accessed on June 20th, 2022.

– **Slideshow and video:** to shift inhabitants' belief that natural, traditional, vernacular, and local construction materials and technologies are related to poor standard housing conditions and to approach the inhabitants with new perspectives about topics on which they had a different vision. These are easier to understand for most inhabitants, which is why they perform better in active participation. An example is a project developed by Dabaieh in Egypt[149] which used slides to show 20th-century European and U.S. adobe houses and videos of interviews with wealthy citizens that happily live in traditional houses in Cairo. Another example could be to show good solutions for housing in specific climates to discuss: Why do they think traditional materials are synonymous with poverty? Would they be interested in learning more about traditional materials in contemporary architecture?

---

[149] See section 5.1

Figure 97. *El Caney* house, Camilo Holguín - 2006 (left); *Imalla* house, Lucia Garzón – 1990 (right).
Sources: https://www.arquitecturanativa.org/;
https://www.unipiloto.edu.co/descargas/Egresados-Destacados-No.2-NOV-18_3.pdf. Accessed on June 20th, 2022.

– **Card sort:** with this simple exercise, it is possible to get considerable insight into what a person likes and why. It can be handy to demonstrate that other materials are possible. In this game, the informed architect shows each respondent a deck of cards, each card with a word or a single image, and asks them to rank them in order of preference (IDEO, 2015). The cards, in this case, can have pictures or words about different building materials —natural and not— and different types of housing —vernacular and modern. This may give clues to why people choose to build with "modern" materials that are inappropriate for the area, despite knowing that it will be more expensive to maintain the material and internal comfort conditions. **Figure 98** shows six examples of card decks. The users must select couples of photographs by contrast; classify cards, and explain why.
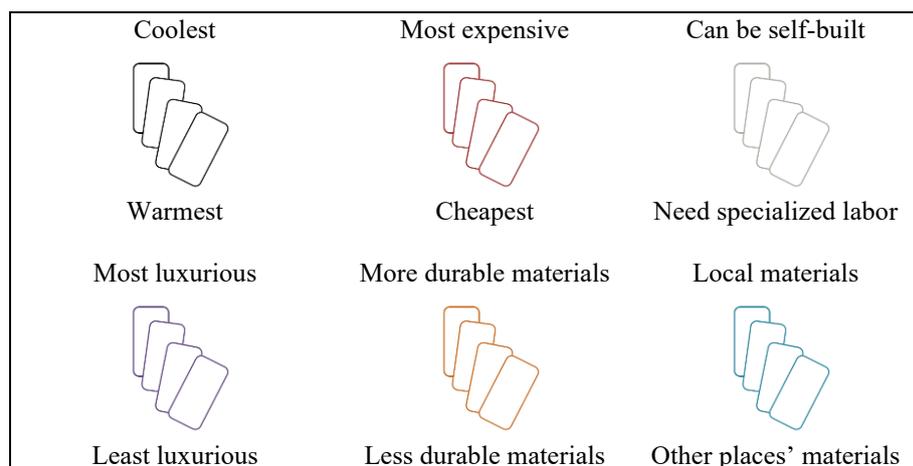
Figure 98. Card sort themes.

– **Introduction to analyzing elements:** to "unblock psychic power and provoke action/reflection by and about society" (Alberich, 1998, p. 36), To generate a process of self-reflection "which allow deconstruction and 'opening up' to new situations and points of view" (Martí, 2002, p. 88), and to seek connections between conflicting ideas. The introduction of certain events or analyzers identified during the research process can impact the community. For instance, a historical analyzer is a tool used in socioanalysis consisting of events that the community is experiencing or has experienced, and that can show existing contradictions (Martí, 2002, pp. 88-89).

o **Workshops:** the informed architect can apply visual resources in group work sessions with the community. These spaces should be characterized by horizontal and simple communication to avoid the dynamics of research subject-researched objects. The community's experience and memory are equally essential and valid sources of knowledge and information.

o **Fieldwork:** a macro tool indispensable for the work of the informed architect. For its execution, the following two working tactics must be considered.

– **Informal dialogue:** is related to the Glossary and terminology tool. Instead of being a total expert, the informed architect must be a translator, articulator, and interpreter of this language.

– **Participant observation:** is a tool used in the social sciences, especially in anthropology, ethnography, and sociology. As the name suggests, it is a closer relationship between the informed architect and the community to understand the daily practices, residential and economic activities, and population dynamics. It is not a study from the outside; it is an in-depth understanding from proximity, intimacy, and familiarity.

• **Systematization of experiences:** a macro tool discussed in section 5.3. Although there are many working techniques that the informed architect can use to systematize the information resulting from the different workshops, interviews, and other tools, this thesis focuses on two of these techniques, which will be explained below.

- o **Inventario aleatorio. The house in time:** is an inventory of housing in which the temporal, physical, and geographical changes of the forms of living of the interviewed families are analyzed: the house of memory (where and how they lived before), the current house (where and how they live) and the house of imagination (where and how they would like to/could live). A more detailed explanation is given in section 5.3.

- o **Exhibitions:** itinerant exhibitions are a tool for communicating the work of informed architects worldwide. They can also contribute to establishing and strengthening creative and collaborative networks of informed professionals.

- **Collective construction:** experiences of collective construction based on informed work are an excellent learning tool for students and professionals who are used to working from the office. Project-Based Learning and Learning by Doing can be applied to these activities.[150]

Software and digital tools

- **Information Sharing:** this macro tool should employ different working tactics. What is essential is that the informed practices do not remain isolated realities but, on the contrary, are part of a collaborative and creative network.

- o **Type-morphological analysis:** the analysis of informal neighborhoods' morphological and typological configuration enables the identification and extrapolation of the essential elements that shape each settlement. This allows seeing the chaos and apparent disorder from another perspective, understanding the logic with which informal dwellings are progressively self-constructed.[151]

---

[150] For more information about Project-Based Learning and Learning by Doing, see the article Hernández-Correa, C.A., Cuberos-Acevedo, J.C., Giordano, R., Muñoz-Veloza, M.A., and Savio, L. (2020). El Solar Decathlon América Latina y el Caribe 2019: una oportunidad para el desarrollo de actividades innovadoras de capacitación y aprendizaje. *International Conference on Transfers for Innovation and Pedagogical Change*, pp. 136-147. Madrid: Escuela Técnica Superior de Arquitectura – Universidad Politécnica de Madrid. DOI 10.20868/UPM.book.66588.

[151] For more information about Project-Based Learning and Learning by Doing, see the article Tessari, A., Benatti Alvin, A. (2022). The form of the informal: a type-morphological analysis of the urban fabric of Paraisopolis favela. *Annual Conference Proceedings of the XXVIII International Seminar on Urban Form*, pp. 695-702. Glasgow: University of Strathclyde Publishing. https://doi.org/10.17868/strath.00080396.

o **Models and drawings:** are two of the tools most used by design professionals. In the case of the informal architect, beyond representing the architectural product, these working tactics must be able to convey the culture and process behind it. An excellent example of this kind of representation is the Graphic Anatomy of Atelier Bow-Wow (Tsukamoto and Kaijima, 2013) which details the residents' daily activities (**Figure 99**).
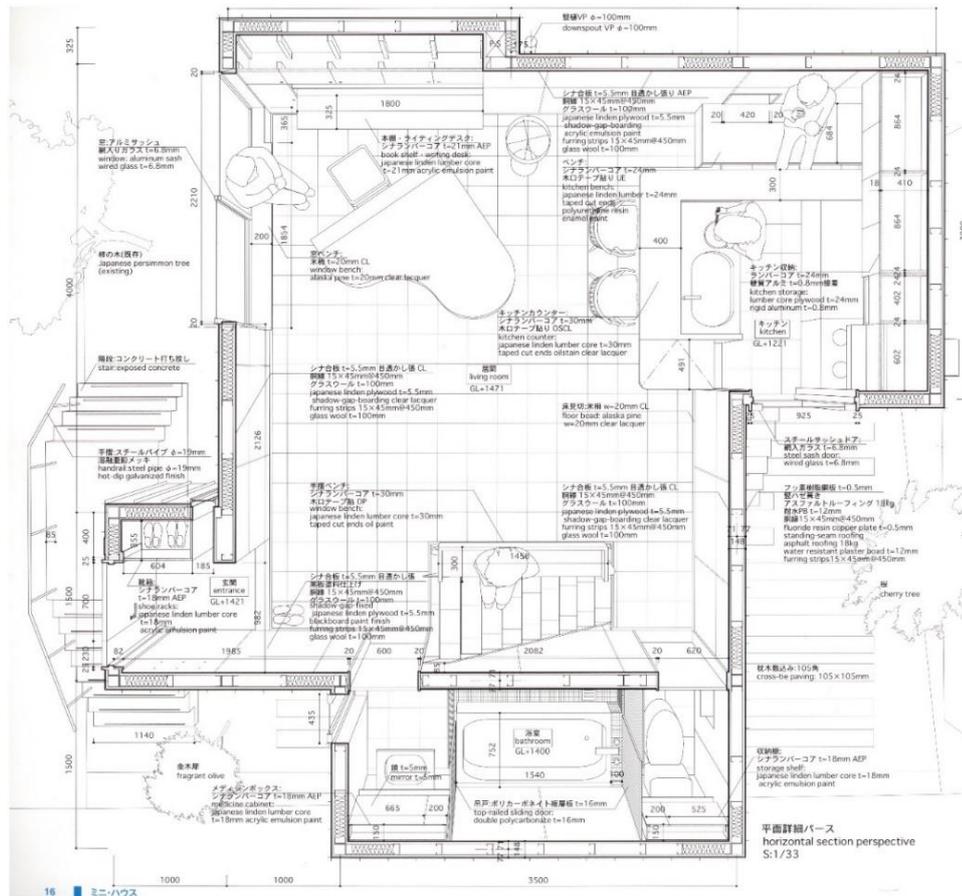
Figure 99. Perspective plan.
Source: Tsukamoto and Kaijima, 2013, p.16.

- **Data visualization:** open information sharing should be easily visible. Online platforms and databases are tools that achieve this goal.

o **Databases of best practices and online design Platform:** the ideas and projects proven to be best practices are indispensable to guide informed architects. However, these should not be considered copy-paste models.

Instead, best practices must engage the professionals' creativity based on the uniqueness of each context.

- **Environmental and technological design tools:** are software tools to support the design definition and evaluation of environmental requirements of products, processes, and materials (Lanzavecchia, 2000, p. 82). Tools for designing and building according to functional needs, regulations and standards, environmental context conditions, and the integration of contextualized techniques and materials.

Practical and material tools

- **Systematic restitution:** is necessary for the information to bring a real benefit to those who provided it. It must be based on a context-specific "language" framework to be understood by the inhabitants, regardless of their level of education. It is also beneficial not to write long and convoluted reports using specialized terminology.

  o **Database of traditional techniques and materials:** is helpful to find information regarding their environmental requirements. It is a tool to properly select and use local and available resources, materials, and technologies (Lanzavecchia, 2000, p. 81).

    – **Laboratory tests:** a tool that complements the previous one as it allows testing -if necessary- the information found in order to contextualize it. It can also contribute to expanding the amount and quality of shared data.

    – **Drawings:** freehand drawings made during fieldwork are working tactics that can increase the sensitivity of the informed architect to the critical reading of informal architecture. Since they need to be done quickly, the professional should focus on the essential elements, leaving aside the "noise" that urban informality may entail.

  o **Troubleshooting Guide:** includes and organizes several common problems the informed architect may face. Through this working tactic, the professional can use reflection questions to clarify his/her ideas. As the best practices databases, a troubleshooting guide is a tool that enables the architect's capacity to give adequate responses. However, it must not be considered a copy-paste method.

○ **Mapping:** this graphic resource can reveal the potentialities of the informal settlements. For mapping, professionals must interact with the community through participatory processes: workshops, talks, and working groups. The data could be used to design low-cost and low-tech retrofitting strategies based on the circular economy principles.

– **Circular economy map:** according to the Ellen MacArthur Foundation, circular economy "replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models" (Ellen MacArthur Foundation, 2013, p.7). The circular economy map is based on "The harvest map" - Oogstkaart in Dutch - developed by architect Cesar Peeren of Superuse Studios (**Figure 100**). [152] In informal settlements, the map can collect information about materials citizens have in their homes or workplaces that can be sold, given away, or exchanged with other inhabitants.
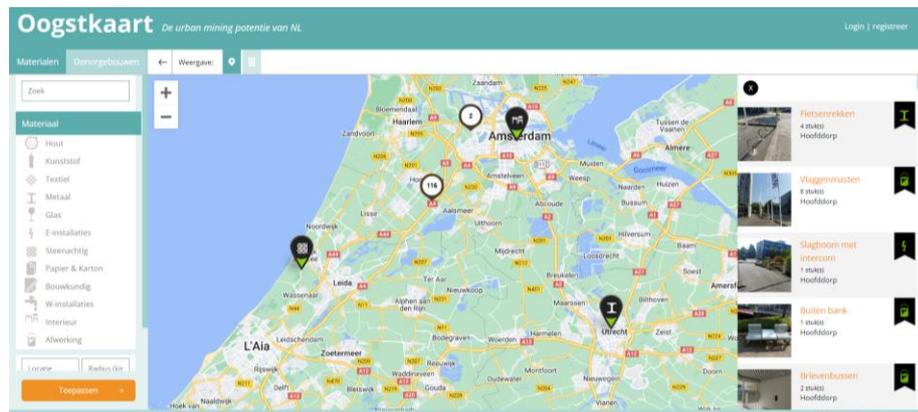
Figure 100: The Harvest map web platform locates products geographically and describes their characteristics: product type, quantity, and dimensions.

○ **Categorization of the information:** the meaning given to the analyzed information must be based on the informed architect's synthesis process. Without an analysis-synthesis unit, the interpretation will be incomplete and

---

[152] For more information about this circula economy tool, see https://www.superuse-studios.com/en/services/ and https://www.oogstkaart.nl/. Accessed on April 11th, 2021.

insufficient. Categorizing the information is a valuable tool for achieving this goal.

- **Eco-compatibility standards and regulation:** define the environmental quality characteristics that can guide the work of the informed architect. The latter is in charge of articulating them with the other tools so as not to fall into a functional and performance reductionism.

Chapter 6: From chaos to a heuristic process

Human action is visible everywhere —in the construction of knowledge *as well as* [italics in the original] in the production of the phenomena those sciences are called to register.

(Latour, 2014, p. 6, as cited in García García, 2017, p. 28)

[EN] Chapter 6 focuses on two experiences related to the case study El Pozón: an analysis of the PEI Máquina Verde-El Arca academic project and the fieldwork in the neighborhood. In addition, the chapter will describe how specific working tactics were implemented in order to unveil some design strategies as well as building and environmental technologies considered appropriate for the reference context and the building habits of the case study's inhabitants.

[IT] Il capitolo 6 si concentra su due esperienze relative al caso studio El Pozón. La prima è l'analisi del progetto accademico PEI Máquina Verde-El Arca. La seconda è il lavoro sul campo realizzato nel quartiere. Inoltre, il capitolo descriverà come sono state implementate specifiche tattiche di lavoro al fine di svelare alcune strategie progettuali nonché tecnologie costruttive e ambientali ritenute adeguate al contesto di riferimento e alle abitudini edilizie degli abitanti del caso di studio.

[ES] El capítulo 6 se centra en dos experiencias relacionadas con el caso de estudio El Pozón. La primera es el análisis del proyecto académico PEI Máquina Verde-El Arca; la segunda es el trabajo de campo realizado en el barrio. Además, el capítulo describirá cómo se aplicaron determinadas tácticas de trabajo para desvelar algunas estrategias de diseño, así como las tecnologías de construcción y medioambientales que se consideran adecuadas para el contexto de referencia y los hábitos de construcción de los habitantes del caso de estudio.

The thesis considered two experiences correlated to the case study El Pozón neighborhood that followed an approach consistent with that described in the previous chapter.

The first is participating in the international Solar Decathlon Latin America & Caribbean 2019 (SDLA&C) competition (**Figure 101**). For this opportunity, a team of students and professors worked on designing and implementing the housing module PEI Máquina Verde-El Arca, conceived for El Pozón. The project was born from a joint analysis of needs and resources, considering how materials can generate collaborative processes.

Figure 101. Photos of the *PEI Máquina Verde-El Arca* housing prototype during and after construction at SDLA&C 2019.
Source: PEI team 2019.

The second experience is the subsequent fieldwork in the informal settlement of Cartagena de Indias (**Figure 102**). The focus of the visits was on trying to detach from the chaos and disorder, the fundamental elements of popular architecture — traditional and informal— though not as a product but as a process. As explained, a multidimensional approach to the reality of informal neighborhoods facilitates

understanding their social, cultural, and environmental dynamics to propose housing improvements. In his analysis of "casual time," Certeau pointed out that:

> Another figure of the transportation of planning projects in the direction of what they do not determine is the unforeseen. The time that passes, interrupts or connects (and which has no doubt never been thought) is not the programmed time. (...) Casual time appears only as the darkness that causes an "accident" and a lacuna in production. It is the lapse in the system, and its diabolical adversary; (...). (1984/1980, p. 202)

Figure 102. Four of the ten self-built houses analyzed in El Pozón.

Informal architecture stands out precisely because it contemplates the "unforeseen," or chaos understood as an "organizing disintegration" (Morin, in De Toni 2013, as cited in Marseglia, 2018, p. 147). That is why both the project for the SDLA&C2019 and the fieldwork in El Pozón attempted to introduce "casual time" into the different activities: from the prototype's design to how the working tactics were used. In PEI Máquina Verde-El Arca, the underlying idea was the union between academic and popular knowledge to propose Tecnologías Sociales. After the completion of the project, further fieldwork focused on how informal self-build

construction could move from being seen as a simple "construction process" to being reconsidered in a "systematic approach" (Ander-Egg, 2003, p. 69).

As Lucas (2016) highlights, "context is too often (but not always) erased by modernist approaches to design and research" (p. 167). In the fieldwork, the El Pozón neighborhood was examined through an alternative reading of informal architecture based on its relationship with vernacular architecture. As established before, the research does not intend to "remystify tradition" or to engage in a battle between tradition and modernity. On the contrary, it sees tradition with an active look to the future, understanding vernacular building practices as a tool to improve informal housing and as part of a new architectural episteme, "one in which sustainability becomes the horizon for purposive living based on a dialogue of knowledges and cultures." (Escobar, 2018, p. 124).

The SDLA&C 2019 project was conceived considering the competition's objective: to design new accessible social housing. On the contrary, the fieldwork focused on existing housing and its possibility of "transformation or metamorphosis." (García García, p. 92) in which "all aspects —social, spatial, functional, economic, procedural, constructive, aesthetic, fruitive, etc.— are considered and related to each other" (Spadolini, 1974).

The integrative collective-based approach was, in part, tested in the case study. For this purpose, the work was carried out in *Isla de León*, one of the most marginal areas of El Pozón. In Isla de León, the percentage of housing consolidation is meager, while the use of precarious materials is high. These characteristics are precisely the reason for the selection of the area, as it was thought to be easier to test this approach with the inhabitants who are still in the process of achieving a definitive housing solution and not with those who already "finish" their de material houses. The latter would have to consider demolishing a part of their consolidated houses to improve their environmental performance.

Unfortunately, the fieldwork was affected by the onset and development of the COVID-19 pandemic, which meant that more weight had to be given to the theoretical component. However, it is worth devoting a chapter to the explanation of the practical component of the thesis, which, although incomplete, can provide an example of how the informed architect will be able to use the toolbox to generate "(...) a new configuration of knowledge (a new episteme)" (Escobar, 2018, p. 52). This chapter gathers information from the two mentioned experiences.

6.1 The case study in Cartagena

There is no consensus on the year the colonists founded Cartagena de Indias. Some sources placed the date in 1503 and others in 1533. They agree that it was built over indigenous territory and is one of the first cities to be established within the framework of the Spanish conquest. Spaniards intended its walled architecture to defend against maritime attacks by their enemies. Today, behind the city walls lies one of the best-preserved historic centers in Colombia, whose monuments, squares, and houses are the subject of numerous trips that attract tourists from all over the world.

Despite its beauty and heritage, which earned it a declaration as a World Heritage Site in 1984 (UNESCO), Cartagena is one of the most socially unequal cities in the country (Hernández Correa et al., 2018). The city walls have separated the old city from the rest of the town and represent a border segregating a significant part of the population. In addition to its historical wealth, Cartagena de Indias has a unique environmental wealth (**Figure 103**). The city benefits from different bodies of water that cross it: "the Caribbean Sea, La Virgen swamp, as well as from a variety of natural and artificial channels that irrigate the territory and connect it to the Nation's interior" (Navarro Morales, 2018, p. 322).

Moreover, the national government and the local administration have categorized Cartagena de Indias as one of the cities with the most outstanding international projection for having "a port area where 60% of the country's maritime trade moves, with more than 2,500 industries that contribute 6% of the national GDP" (Alcaldía de Cartagena de Indias, 2014 p. 20). Apart from this face of "Cartagena that gets all the praise," there is another city: the Cartagena of the Cartageneros, characterized by problems of different types, including economic, social, political, and environmental (Guarín, 2003).

Cartagena has grown without the guidance of an urban planning idea, as have most Latin American cities. Since two of its most important engines for economic development are the port and private real estate rentals, the areas of the town that did not generate profits were forgotten. As a result, today's city is a collection of physically and socially disconnected pieces. The city is also located in one of the most important tourist areas in Colombia: The Caribbean region. Its three main towns: Santa Marta, Cartagena, and Barranquilla, grew along the *Troncal del Caribe*. This vital road corridor has divided the coastal zone —the tourist zone— from the inland zone, which has had two main consequences. The first is that the municipal authorities have focused mainly on exploiting the economic potential of

the beaches, which have been privatized for the exclusive use of large hotels and residential complexes. The second is the neglect of other ecosystems that adjoin and depend on the coastal zone and the balance between the bodies of water.

Figure 103. Natural green and blue areas make up the district of Cartagena de Indias. Source: Alcaldía de Cartagena de Indias, MADS, INVEMAR, CDKN y Cámara de Comercio de Cartagena. 2014, p. 36.

These penalties have generated a decrease in the ecological richness of the internal areas and consequent impoverishment of its inhabitants, who end up being marginalized (Bermúdez & Bermúdez, 2018). According to data presented by Ayala García and Meisel Roca, 55 out of every 100 people who work do so

informally, i.e., they do not have the social benefits of a permanent job. The environmental and social problems are even more problematic, considering that the population rate of Cartagena continues to increase (Alcaldía de Cartagena de Indias, 2020) [153], which will lead to increased pressures on ecosystems. Moreover, segregation, inequality, and social exclusion will surely increase without city planning (**Figure 104**).

Figure 104. The scenario of high (red), medium (orange), and low (green) socioeconomic vulnerability in different sectors of *Cartagena de Indias* in 2040.

---

[153] https://www.cartagena.gov.co/index.php/2017-09-11-20-41-11/93-acciones-comunica-cionales/958-dane-certifica-que-cartagena-supera-el-millon-de-habitantes. Accessed on June 21st, 2022.

Source: Alcaldía de Cartagena de Indias, MADS, INVEMAR, CDKN y Cámara de Comercio de Cartagena. 2014, p. 43.

Figure 105. High flood scenarios (sea level rise + heavy rainfall) projected for the year 2040: 28% of the industry under threat of flooding; 35% of road infrastructure at risk of flooding; 86% of the historical heritage under flood threat; 70% of mangrove areas affected by rising sea levels; 100% of beaches at risk due to erosion.
Source: Alcaldía de Cartagena de Indias, MADS, INVEMAR, CDKN y Cámara de Comercio de Cartagena. 2014, pp. 39, 42.

The exponential growth and transformation of the city have already begun. The town is expanding northward, constructing new urban and suburban areas where gated communities will predominate. Unfortunately, this expansion may have disastrous consequences for the ecosystem of *La Virgen* swamp as it would affect

the relationship with its watershed and destroy the mangrove areas that have survived until today (Romero Olivera, 2018). On the other hand, the city's vulnerability to climate change is equally problematic. According to *Plan 4C Cartagena de Indias Competitiva y Compatible con el Clima*[154], the sea level is expected to rise by 15 to 20 centimeters by 2040 (**Figure 105**). As a consequence:

> (...) the areas surrounding *La Virgen* swamp, the city's tourist zone (Bocagrande, Castillogrande, El Laguito, Centro Histórico), and the port and industrial area would be the most affected by the rise in sea level. The most exposed neighborhoods are Olaya Herrera (39,649 inhabitants), El Pozón (2,122), Manga (6,052), Bocagrande (13,296), Crespo (14,710), and Castillogrande (6,759). (Alcaldía de Cartagena de Indias, MADS, INVEMAR, CDKN y Cámara de Comercio de Cartagena. 2014, p. 38)

In addition to the population growth that threatens ecosystems and biodiversity, there is also poor sanitation and waste management in the city and its industrial zones. This situation endangers the lives of thousands of species. Likewise, economic activities that are practiced in the area and are traditional, such as fishing, are threatened (Navarro Morales, 2018). Moreover, the development model and growth logic managed by the city are putting its ecosystems at risk without generating good economic conditions for many of its inhabitants (**Figure 106**).

According to current development trends, the entire coastline will eventually be urbanized, resulting in the Magdalena River delta becoming detached from the seashore. "A linear wall-city parallel to the coast is being created for short-term profits, undermining environments, increasing flood risk, promoting social instability and finally causing economic breakdown" (Bermúdez & Bermúdez, 2018, p. 356).

From the economic, environmental, and social points of view: Cartagena has severe problems meeting the Sustainable Development Goals. Its current state is not spontaneous; it results from a historical process that marginalized an essential segment of its population and concentrated economic activities in certain areas. The economic model has slowly changed the use of the territory. The original residents have been expelled to make way for tourist complexes with severe environmental impacts. Migratory flows and the armed conflict have caused the city to receive people who have turned to self-construction as the only housing alternative, in

---

[154]   https://plan4c.cartagena.gov.co/wp-content/uploads/2018/06/20141015095321_plan4c-cartagena-competitiva-y-compatible-con-el-clima-1.pdf. Accessed on June 21st, 2022.

marginalized parts of the town and with few resources. These migratory flows and the city's demographic growth have led to uncontrolled expansion and "(...) emphasized the country's inability to fulfill the fundamental needs of its citizens" (Hernández Correa et al., 2018, p. 290).
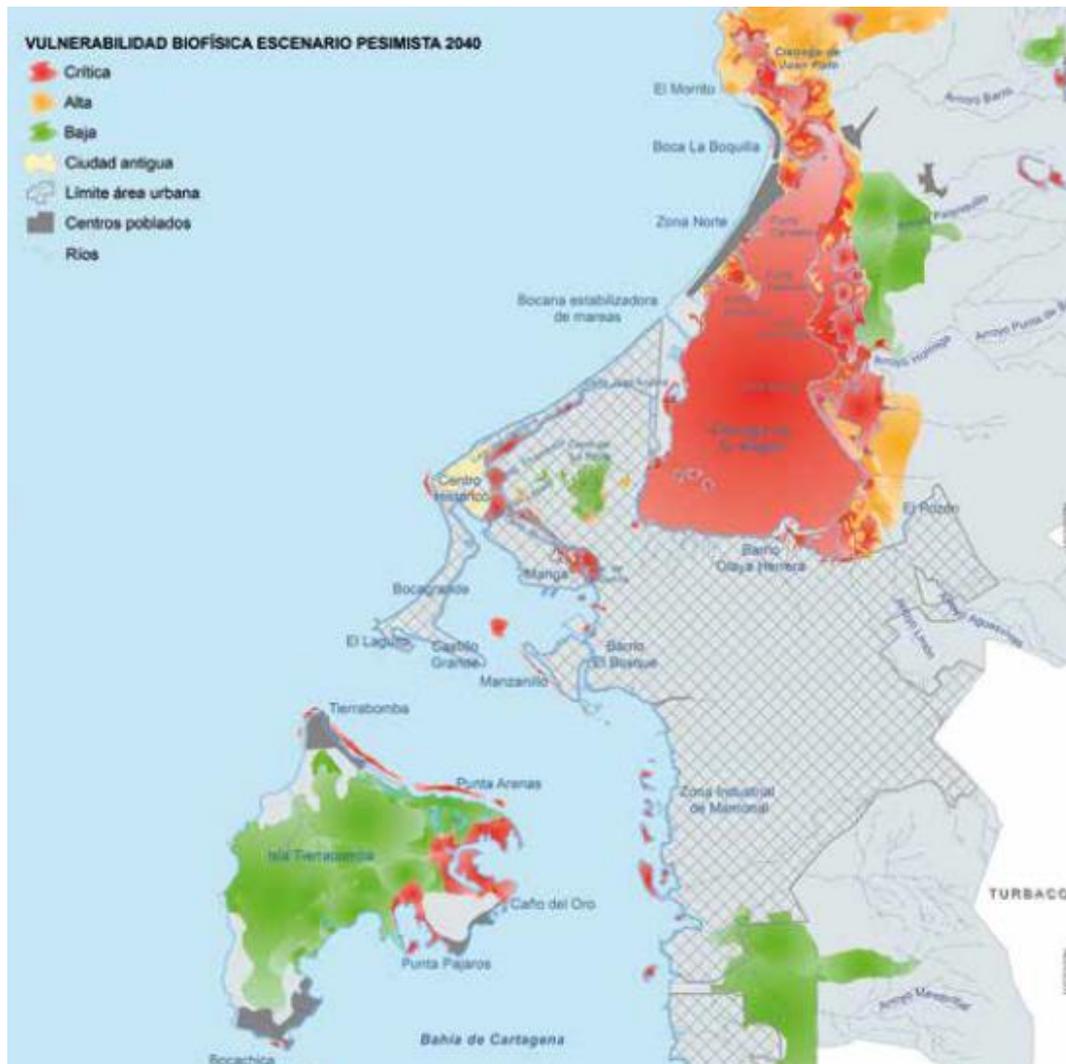
Figure 106. Vulnerability of the ecological heritage of Cartagena de Indias by 2040. Source: Alcaldía de Cartagena de Indias, MADS, INVEMAR, CDKN y Cámara de Comercio de Cartagena. 2014, p. 44.

In this scenario of social and economic complexities, there is also a cultural dimension that dates back to colonial times. As a city that was one of the most important ports in the colonial period, Cartagena has been the site of cultural encounters and exchanges. Initially, this cultural interaction occurred between the local indigenous people, European immigrants, and enslaved Africans. The cultural,

environmental, and economic richness, combined with enormous difficulties, make Cartagena a city of great importance as "a background full of opportunities, of which the architectural project is a tool to see the city with" (Navarro Morales, 2018, p. 324). It is a city:

> Ready for any surprise and willing to be amazed. Going from problems to stimulating experiences. Meeting, describing, looking, reading, drawing, experimenting, running, walking, meandering, accepting, understanding, knowing and recognizing, coincidences and divergences, sympathies and antipathies, fantasy, hallucination, amazement, and surprise. The past is something that a traveler might read in Cartagena. Something an architect might learn in Cartagena. However, the real and true Cartagena is its inhabitants. (Rafael Méndez (compiler), International Workshop of Architecture in Cartagena, 1987-2010, Bogotá 2011, as cited in Ariza Parrado, 2018, p. 339)

According to official data, "In Cartagena de Indias, 75% of the population lives in neighborhoods of informal origin, and approximately 21% lives in a state of unsatisfied basic level" (DANE, 2018). Due to the cultural and social dynamics that marked the city's growth and the consequent economic, political, and racial exclusion, informal self-construction became the real protagonist of the housing market. For these reasons, this doctoral dissertation has considered Cartagena, particularly the El Pozón neighborhood, as a case study that allows an understanding of broader dynamics and whose conclusions can be extended to more extensive analyses.

6.2 El Pozón and La Virgen, the neighborhood and the swamp: two active organisms

Since the second half of the twentieth century, "housing begins to be understood as an active organism in which people are the protagonists of actions, not furniture, nor walls" (Montaner, 2014, p. 27). This same concept can be extended to neighborhoods and the city, a "scenario of permanent encounter and conflict between the social agents that constitute it" (Torres Tovar, 2009, p. 59).

In this sense, the La Virgen swamp and the El Pozón neighborhood can be understood as active organisms that adapt, grow, modify, and even conflict. As stated by Turner: "The relationship between man and environment: the study of a living process rather than a static form. Development must be integrated and must produce a mutual stimulus between organism and environment" (2018, p. 147). With this statement in mind, this section presents some lines describing the

relationship between the two, showing how the territory has been modified, adapting human life and affecting the swamp ecosystem (**Figure 107**).
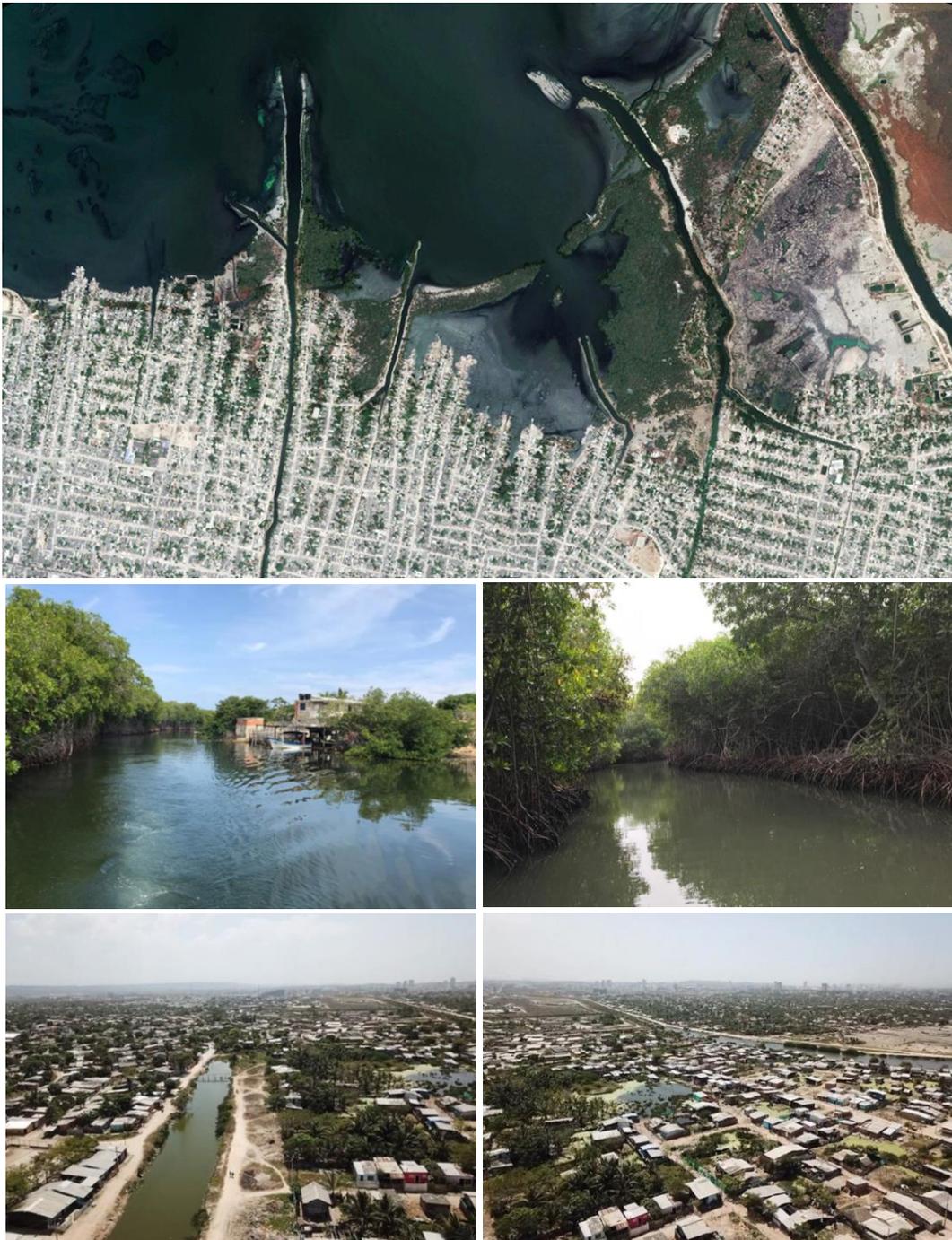
Figure 107. La Virgen and informality.
Source: PEI team, 2019.

The construction of the El Pozón neighborhood is a representative case of other self-construction processes in the city of Cartagena de Indias. It has to do with the economic incentives it represented. This situation was read by those who later populated the neighborhood as an offer of life opportunities that accelerated the rural-urban migration processes, giving rise to diverse impacts on the city. One of the most significant was the emergence of illegal settlements on the lands of La Virgen swamp and the *Tesca* Lagoon (Torres Tovar, 2009, pp. 202-209). The latter has also resulted from gentrification and tourist speculation in the city center, which have expelled the original population with no alternative but to settle on land not desired by the real estate market, such as environmentally fragile areas[155]. It is the case of Mirian Díaz[156], a social leader and inhabitant of the neighborhood. She moved to El Pozón in 1997 when she could no longer live in the central part of Cartagena. According to her:

> I bought the land with 10m of frontage and 20m of depth from the owner for 500,000 pesos. I found a lot with a pool (it was part of the swamp), and we built the house little by little, hiring young people from the neighborhood to do it (...) In the beginning, we used one half to put a neighborhood store, but I always had the idea of giving half of it to my son (...) I was very happy with it. (Regatero Ortíz-Cañavate, 2020, p. 46)

How informal settlements developed can be understood from the perspective of intersectionality, which "refers to the idea that different forms of oppression and marginalization should not, and cannot, be understood in isolation" (Riach, 2017, p. 33). In the type of population that has come to inhabit these natural areas illegally, there are intertwined variables of discrimination and marginalization of different orders: racial, economic, and social. Likewise, this situation is the result of the limited supply of social housing as well as the financial capacity of the families, which has led to the fact that "75% of the neighborhoods of Cartagena are the

---

[155] According to Tessari:

> The favela comes into being and consolidates itself by occupying marginal, swampy, unstable areas that appear uninhabitable and in no way attractive to the formal real estate market. It colonizes and reclaims, overrides natural terrains with an artificial stratigraphy, devours the natural landscape, steals land from the swamp, creates new geographies to inhabit wet plains and expands into peri-urban spaces, building a city within a city. (2020, p. 98)

[156] She is part of a social organization, which educates children about the cultural and environmental heritage of the sector. See section 6.4.

product of informal settlements using invasions or plots on behalf of pirate urbanizations" (Torres, 2009, p. 209).

El Pozón originated through a process of land invasion near La Virgen swamp and the simultaneous self-construction of temporary shelters by the first inhabitants. According to some, the neighborhood began to be established in 1969. However, due to its very nature of illegality, this date is not shared by all. Due to its lack of planning and the disorderly relationship between nature and housing, today, 60% of the houses are at significant risk of direct flooding. In addition, the self-construction processes were carried out —and continue to be carried out— with low-quality materials, practically with what they can quickly get their hands on (PEI team, 2019, p. 17). The first temporary houses in the neighborhood were built with scrap materials, such as wood and plastic. Later, those materials gradually gave way to concrete and brick. Although the change in materials improved the quality of the houses, they still present severe problems in responding to the climatic and environmental dynamics of the area (**Figure 108**).

Figure 108. Low consolidation sector – Isla de León (left) vs. consolidated sector – central square and Cultural house (right).

According to Gouverneur (2015), residents of squatter areas generally do not pay the State for water, electricity, and gas. They sometimes do not even pay taxes, at least in the early stages of housing. For example, the lack of public services in large part of the area led to the emergence of public fountains, water trucks, and the so-called *burroducto* (Torrez Tovar, 2009, p. 205), where water is transported on donkeys and taken from house to house and from neighborhood to neighborhood through a rather rudimentary process. Over time, NGOs, community organizations, the public sector, and government agencies may provide the essential infrastructure for informal settlements. Electricity is usually the first to arrive, followed by water.

Currently, most of El Pozón has access to a water and sewage network. However, in the poorer areas of the neighborhood, such as the Isla de Leon sector (**Figure 109**), not all homes have access to public utilities, as this is a decision to be made by each family. This sector has a particular characteristic, and that is that, contrary to others that were occupied by pirate developers who sold a piece of land to others, Isla de León was formed with the direct invasion of the lots referred to above: "The organized community or individuals take a lot on their own initiative as the only possible way to solve the problem of having a roof over their heads and thus guarantee access to housing and subsistence" (Torres Tovar, 2009, p. 63).
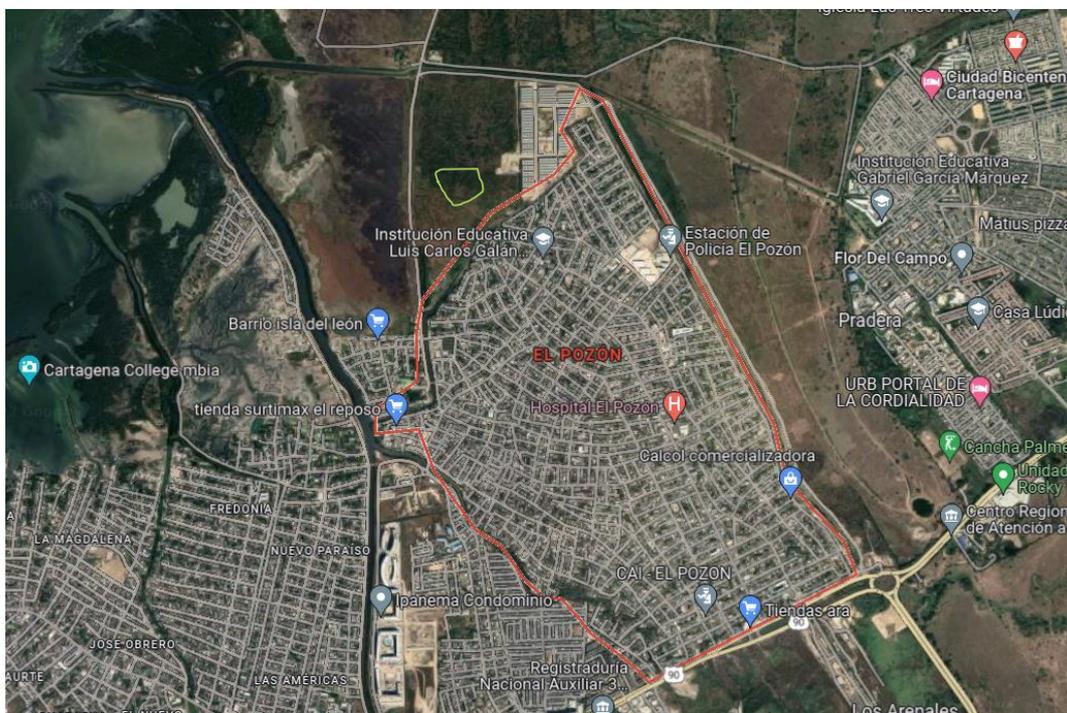
Figure 109. Location of Isla de León in relation to El Pozón.
Source: Google maps.

According to an interview that Gouverneur's work transcribed, in informal neighborhoods, the wastewater management network is usually incomplete or non-existent. It is widespread for sewage to flow out of houses through pipes and fall directly into ecosystems without any treatment into wetlands or water bodies. These water bodies are also used to deposit solid waste due to the difficulties of any garbage collection process (Gouverneur, 2015, p. 26). Unfortunately, the El Pozón neighborhood is no exception, and the relationship between the area's inhabitants and the bodies of water with which they coexist remains quite complex (**Figure 110**).

Figure 110. The environmental problem.
Source: the author (top left); Caterina Dadati, 2019 (top right and bottom).

These situations regarding waste management and marginality do not impede population growth, and El Pozón still experiences an expansion toward the La Virgen swamp. The latter has an area of approximately 3,300 hectares and supports almost 140,000 people (Bermúdez & Bermúdez, 2018, p. 357). One of the leading practices of the settlement is the establishment of "landfills," using waste materials from construction and demolition, garbage, and discarded tires. These new dry zones are located on the swamp's edges and extend further into the interior of the body of water. This invasion is causing a decrease in the marsh area and also affecting the mangrove ecosystem that depends on it. About the idea that the neighborhood is an active organism, it is necessary to mention the construction rules that the community has been establishing autonomously. Among them, the "*La ley de los cuatro palos*" (Law of the four sticks) stands out[157] (**Figure 111**). This is translated into forms of control and organization that regulate and establish the conditions for inhabiting the space. For instance: it is forbidden for the lots to be

---

[157]   See   https://www.eluniversal.com.co/cartagena/la-vida-mas-alla-de-la-via-perimetral-HE1897548. Accessed on June 23rd, 2022.

occupied to be larger than 12x6 meters (Regatero Ortíz-Cañavate, 2020, pp 46-48). Precisely because of the instability of the artificial fill, the vertically expanding housing in the neighborhood does not exceed three stories in height.

Figure 111. Law of the Four Sticks.
Source: PEI team, 2019.

From time to time, the inhabitants must refill the land, hiring dump trucks that illegally carry the waste to the site. This has to be done because they sink in an area belonging to the swamp. Moreover, being built on artificial landfills, the conditions of the houses located there are particularly problematic as they are susceptible to flooding and to unhealthy problems due to the poor management of sewage that ends up in the swamp on which many anglers in the area depend.

In 2011, for example, due to heavy rains, the body of water reclaimed the place that belonged to it, causing one of the worst floods in the neighborhood and putting the population at high risk[158]. Despite the difficulties that characterize it, El Pozón continues to be one of the most populated neighborhoods of the Caribbean city. This demographic increase and the lack of environmental awareness that

---

[158] This information was obtained from interviews with the sector inhabitants and verified through journals and news reports of the time.

unfortunately characterizes many of the neighborhood's inhabitants have exerted tremendous pressure on the swamp and its mangroves, which have been dying little by little.

Just as the *Vilas Canoas* favela in Rio de Janeiro is located in a terrain with a high hydrological risk, El Pozón "claims the territory in a radical act: where there is no land to occupy, a 'new geography' for possible occupation is invented" (Tessari, 2020, p. 29). In the Colombian case, the swamp and its mangrove forest are "transformed into an artificial and densely inhabited embankment, a compact and complex structure that offers space for settlement and a means of survival" (p. 29). This active organism, El Pozón, is in permanent conflict with La Virgen Swamp: a natural space characterized by mangrove ecosystems and a key element in the typological conformation of the neighborhood. The mangrove forests are located in coastal areas and are characterized by interwoven aerial roots to give them robustness and strength, allowing them to withstand storms and hurricanes. This intricate network of roots captures refined grains and mitigates coastal erosion. For these reasons, they prove vital in preventing flooding (Davis, 1997, as cited in García García, 2017, p. 63). Likewise, mangroves are rich habitats for fauna, as they are places where different species, such as birds, fish, and crustaceans, feed (García García, 2017, p. 63). Mangrove forests are also primary examples of "relational ontologies." According to Escobar:

> The mangrove-world is enacted minute by minute, day by day, through an infinite set of practices carried out by a multiplicity of beings and life forms, involving complex weavings of water, minerals, degrees of salinity, forms of energy (sun, tides, moon), human activity, spiritual beings, and so forth. (2018, p. 70)

El Pozón must be understood as a "collective" and not a "society," as Latour differentiated[159]. He also recalled that "Nature itself is no longer natural (...) Nature and society are not two distinct poles, but one and the same production of successive states of societies-natures, of collectives" (Latour, 1993, chapter 5). It is well known that some natural sciences, such as geology, oceanography, and climatology, have noticed changes in ecosystems. Meanwhile, architecture has not yet acquired a leading role in thinking about and dealing with this type of situation. However, this

---

[159] See section 2.5.

discipline can contribute to the debate and solutions to face the climate crisis (García García, 2017, p. 8) and achieve Sustainable Development Goals.[160]

6.3 The PEI Máquina Verde-El Arca project and the experience of the Solar Decathlon Latin America & Caribbean 2019

The housing module PEI Máquina Verde-El Arca was developed for the SDLA&C 2019 competition held in Cali, Colombia. It was designed and built by students from the PUJ course, Nuevos Territorios, directed by Professor Carlos Hernández, together with students and professors from the Politecnico di Torino. The work was developed in different phases and semesters of the course, changing and increasing the number of students involved. The author and supervisor of this dissertation joined the team in the last part of the design stage (2018-2019) and were part of the group that built the model in Cali.

PEI Máquina Verde-El Arca tried to respond adequately to the context in which it would be inserted, which arose from environmental, technical, and social factors. The urban project was a strategic intervention designed to be implemented in the margin between the El Pozón neighborhood and La Virgen swamp (**Figure 112**).

Figure 112. El Pozón: current situation (left) vs. PEI Máquina Verde-El Arca Urban Masterplan (right).
Source: PEI team, 2019, p. 21.

As described in the preceding section, this body of water is an endangered ecological area due to multiple factors, including the expansion of the informal

---

[160] Goal 6 for instance focuses on "Ensure access to water and sanitation for all. One of its focus is: to "Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes by 2030 (...) Support and strengthen local community participation in improving water and sanitation management" (UN, 2015, p. 19).

neighborhoods that border it. Because of this, the project reconsiders this urban boundary as an area that articulates productive activities with environmental practices that improve the poor conditions in which this fragile ecosystem finds itself today (**Figure 113**).

The swamp as a food provider

Flooded area for possible hydroponic crops

Planting of wood for construction purposes

Water bodies
Green areas
Mangrove areas
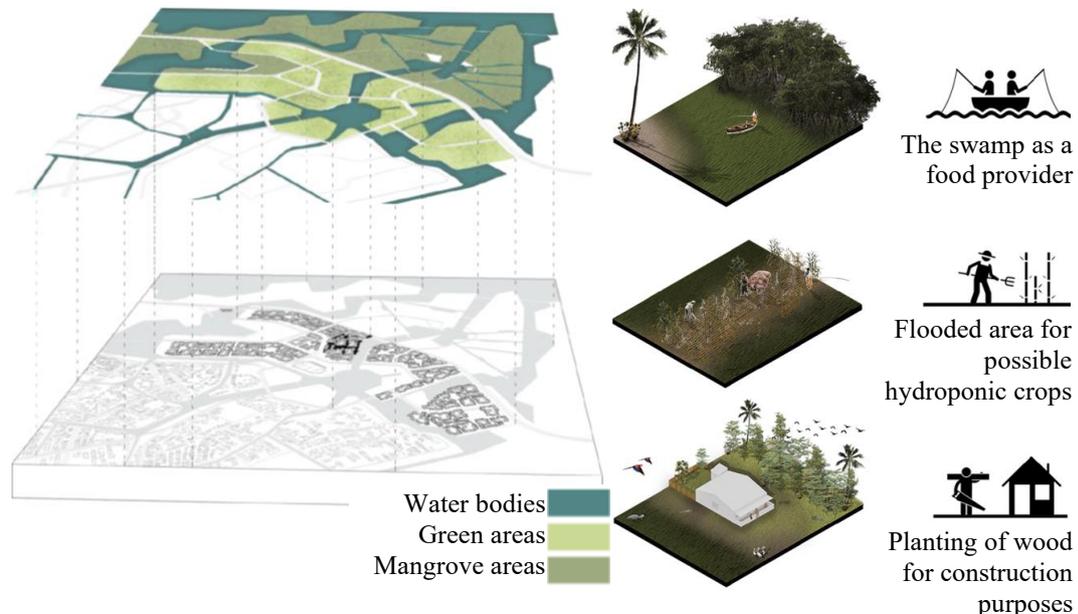
Figure 113. Environmental system (left) and activities on the urban-natural margin (right). Source: PEI team, 2019.

According to the competition rules, the team proposed a low-rise, medium-density housing complex (**Figure 114**). In addition, the project included the possibility of "recover the mangrove and plant 60 hectares with fast growing timber with which 3,600 homes can be built" (Hernández Correa et al., 2018, p. 304). The team considered that the inclusion of this type of initiative could generate self-sufficient communities (**Figure 115**).

LIVING PLACE
Residential use.

The possibilities of progressivity allow to make
productive the first floor of the house,
equipping neighborhood units on a smaller
scale with shops, workshops, etc.

This is how the residential use moves to
second and third floor.

MARKETPLACE
Zone scale equipment

Dotational use.
Meeting space, exchange and pedestrian relationship,
essential in the conformation of city.
Central location with respect to the neighborhood units
of housing.

BASIC HOUSING MODULE
"U"

DOCK
Urban-scale equipment

Dotational use.
Peripheral location determined by the channels of use
commercial and passenger.
Equipped with equipment of local scale for its
greater use.

KINDERGARTEN
Neighborhood scale equipment

Dotational use.
Central location with respect
to the neighborhood unit.
Enrolled in the green apple center.

Figure 114. Collective housing building axonometry (left) and growing block (right).
Source, PEI team, 2019, pp. 22-23.
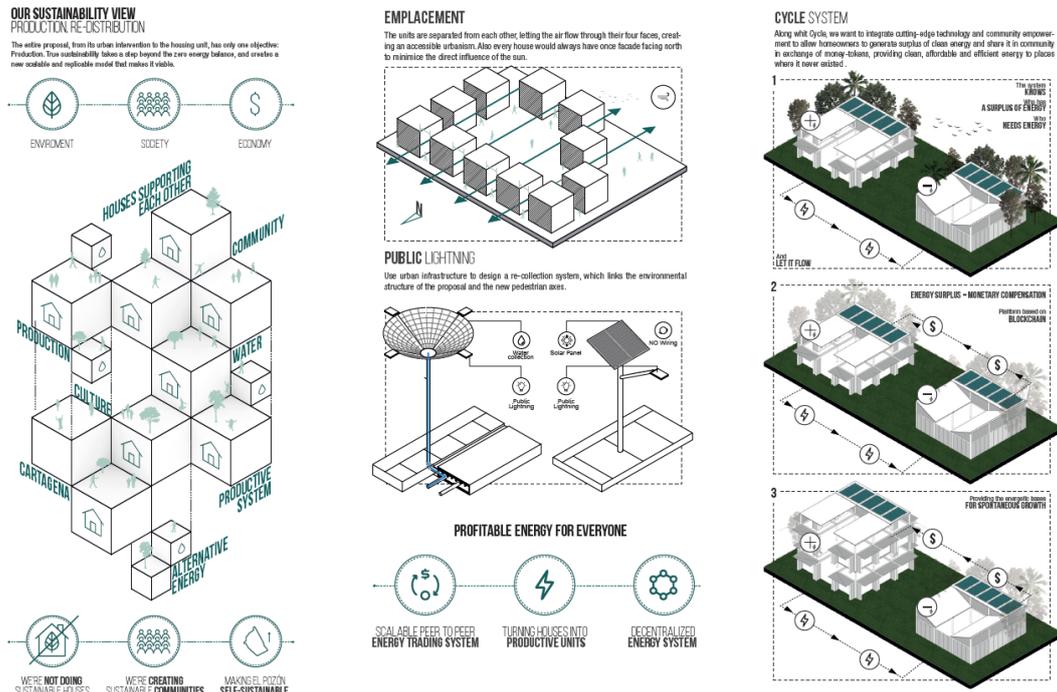
Figure 115. Sustainability concept in the *PEI Máquina Verde-El Arca* project. Source: PEI team, 2019.

Bearing in mind that "'the experimental and open-ended qualities of prototyping,' (...) have become a surrogate for new cultural experiences and processes of democratization" (Corsín Jiménez 2013, 382, as cited in Escobar, 2018, p55) an architectural prototype in 1:1 scale was built and monitored during the competition period in Cali[161]. The design was derived from two main ideas based on the analysis of the informal housing dynamics: its construction must be progressive and include spaces for productive uses (**Figure 116**).

One of the main problems faced was the cost of construction. Due to a budget issue, for the realization of the prototype that competed in the SDLA&C 2019, it was necessary to work with sponsoring companies. This generated that some of the materials thought at the beginning of the project had to be changed for others donated by sponsors from the construction sector. For instance, in the first stage,

---

[161] The ten categories of the Sola Decathlon are: 1) Architecture, 2) Engineering and construction, 3) Energy efficiency, 4) Electrical energy balance, 5) Comfort conditions, 6) House functioning, 7) Communications, 8) Urban design and affordability, 9) Innovation and 10) Sustainability. For more information about the Solar Decathlon, see the official web page https://www.solardecathlon.gov/.

we worked hand in hand with Oxford Brooks University to develop a guadua structure. However, for the prototype built, a steel skeleton was used.

Figure 116. Project renders.
Source: PEI team, 2019; https://www.archdaily.co/co/947234/maquina-verde-prototipo-de-vivienda-social-modular-adaptable. Accessed on June 25th, 2022.

On the other hand, some construction costs were reduced by relying on one of the practices that are part of the identity of informal neighborhoods: self-construction. In this case, a few students guided by Prof. Alfonso Gomez from PUJ realized solar collectors to heat water for domestic consumption (**Figure 117**). During the monitoring phase, the jury tested the shower water temperature, and the results were satisfactory.

Figure 117. Positioning of the solar collectors on the roof next to the photovoltaic panels. Source: PEI team, 2019.

The prototype PEI Máquina Verde-El Arca built during the competition resulted from a multidimensional, multiscale and inter-university analysis process. The different backgrounds of the group members added value to the project, which was based on critical regionalism principles: the study of vernacular architecture, construction technologies and traditional materials, local know-how, urban fabric, and social dynamics. However, it is essential to clarify that the housing module was not intended as an aesthetic model that could be replicated uncritically. On the contrary, it was a design experiment that made it possible to recognize new ways of thinking about traditional architecture towards the "Buen Vivir" of the informal neighborhood dwellers. Following the rules of the competition, the team transformed the documentation of this academic experience into a Project Manual[162].

The architectural project as a system - process and not a product

In 1977, the mass-produced Modular Post Office Project by Italian architect Pierluigi Spadolini was developed and spread around Italy (**Figure 118**). The idea was that the model could work as an "envelope" for the function without considering the context in which it was built or the local environmental conditions.

Contrary to this, the design action leading to the definition of the PEI Máquina Verde-El Arca prototype was not envisioned as a process of reproducibility. Moreover, it was not intended to be a copy-and-paste paradigm but one from which

---

[162] See the Project Manual https://www.javeriana.edu.co/bienal2021-arquitectura/wp-content/uploads/2020/10/PROJECT-MANUAL-No.-5_compressed-1.pdf. Accessed on June 21st, 2022.

to take inspiration and reformulate it based on the specific context. A reference model that is composed and can be decomposed according to definite needs.

Figure 118. Progetto modulare di Ufficio Postale prodotto in serie – Pierluigi Spadolini (1977): Novate (MI) – Lombardy (left); Querceta (LU) – Toscany (middle); San Nicandro Garganico (FG) – Puglia (right).
Source: http://www.architettiprato.it/joomla/vaiano/baldo. Accessed on June 24th, 2022.

According to Harvey, "we should focus on the processes rather than things and we should think of things as products of processes"[163] This is precisely what the PEI team set out to do by participating in the SDLA&C2019. The architectural result of PEI Máquina Verde-El Arca won second place in the final ranking. It was also among the top three in seven of the ten categories.[164] However, the process before the prototype construction led the team to think of housing and architecture as a system beyond the resulting object.

This analysis was fundamental to provide a response that would adapt to the changing reality of the inhabitants of the El Pozón neighborhood (**Table 20**). As

---

[163] D. Harvey, Social Process and Spatial Form. Transforming Cities: Contested Governance and New Spatial Division, ed. By N. Jewson, S. McGregor, London, Routledge, 1996, as cited in Tessari, 2020, p. 105.

[164] Two first places in the "Engineering & Construction" and "Urban Design & Affordability" categories, four second places in the "Architecture", "Innovation", "Energy efficiency", "Energy consumption" and a third place in the "Communication, marketing and social awareness" category, for a total of seven awards in the ten evaluation categories.

stated by Turner, in informal settlements, "housing is made by the users over time, it is less a finished and serialized object than an open and progressive process where the inhabitants, previously organized, creatively shape their houses and the neighborhood spaces" (Turner, 2018, p. 70). Thus, in the project for the SDLA&C2019, the team considered the importance of the social construction of space in spontaneous urban dwellings. [165] Furthermore, the concepts of multi-scalarity, multi-functionality, modularity, and flexibility in the urban and architectural proposal were also taken into account.

Table 20. Geographic, social, economic, and cultural variables affecting social housing Source: Saldarriaga & Carrascal, 2006, p. 40.

Environmental factors	Socio-economic factors	Cultural factors	Urban factors
Topography Relative humidity Temperature Sun exposure Prevailing winds Vegetation	Family composition Family income Employment status Origin Housing background	Typological traditions Construction traditions Forms of coexistence Regional identity	Urban location Connections, mobility, and accessibility Urban fabric Community facilities Public services

The housing module was conceived as a chassis, a load-bearing structure that could be modified in its interior through easy processes and by the inhabitants themselves (**Figure 119**). In principle, it is a single C-shaped house with an internal courtyard (**Figure 120**). However, it can be divided into two independent dwellings, a recurrent informal housing practice (**Figure 121**).

---

[165] See section 3.2.

Figure 119. The chassis: steal structure.
Source: PEI team, 2019.

Figure 120. The built prototype.
Source: PEI team, 2019.

Figure 121. First level axonometric plant (left); First level axonometric plant of Bi-casa – possibly dividing the building into two mirrored houses (right).
Source: PEI team, 2019, pp. 50-51.

Usually, in informal dwellings, the upper floors are generally converted into apartments occupied by the children and their families or rented out for a more stable income. Likewise, the prototype was considered in terms of volume, not area. This is why the house's original state is composed of a first floor and a mezzanine on the two opposite wings. But when more space is required, it is possible to raise the roof and increase the volume of the building (**Figure 122**).

Figure 122. The movable roof: Possibility of increasing the volume of the dwelling by ceiling movement.
Source: PEI team, 2019, p. 31 (top and bottom left); Marco D'Amico (bottom right).

As explained in the first part of this thesis, the social role of the architect began to be part of the academic debate after the modern model, which had ruled until then, entered into crisis. The new architect's figure was based on a more open vision of the discipline, reaching answers through collective and participatory processes (Perriccioli, 2017). Therefore, the PEI team focused on "the design process on all actors in the system, going so far as to cancel the concept of 'fetishism' of commodities and achieving a more ethical approach to the design act" (Findeli, 2001, pp. 15-16, as cited in Marseglia, 2018, p. 75).

One of the activities during the design phase was the approach of the students to handicrafts through a workshop with the participation of a Colombian artisan working with natural fibers (**Figure 123**). In the workshop, the students could see firsthand that tradition and craftsmanship are not things of the past but, on the contrary, are present and are part of the current Colombian culture. For the housing module, the team decided to use a handicraft technique and a natural material for the elaboration of the second façade of the building: weaving with *seje* palm. This material is taken from the branches that support the fruit of the palm, which grows in humid and rainy areas less than 1000 meters above sea level (Rojas Parada, 2019, p. 148).

Figure 123. Weaving workshop with natural fibers, students of the 2019 Nuevos Territorios course.
Source: PEI team, 2019.

For the SDLA&C2019, the weaving was done by the artisan Alcides Vides. During the construction phase, the PEI team was in charge of fixing each fabric to one of the frames that made up the second skin of the house (**Figure 124**). This external layer was designed to protect the interior space from direct sunlight, which is very intense in Cartagena, as in Cali, where it was built. The second façade also regulates climatic factors allowing wind flow through the house and keeping the inner temperature at approximately 22°C" (PEI team, 2019, p. 44).

Figure 124. The "second skin": seje palm weaving.
Source: PEI team, 2019; Julián Olaya (top left); PEI team, 2019 (top right); Juan Felipe Pinto (bottom left); Lorena González (bottom right), https://www.arch-daily.co/co/947234/maquina-verde-prototipo-de-vivienda-social-modular-adaptable.
Accessed on June 25th, 2022.

The realization of the prototype represented a great experience of collective intelligence and collaborative work. Thanks to the joint work between academia, construction companies, master builders, and skilled artisans, this project combined traditional materials and techniques with modern and contemporary ones and popular knowledge with technical and scientific knowledge (**Figure 125**). Likewise, the analysis of the El Pozón neighborhood through fieldwork conducted by students belonging to the group in previous years was the basis for the continuation and completion of the PEI Máquina Verde-El Arca project by the 2018-2019 team.

Figure 125. PEI Máquina Verde-El Arca: collective intelligence and collaborative process.
Source: PEI team, 2019.

Although the housing module was based on the idea of self-construction, for a project of this type to be viable, inhabitants must be able to generate some income. In 1987, De Orteiza stated that:

> These specialists promote using wattle and daub and agricultural waste (rice husks, coconut shells, bagasse, etc.). to do it through self-construction construction. Do they realize that all this implies a more significant commitment of the user to the construction of his house? Does man's work not count? does it not have a value? (p. 90)

The preservation of memory, traditional practices, and a community's tangible and intangible heritage are opportunities to generate emerging dynamics in their territory: the *Escuelas taller*[166], the local academies of arts, sciences, and sports "to promote projects or strengthen the urban and social fabric" (Hernández Correa et al., p. 295). In this case, the training of the community in the management of guadua and red mangroves as construction materials could help reduce the quantitative and qualitative housing deficit and contribute to the rehabilitation of the La Virgen swamp. Thus, the project considers Guattari's three ecologies (1996):

---

[166] See sections 3.3 and 4.3.

Economic ecology accomplished by using guadua as the main construction material for housing and new and existing economic activities. Environmental ecology accomplished with the recovery of *La Virgen* swamp, the *Chiricoco* and *Limón* streams, the mangroves and biodiversity. Social ecology accomplished by including the local people in the decision-making process and by improving the living conditions, creating new spaces and public endowments. The use of guadua and wood is fundamental to improving the productive system of the 180 families. Planting 24,500 seedlings will be used in 3 years to build the structures of these houses and even sooner to build local handicrafts, furniture, etc. Once the houses are built, this material can be sold to generate income for the families. (As cited in Hernández Correa et al., p. 303)

6.4 From El Pozón to Solar Decathlon and vice versa: Tools used

According to Certeau: "(...) orality remains indefinitely something exterior without which writing does not function. The *voice* makes *people write*" (1984/1980, p. 161, italics in the original). For the author of this dissertation, the PEI working group was decisive in choosing the case study and participating in the SDLA&C2019.

Guided by Prof. Carlos Hernández, PEI has based most of its activities in the Colombian Caribbean area, especially in Cartagena de Indias, where they have developed design processes through participatory methodologies. In El Pozón, PEI already had a relationship with some inhabitants thanks to the fieldwork done over the years through the academic workshops Nuevos Territorios. These conditions, in place before starting the research, were of great help for the thesis implementation.

In both the Solar Decathlon experience and the four visits made to El Pozón, some of the tactics presented in the previous chapters were partially put into practice. **Figure 126** shows which tools and working tactics were tested. It is necessary to clarify that in the project carried out for the competition, it was the working group PEI Máquina Verde-El Arca and not the author of this thesis individually who, in one way or another, used the tools.

Moreover, the reader can find the sitography references used in the thesis writing and some academic and popular terminology explained throughout the text. Concerning the databases of best practices, a first attempt can be found in section 5.1. The reader will also find some secondary sources and propaedeutic material in the bibliography at the end of the text.

	Comprehensive tools	**Working Tactics**
Theoretical and analytical	Secondary Sources and propaedeutic material	Bibliography
		Sitography
	Glossary and terminology	
	Transdisciplinary support	
Participative and collaborative	The collective recovery of history, memory, and knowledge	Interviews
		Visual resources: Conversation starters
		Fieldwork: Informal dialogue
		Exhibitions
	Collective construction	
Software and digital	Information Sharing	
	Data visualization	Databases of best practices
	Environmental and technological design tools	EURECA
		EDGE
Practical and material	Systematic restitution	Database of traditional techniques and materials: Laboratory tests, drawings
	Eco-compatibility standards and regulation	

Figure 126. Comprehensive tools and working tactics tested in the case study.

For the realization of the project presented in the SDLA&C 2019, the transdisciplinary support of design and construction and social and human disciplines was indispensable. A clear example is the work of observation and qualitative research conducted during field trips to some informal neighborhoods of Cartagena de Indias. Based on urban ethnography and through surveys and interviews, the students could investigate these impoverished and vulnerable communities' images, experiences, and memory, describing and identifying their objects and spaces.

A characteristic of almost all houses —if not all— is the axis formed between the front door and the door leading to the backyard. This configuration allows the necessary cross ventilation, considering that informal dwellings generally do not have air conditioning due to their high operation cost and rely on natural ventilation

and fans. The PEI Máquina Verde-El Arca workgroup analyzed this information through freehand drawings. The team also used digital tools to realize models and designs that gave the inputs for the design and subsequent collective construction of the prototype for the SDLA&C 2019.

To organize and categorize the information and products that the different groups of students produced, the team used the management software *Trello*. On this platform, each group was in charge of updating the material on a specific topic related to the project: furniture, structure, enclosures, energy, plumbing, etc. (**Figure 127**).
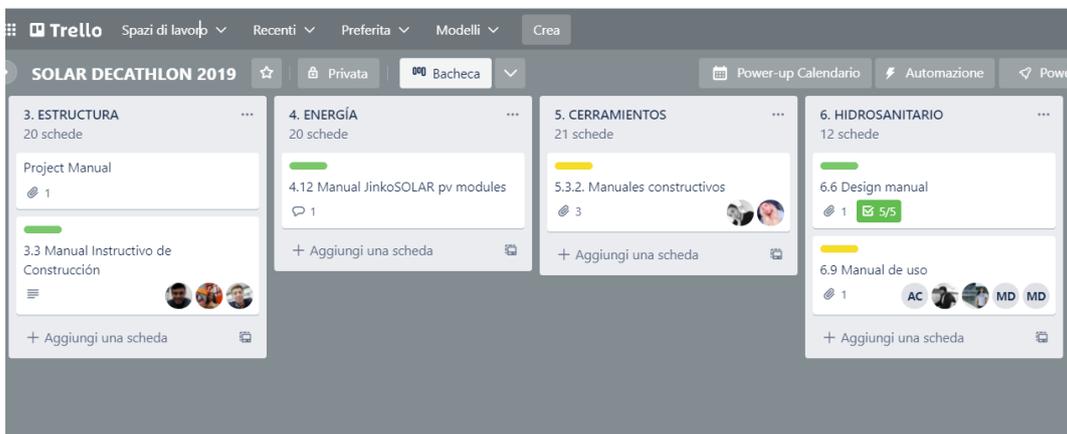
Figure 127. Trello platform as a digital management tool.

As described in section 6.3, for the realization of the second facade of the housing module, the working group chose a natural material from the seje palm. This choice was not accidental since one of the students who participated in the SDLA&C 2019 did his undergraduate thesis on different typical weavings of some Colombian regions.[167] The result of this study was a database of traditional techniques and materials subjected to different laboratory tests to evaluate their physical characteristics. This work was presented during the international competition (**Figure 128**).

---

[167] For more information about this study, see the thesis Rojas Parada, S. C. (2019). Técnica y tradición. Laboratorio de técnicas vernáculas para soluciones arquitectónicas contemporáneas, Bogotá, Pontificia Universidad Javeriana, Facultad de Arquitectura.

Figure 128. Exhibition of the work "Técnica y tradición. Laboratorio de técnicas vernáculas para soluciones arquitectónicas contemporáneas during the construction of the PEI Máquina Verde-El Arca housing prototype.
Source: PEI team, 2019.

One of the Solar Decathlon's competitions focused on achieving sustainability. For this, the team used two tools: EURECA and EDGE. The Eco Utility for Reduction of Energy and Carbon EURECA is software programmed by the Technology and Environment research group (Department of Architecture and Design - DAD, Politecnico di Torino). It implements the IREEA (Initial and Recurring Embodied Energy Assessment) spreadsheet developed by Enrico Demaria and Angela Duzel. For the SDLA&C 2019, the students Federica Gallina and Benedetta Quaglio, under the coordination of Professors Roberto Giordano and Lorenzo Savio, were in charge of the prototype's Life Cycle Analysis (**Figure 129**). Referring to international standards, the two indicators chosen for assessing the environmental sustainability of the project were:

- Resources depletion: Embodied Energy [MJ].

- Global warming potential: Embodied Carbon [kgCO2eq].
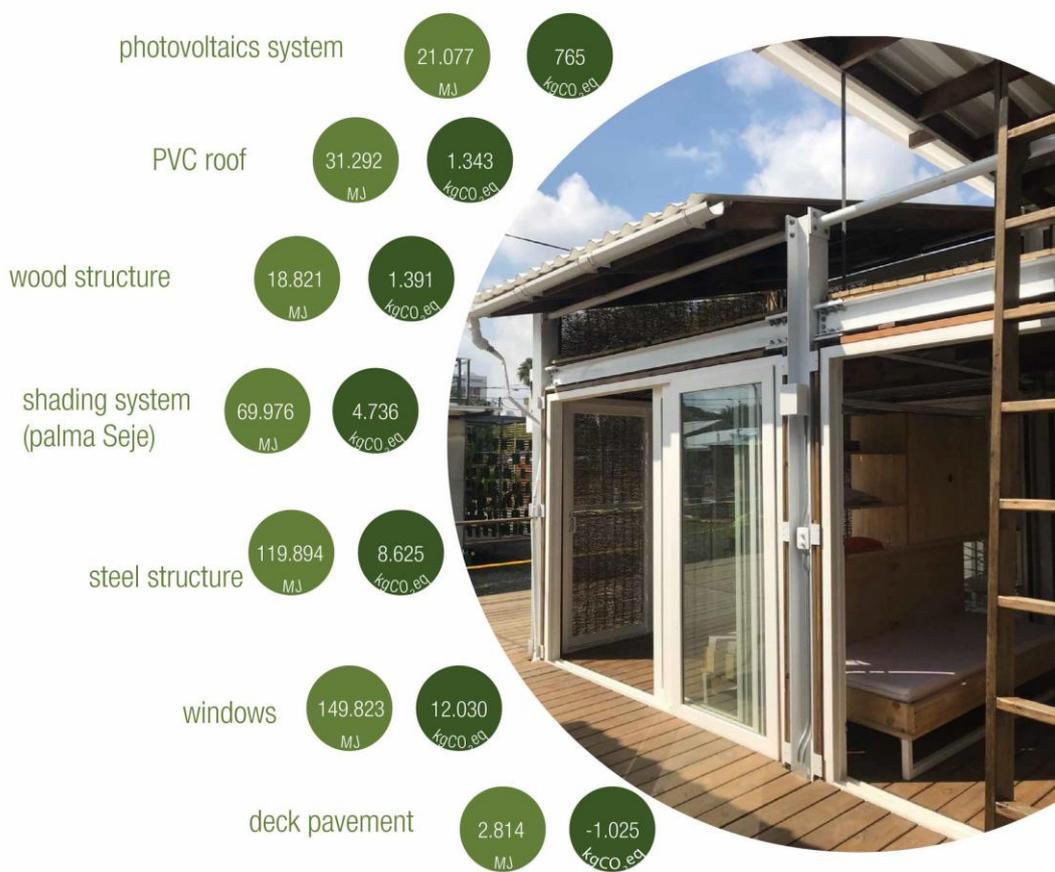
Figure 129. EURECA results. The primary materials considered in the EURECA evaluation are steel, Seje´s palm seed, wood (Yellow pine), PVC, and laminated glass. Source: Gallina and Quaglio, 2019; PEI team, 2019, p. 71.

On the other hand, EDGE is an environmental design tool that measures resource intensity and the buildings' environmental impact divided into materials, energy, and water categories. In the PEI Máquina Verde-El Arca case, the calculation results in the materials section were similar to those of the EURECA program. **Figure 130** shows the result in the other two categories: water and energy.

ENERGY SAVINGS   EDGE ADVANCED

Energy Efficiency Measures 78.17%   Meets EDGE Energy Standard

| | Base Case | Virtual Energy for Comfort* | Improved Case | Virtual Energy for Comfort* |

ENERGY(kWh/m²/Year)
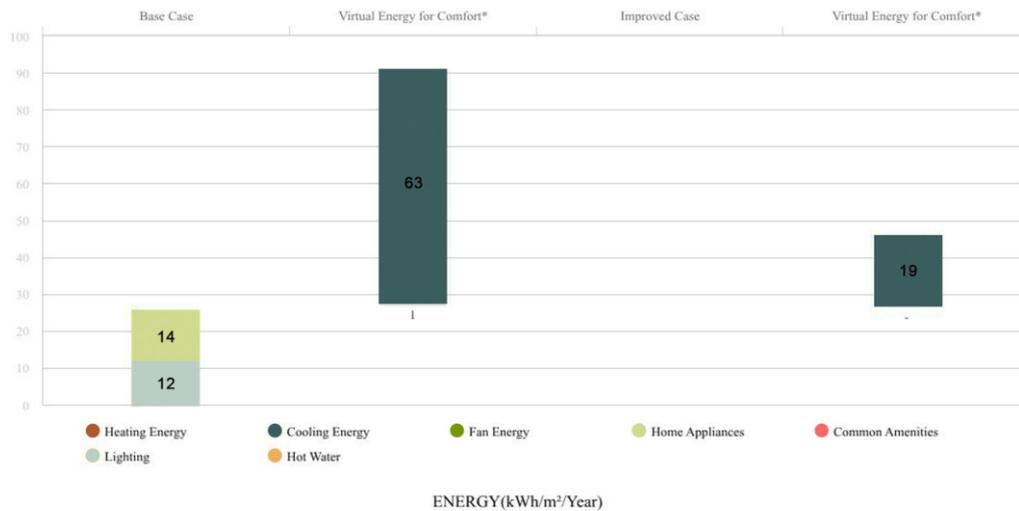
WATER SAVINGS

Water Efficiency Measures 63.88%   Meets EDGE Water Standard

| | Base Case | | Improved Case |

WATER (kL/unit/year)
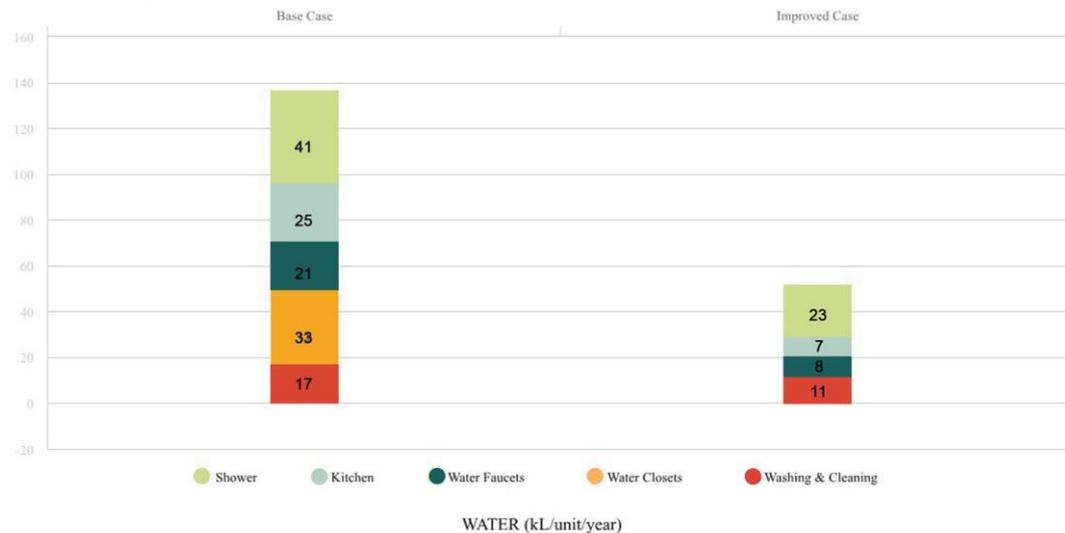
Figure 130. Energy savings (top) and water savings (bottom). Comparison between a business-as-usual case (left results) and the PEI Máquina Verde-El Arca prototype (right results) using EDGE software.
Source: PEI team, 2019, pp. 98-99.

The working group PEI Máquina Verde-El Arca had the opportunity to show the project's results at the "Time Space Existence" exhibition organized in parallel to the 17th Architecture Biennale in Venice, Italy. For this occasion, the space

"Researches and Dialogues on Architecture and the Culture of the City, 2017-2021" was dedicated to the projects that the Politecnico di Torino developed with the Pontificia Universidad Javeriana (**Figure 131**).

Figure 131. Poster presented at the exhibition "Researches and Dialogues on Architecture and the Culture of the City, 2017-2021" at Venice Biennale 2021. Source: Lorenzo Savio.

Unfortunately, systematic restitution was one tool that should have been used but could not be implemented due to pandemic-related issues. The initial idea was

to bring to Cartagena the module built for SDLA&C 2019 to be used by the population as a multifunctional space.

Regarding the fieldwork in El Pozón, the first results highlighted the importance of how professionals formulate questions since this action can implicitly lead to one answer or another. Moreover, using visual resources (pictures, images, videos), it was possible to see how the inhabitants' attitudes towards specific issues changed after a more profound analysis that allowed them to become aware of their situation (**Figure 132**). This brought to light exciting ideas about social technologies, especially rainwater management and storage.[168]

Figure 132. Conversation starter about rainwater management using visual resources.

Through informal interviews conducted in the same environment where people live their daily lives, it was possible to collect information about changes in 10

---

[168] For more information on this experience, see the article Muñoz Veloza, M.A., Dadati, M.C., Giordano, R., Savio, L. (2022). Water security: the "new normality" of informal settlements. Nature-Based Solutions as sustainable mitigation and adaptation strategies. *VITRUVIO - International Journal of Architectural Technology and Sustainability*, *7*(1), pp. 62-77. Valencia: Universitat Politècnica de València. https://doi.org/10.4995/vitruvio-ijats.2022.17437.

families in the Isla de León sector's ways of living. Although each informal neighborhood is a catalog, the recommendation made by Martí was taken into account:

> In conversational techniques, there is no rigid criterion on how many interviews to conduct; generally, the principle of saturation is introduced (Glaser and Strauss, 1967): when the information given by individuals/groups is reiterative, it means that there are no more discourses. Therefore, it is not worthwhile to conduct more interviews. At least 8-10 interviews should be conducted. (2002, p. 89)

The selected cases are representative of residential spaces in informal settlements. They were chosen as the basis for identifying and understanding informal self-building techniques and their relation —visible, tacit, forgotten, or denied— with traditional self-construction. This analysis is a step towards accepting the "surprising" reality that is popular —traditional and informal— knowledge. Likewise, its horizon incorporates decolonial and pluriversal perspectives, which is essential to improve these contexts in a genuinely sustainable way.

The interviews were based on the issues addressed by Moreno Escárraga in his research My House My Body: Forced Migration, Memory and Collective Creation[169]. The aim was to understand whether different times have converted into the informal space of the now and how in the latter is possible to see the "presence of various pasts" (De Boeck and Baloji, 2017, p. 144). For the realization of the fieldwork, it was essential to count on the help of two key informants "natural leaders of networks of friends, relatives, and neighbors whom 'everyone' knows because, 'without being anywhere, they are everywhere'" (Martí, 2002, p. 100). They are Mirian Correa and Merlys Valdez, social leaders and inhabitants of El Pozón (**Figure 133**).

---

[169] See section 5.3.2.

Figure 133. Mirian Correa (left) and Merlys Valdez (right).
Source: https://www.facebook.com/mirian.correa.52090/photos (left); https://www.eluni-versal.com.co/suplementos/facetas/leon-una-isla-que-no-es-paradisiaca-249342-JWEU359527. Accessed on June 27th, 2022 (right).

Mirian lives in a house de material in one of the most consolidated areas of the neighborhood. In fact, near her home run one of the main roads of the neighborhood where the El Pozón Hospital is located, as well as different commercial activities. On the other hand, Merlys lives in the Isla de León sector, one of the neighborhood's poorest and least consolidated areas. This area is separated by a water channel that flows into the La Virgen swamp, carrying the waste produced by the inhabitants. It was the same inhabitants who, at the beginning of 2020, built the concrete bridge that currently connects them with the other sectors since, according to Merlys, they never received any response from the authorities to solve the problem. Self-building is, therefore, not only a practice focused on housing but also ends up being the solution to the gaps left by the government.

The following are the families who opened their homes' doors and contributed valuable information to realize this dissertation. The text display information from the first two interviews, while for the other eight, the section will present only images. However, the last part of the section will give the fieldwork's salient themes, results, conclusions, and evidence of the tools used. **Table 21** will show a tool that correlates the information collected during the interviews: the environmental, cultural, and lifestyle needs of the El Pozón residents, as well as the environmental, social, and technical requirements for informal housing construction.

1ˢᵗ house, home of José and Rosario

They both were born in Cartagena. The couple arrived eight years ago to live in El Pozón. Previously they lived in another house in the same neighborhood. In her youth, Rosario lived in Maria La Baja's village in the Bolivar department, 2-3 hours from Cartagena. The house was made of mud with sand and wood entanglement. The bricks of this material were stacked on each other and compacted. This type of house is known as "*casas embutidas*."

José and Rosario's current house was built by themselves using mainly aluminum and wood. It has two bedrooms, and the bathroom is located on the patio because it is not "made of material," so the water could infiltrate the rooms if it were inside the house. In the living room, they have a candy and school supplies store.

While Rosario remembers her house in Maria la Baja as a ventilated house, she would like a de material house in the future. She still prefers it even when she states that wood was recommended to her since the terrain and salinity of the place damage the concrete and must be restored from time to time. When the interview was conducted, Rosario had a sundries business inside the house's living room. She would like to continue to have one in the future.

In José and Rosario's house, there is not always potable water, so they are used to collecting rainwater. They use it for bathing, washing clothes (by hand and in a washing machine), cleaning the house, and flushing the toilet, which has no water connection. In 2016, this family was one of the beneficiaries of the construction of an additional room in the back of the house, thanks to the work of volunteers from TECHO Colombia. Since it was prefabricated, they were able to build it in two days, using wood as the primary material and a thermal insulator under the aluminum roof. According to Rosario, many of the beneficiaries of this initiative have decided to demolish the rooms and build de material.

Figure 134. Interior and exterior of José and Rosario's house.

2nd house, home of Aida and Luis and two of their five children

Aida and her family have been living in El Pozón for three years. She is originally from San Antonio, located in the department of Sucre. For a time, she migrated to Venezuela, returned to Colombia, and settled in the Cartagena neighborhood of San Francisco, near the city's airport. Aida remembers that the house where she spent her childhood was made of palm, like many others in San Antonio:

> (...) *nosotros jugábamos mucho en el patio. Mi hermano y yo y hacíamos casitas pequeñas con tablas para jugar* (...)

Her parents' house was made of cow dung and mud. According to Aida's testimony, the cow's dung must be taken when it is still soft and mixed with sand. This mixture is then placed on the floor and stomped with the feet. Once the mixture is homogeneous, the wooden structure previously built is filled with the hands until the wall is smooth. In the village of Aida, it was common to use *lata* wood, a tree that grows in the area. Lime is used as a finishing material, and the desired paint is applied.

Aida explained that this type of construction lasted for quite a long time and that the repairs were done more to beautify the houses on important dates such as Holy Week than out of necessity. She also says that while the mixture of manure and sand was wet, the unpleasant smell could be perceived, but once it dried, it disappeared. However, the most popular construction techniques in the village of origin have changed, and few palm houses are still standing. These houses are called "de Palma" because that is the material commonly used for roofs. Luis points out that these roofs are also resistant and must be changed approximately every 15 years. It is worth noting the use of large leaves on the roof to protect the walls from rain.

The house in which Aida, Luis, and their children lived at the time of the conversation was not theirs. However, at that time, they were building their own house in the same neighborhood, a few streets to the south. As can be seen in the photo, the rented house is made of wood. The house under construction is made from the same material.

Figure 135. Exterior of Aida and Luis' house It was not possible to access.

3rd house, home of José Miguel, his wife, and their two children

Figure 136. Exterior and interior of José Miguel's house.

4th house, home of Jenny, her husband, and their six children

She has lived in Isla de Leon for eight years.

Figure 137. Exterior and interior of Jenny's house.

5th house, home of Shirley, her husband, and another relative. Her sons live in the neighborhood with their families

Figure 138. Exterior and interior of Shirley's house.

6th house, home of Carmen Valencia, another adult, and two children

(…) Donde cabe uno, caben dos (…)

Figure 139. Exterior and interior of Carmen's house.

7th house, home of Pedro Gòmez, Elba Sanchez, and six other relatives

Figure 140. Exterior and interior of Pedro and Elba's house.

8th house, home of Fanny and Hermes. Their daughter lives in the same neighborhood

Figure 141. Exterior and interior of Fanny and Hermes' house.

9th house, home of Esther, her mom, and her husband

Figure 142. Exterior and interior of Ester's house.

10th house, home of Eladis, her mom and dad, her brother, his wife, and daughter

Eladis was very ashamed of her house because it was one of the few that remained built in wood. Her sister lives in the de material house next door. She is the one who led Eladis and her family to use the bathroom since Eladis does not have one inside her home.

Figure 143. Exterior and interior of Eladis' house. It was not allowed to take many photos.

Table 21. Eco-compatibility tool. Correlation between sociocultural and environmental aspects and design strategies.

Users	Needs	Requirements	Design Strategies
Socio-Cultural Aspects	Individual	• Identification of individual characteristics such as age, gender and preferences	
	Collective: Family - Community	• Identification of family composition	
		• Use of space and Identification of productive activities carried out by the families, and their needs	
		• Recognition of ethnic and racial diversity: Use of traditional architectural/special features	
		• Identification of symbolic elements as an expression of identity	
	Environmental protection	• Improve conditions of the swamp	
		• Stop the growth of landfill into the swamp	
		• Use of native vegetation	
	Water	• Relationship with the swamp	
		• Reuse rainwater	
		• Reuse gray water	
		• Sewage treatment	
	Soil	• Smart internal space distribution	
		• Relationship between building and topography	
	Materials	• Use of local and traditional materials and techniques	
		• Use of low-environmental impact materials	
		• Use of recyclable materials	
	Rational use of resources / Energy	• Passive solar building design (passive cooling)	
		• Thermal insulation	
		• Thermal Inertia for natural air conditioning	
		• Passive ventilation (natural ventilation)	
Environmental aspects	User's welfare, hygiene and health	• Reduction of thermal radiation between users and surrounding surfaces in overheating periods	
		• Control of air flow across the building (moisture control, energy savings, comfort and health)	
		• Adaptive control of thermal comfort	
		• Acoustic Comfort (noise control)	
		• Visual comfort	
		• Natural light	
		• Use of flow emission materials (reducing toxic indoor emissions)	

For the interviews, the author used an informal dialogue. One main conclusion drawn from this tool was the importance of language. Many times, it was necessary to ask about the meaning of the words used by the inhabitants, some because they are part of the everyday jargon, others because, for them, the purpose is different from the official one.

It is well known that memories bind us to places. Using working tactics from the Collective recovery of history, memory, and knowledge macro tool, it became clear that the issue of water is fundamental in El Pozón. During a visit to her house, Merlys mentioned a recent study made by a psychologist with people in the neighborhood. The objective was to understand why they had chosen to live there. The research identified a common point among most of the participants in the study: water.

Many of the people who decided on El Pozón as their new home came from areas near rivers, lakes, or other bodies of water, and the proximity of this neighborhood to the La Virgen swamp reminded them of their places of origin. While this would have been an excellent starting point for further work with the community to improve their relationship with the swamp —which is currently more of a dumping ground than an ecosystem— the opportunity was lost because all the research information now sleeps on office bookshelves. This failure demonstrates the importance of systematic restitution of information. According to Gouverneur:

> Responsiveness to the uniqueness of natural and cultural conditions is crucial in defining the design solutions and the performance of these new urbanized territories. (...) The identification of particular site conditions that can enhance design strategies and increase the resilience of new districts. (2015, pp. 189-191)

In another interview conducted by Regatero Ortíz-Cañavate, to the question Would you change your house for a VIS of the State plan for the neighborhood? An inhabitant replied: "I have lived by the water all my life, and I have been doing so for 20 years in this house. Nobody hurts me, and the place is ventilated when it's hot outside. I don't want to go to the other concrete houses" (2020, p. 23). The strange thing is that when they have resources, the first thing most people do is self-build in concrete.

Although most of the people interviewed remember with pleasure the internal comfort of the houses where they grew up, at the time of the fieldwork, only one of the families had decided to use palm leaves to make the roof of the interior patio.

Likewise, only one of the interviewees, an older man with experience in construction, expressed the desire to have a house made with natural materials as he had done in the first stage of construction of his current home. He explained that he then switched to concrete and brick to avoid being "left behind" compared to his neighbors.

Gouverneur stated that: "trees have a particular cultural load in most countries of the developing world, where the majority of urbanities lived in rural areas only a few decades ago" (2015, p. 190). This statement was corroborated during the interviews. Many people interviewed emphasized the importance of trees in reducing the temperature in the streets. Likewise, the presence of trees, food plants, and ornamental and medicinal plants was observed in several houses.

As Tessari described: "Vegetation, against which the early inhabitants long fought in search for empty space, is almost completely absent in the informal settlement today, but reappears as an important ornamental element" (Tessari, 2020, p. 254). However, according to Mirian, few people are willing to take care of the water bodies and vegetation they have tried to plant as part of environmental programs. These initiatives aim to improve the urban conditions of the neighborhood while providing food for the inhabitants with fruit trees. The information given by Mirian was verified on-site, where the poor state of many of these trees was evident.

It was interesting to apply the methodological framework to some inhabitants of El Pozón from different areas of the Caribbean region that share the same —or similar— climatic characteristics. This opportunity showed the similarities and differences —however small they may seem— of different cultures and ways of understanding and conceiving housing. One of the similarities found was the use of cow dung in the preparation of a material used to build the walls: "It is used in the mixture of mud or clay, in plaster to make the mixture more compact and not crack" (Anzellini, 2016, p. 146). Likewise, cane walls were part of the past dwellings of many people interviewed.

When questioned about their past dwellings, the oral descriptions made by the inhabitants emphasized the actions they carried out with their families to construct the house. For them, it was essential to discuss the materials or techniques used and highlight the collective activity it represented. According to Pradilla:

When designing rural housing, one can call in an architect who will rightly design houses ideal for the location (according to bioclimatic criteria and using materials from the region). However, it is clear that this does not work, as the inhabitants will feel the solution's imposition on them. They will think that using materials such as wood or clay is to save money and not because they are the best option. (2010, p. 10)

Rather than materializing the inhabitants' dreams, the informed architect's work should propel the action of *disoñar*: "to embed design with dreams, to dream in order to create" (...) *A disoñar, a re-diseñar, a recomunalizar!* Dream-design, redesign, recommunalize! (Escobar, 2018, p. 2016).

Chapter 7: A look at the past to design the future. Results, conclusions, and proposals

> (...) it is important to grasp the logics of informality, evaluating benefits and drawbacks, (...) the positives to draw on and negatives to avoid.
>
> (Gouverneur, 2015, p. 30)

[EN] As defined in the purpose and main objective, the thesis outcome is the definition of a set of tools collected throughout the thesis. It is thought for the training of future architects and for those who are already professionals and want to work in Latin American informal settlements. Chapter 7 pragmatically summarizes this final result, the research's conclusions, limits, and possible future proposals to improve the work done during the Ph.D.

[IT] Come definito nello scopo e nell'obiettivo principale, il risultato della tesi è la definizione di un insieme di strumenti raccolti lungo lo svolgimento della ricerca. È pensato per la formazione dei futuri architetti così come per coloro che sono già professionisti e desiderano lavorare negli insediamenti informali dell'America Latina. Il capitolo 7 riassume pragmaticamente questo risultato finale, le conclusioni, i limiti e alcune eventuali proposte future per migliorare il lavoro svolto durante il dottorato.

[ES] Como se definió en el propósito y objetivo principal, el resultado de la tesis es la definición de un conjunto de herramientas recogidas a lo largo de la misma. Está pensado para la formación de futuros arquitectos, así como para aquellos que ya son profesionales y desean trabajar en los asentamientos informales latinoamericanos. El capítulo 7 resume pragmáticamente este resultado final, las conclusiones de la investigación, sus límites y eventuales propuestas futuras que permitan mejorar el trabajo realizado durante el doctorado.

"Looking to the past to design the future: the informal built environment in Colombia. Design Process Innovation through collective and collaborative knowledge" wanted to understand how the architect's role could be redefined in self-built urban contexts. The thesis proposes a toolbox that can contribute to this paradigm shift through an integrative collective-based approach that includes the traditions of communities living informally.

According to data from different organizations, everything points to the fact that the urban population will increase in the coming years, and more people will live in informal neighborhoods of large and medium-sized Latin American cities. This dynamic makes it particularly urgent to find answers contributing to the consolidation of sustainable informal habitats. However, this urgency should not lead to hasty, facile, and paternalistic solutions that ignore what is important. On the contrary, it should serve as an impulse for creative thinking, searching for new paradigms, and incorporating others that have been forgotten.

Informal settlements are not a static phenomenon without a form. They are active organisms whose form is born from within (in-formal) and changes with time. These settlements have produced alterations to the urban fabric never seen before. This definition does not mean that urban, technical, social, and architectural issues do not exist in these contexts. It implies that informality is a reality that architects should appreciate instead of ignoring and underestimating its alternative knowledge. The enormous diversity of solutions to problems that professionals could not solve, and the popular cultural background that inhabitants of spontaneous settlements can share, are the informal heritage that professionals must enhance.

The term popular used here does not refer to something recognized or admired. On the contrary, it defines what belongs to the people or what they develop. As evidenced from the beginning of the text, popular architecture encompasses, on the one hand, traditional/vernacular regional architecture and, on the other hand, informal/spontaneous urban architecture.

This dissertation tried to reconcile ethnographic research —knowing the traditional building practices (current and disused) of a community— with a technological experiment —reintroducing optimized and conscious practices that are part of the cultural baggage of the inhabitants. The objective was not to outline rigid guidelines for the informal design process but rather to help build an abacus of possibilities so that the architect who wants to work in informal contexts has the tools to do so. Thinking about the future of these communities does not mean

designing the "house of the future." This erroneous idea implicitly encompasses the cancellation or invisibilization of their past and present and imposes a single option as a possible scenario. It is a tabula rasa that does not consider the possibility of plural futures. The thesis was based on the decolonial and pluriversal thinking that has gained strength in Latin America in recent years. Based on this, it has tried to describe the most critical issues that characterize self-built urban housing and are related to the informal context. It has also attempted to identify why it is necessary to form a professional figure specialized in the subject.

The thesis has made it clear that the One-size-fits-all ideology is unsustainable. Many business-as-usual approaches have tried to come up with universal answers to "solve" the problem of urban informality. However, they have failed and have even proved to be more harmful than beneficial to the community. The latter is understood as the whole between humans and non-humans, i.e., the environment, nature, flora, and fauna. On the other hand, the uncritical use of foreign technologies to alleviate local problems also fails to achieve its purpose: sustainably improving people's quality of life.

The horizon of the work described in this dissertation questions the role of professional architecture in contexts where the inhabitants build their homes. As part of the integrative approach, it proposes an openness towards other areas and disciplines of knowledge and alternative, subaltern, and popular knowledge and building know-how. The latter can provide different points of view that complement the architect's work. Furthermore, the operational proposal of a collective-integrative approach aims to avoid cultural epistemicide by channeling the technology of architecture, certain vernacular architecture potentiality, and the community's collaborative dimension in self-construction processes towards the participatory redevelopment of informal neighborhoods.

The determination of the informed architect figure requires a paradigm shift in which nature and culture go hand in hand. Likewise, its approach should not be to "remedy informality with formality." On the contrary, it should be based on the very essence of informal building processes, considering the imperfections, complexity, and continuous transformation of self-built urban dwellings. This, in turn, must be complemented by the informed architect's knowledge, who, with his/her training inside and outside the academy, will have the necessary information to avoid improvisation. The inhabitants must also prevent the latter. For this, giving them the tools to exercise critical participation is essential.

As often stated in the dissertation, the overall aim of this research is not to design and propose a new methodology from scratch. Instead, the thesis advocates for a combination of multiple existing approaches to reconstruct a modus operandi through the outcomes of different disciplines and several practices and experiences based on collective and collaborative processes. The resulting toolkit tries to provide valuable information to develop Social Innovation and Tecnologías Sociales that support real and sustainable improvements of existing self-built housing and its inhabitants' living standards. The techniques, procedures, operations, mechanisms, elements, and strategies included in the toolbox presented in the dissertation, stem from the background of the inhabitants as well as their existing conditions. As each community is different, the toolkit and each tool are flexible and can be adjusted according to the context.

Recovering popular knowledge and building culture

At a conference held at the Politecnico di Torino, a famous Colombian architect belonging to a select group of professionals who built a large part of the country's capital was invited. On that occasion, the lecturer presented his work, based mainly on using concrete and brick: libraries, schools, and gated communities, among others. After the presentation, the author of this thesis took advantage of having such a well-known figure on the national scene to ask him what he thought about the introduction of natural materials in the architecture of our country.

The architect's answer reflected what many think about the Global South compared to the Global North: the former cannot afford to think about environmental sustainability due to its social emergency. The latter, on the other hand, does have the tools to be able to realize environmentally sustainable projects. In other words, the general thought is that the concept of degrowth, which is booming in the Global North, is not applicable in the Global South and that the latter should dedicate its efforts to economic development.

This thesis, on the contrary, considers not only pertinent but also necessary and feasible the recovery of popular knowledge and building culture and, with this, the reintroduction of traditional, local, and regional materials and technologies. This does not mean that the thesis considers it appropriate to build in the cities as it was built in the past or as it is still being built in some rural areas. Instead, it proposes resignifying these contextualized techniques and materials as the germ of Social Innovations and Tecnologías Sociales that contribute to a passive climate-adapted retrofitting design.

Colombia is home to diverse communities and ethnic groups with different backgrounds and histories located in different geographic contexts. Throughout the Colombian territory, this heterogeneity of cultures is manifested through collective behaviors, physical spaces, rituals, symbols, and local traditions. However, when these communities migrate to the city and come to live in informal settlements, emergency conditions, together with a generalized idea of progress, have catalyzed the current typological and technological homologation of traditional self-constructive processes. In rural contexts, these responded to the needs of the inhabitants and were adapted to the local environment. In informality, they have lost these characteristics, concentrating only on satisfying the right to housing, even if it is not dignified.

In Europe, the traditional position of the architect's work in design is largely defined by analytical, instrumental, and measurable factors such as the Life Cycle Assessment and CO_2 accounting. This approach facilitates the development of building projects with high architectural quality and low energy consumption. However, such models of sustainability many times do not achieve the desired results when operating with the same logic in the cities of the Global South. This is even more evident when working in informal contexts where emergency problems and conditions do not allow adopting this approach. Therefore, it is imperative to formulate contextual responses that do not just meet a list of functional requirements but have relevance in the specific context in which common principles and standards can be evaluated.

Although the Solar Decathlon is an international competition born in the United States, the PEI Máquina Verde-El Arca project wanted to highlight the potential value of traditional knowledge and materials in Colombia. Making them part of our way of living, inhabiting, and building does not mean taking a step back but moving towards actual progress based on culture. Furthermore, the fieldwork in the El Pozón neighborhood showed that the community's creativity, recursion, and resilience could be the basis for innovative technological solutions in such a fragile socio-environmental context. For these to thrive, they must be low-cost, low-tech, and easy to implement. They must also embrace the need for change that characterizes informality.

Moreover, for anyone doing extra-European studies, there are propaedeutic readings that allow architects to define and contextualize their work. These should be required readings for those who want to work in subordinate contexts. Equally important is to consider the regulatory framework in which one fits and works.

This thesis concludes that by articulating the popular knowledge of the communities and the technical expertise of the professionals, it is possible to broaden the vision of improving spontaneous urban housing. This union can be the basis for rethinking the genius loci of the informal city. The work of the inhabitants should not replace the role of the architect, nor is it a matter of promoting a Do-It-Yourself philosophy. It is to understand that to fulfill its social function. Architecture must consider the inhabitants as the generating subject of knowledge.

The collective-based toolbox for the informed architect

This research was mainly conducted during the Covid-19 pandemic. Unfortunately, this specific situation has penalized the work done. Above all, the implementation of the theoretical framework through fieldwork.

Therefore, the conclusions reached are partial answers compared to a larger framework of questions. As noted in chapter 5, the academic contribution of the proposed integrative collective-based approach is the definition of a toolbox that offers assistance to collectives, associations, or individuals wishing to assume the role of "informed" architects. The Informed Design Toolbox is an organized set of social and technical tools that considers the inhabitants' knowledge and experiences.

While some of these tools were identified in the theoretical framework of the thesis (analyzed bibliography), others were highlighted in the methodological framework proposed and were partially tested during the fieldwork. Other instruments assess environmental requirements (Eco-software). Others, instead, contribute to eco-compatible technological design (databases, national or international eco-standards, circular economy maps, etc.). It is thought that the combination of these tools is best suited for the design process in informal settlements, considering the complexity of their social, economic, and environmental challenges. It is essential to clarify that although it is possible to use several of these tools in the same project, not all of them can have the same weight on the final result. This is why the toolbox alone wastes its potential. The choice of the tools best suited to each case is up to the skill of the informed architect for whom it is intended.

On the first visits to the EL Pozón area, the inhabitants had animosity toward traditional architecture because, according to them, it is based on precarious and old-fashioned materials. Photographs of dwellings that use these materials in a contemporary way are fascinating to see how their opinion about the matter

changed. Furthermore, in many of the interviews conducted, when people talked about their past houses, often made with natural materials, they highlighted their many positive features: indoor thermal comfort, low cost, ease of construction, etc. However, only one person had the desire to build with natural materials. Sorting cards is an excellent way to help narrow the gap between what people say and what they do.

The collective recovery of history, memory, and knowledge should also incorporate triangulation. In site visits, people described the house where they used to live: when they were growing up or their parent's house. They referred to the construction techniques, the materials used, and the comfort of the interior spaces. A literature review of the architecture of the house's area helped the author better understand what the inhabitants recounted. This triangulation makes it possible to highlight possible traditional technologies that could be used in future Social Innovations.

The toolbox is neither a finished nor a static tool and can always be adapted to other Latin American informal realities. Its description in chapter 5 allowed a better understanding of the toolbox functionality, in which sociological tools complement analytical indicators in support of the architect's work. The text presented here synthesized the analysis and recognition work done during the Ph.D. Thus, only some instruments that make up the toolbox were shown. This can be the germ of a future online platform where architecture professionals can contribute with other innovative tools. A large community that is socially committed to the sustainable transition from informal to informed architecture.

Bibliography

Acevedo, I., Castellani, F., Lotti, G., & Székely, M. (2021). *Informalidad en los tiempos de l COVID - 19 en América Latina: implicaciones y opciones de amortiguamiento.* Oficina de Planificación Estratégica y Efectividad en el Desarrollo. Bogotá: Banco Interamericano de Desarrollo. Retrieved from https://publications.iadb.org/publications/spanish/document/Informalidad-en-los-tiempos-del-COVID-19-en-America-Latina-Implicaciones-y-opciones-de-amortiguamiento.pdf

Adler, V., Vera, F., Wainer, L., Roquero, P., Poskus, M., Valenzuela, L., . . . Silva, M. (2018, city). *Housing, what's next?: from thinking the unit to building the.* (V. Adler, & F. Vera, A cura di) Washington, USA: Inter-American Development Bank. Housing and Urban Development Division.

ALAI. (2009, June). *América Latina en Movimiento.* Quito, Ecuador: Agencia Latinoamericana de Información. Retrieved from https://www.alainet.org/sites/default/files/alai445w.pdf

Alcaldía de Cartagena de Indias, MADS, INVEMAR, CDKN, and Cámara de Comercio de Cartagena. (2014). *Plan 4C. Cartagena de Indias Competitiva y Compatible con el Clima.* Medellín: Serie de Publicaciones Generales del INVEMAR.

Amirjani, R. (2017). An Analogical Quotation. *Conference: QUOTATION: What does history have in store for architecture today?*, 13-23. Retrieved from https://www.sahanz.net/conferences/quotation-quotation-what-does-history-have-in-store-for-architecture-today/

Amirjani, R. (2018). Alvaro Siza's Design Strategy: An Insight into Critical Regionalism. *International Journal of Architectural and Environmental Engineering, 12*(10), 930-934. doi:doi.org/10.5281/zenodo.1474829

Ander-Egg, E. (2003). *Repensando la Investigación-Acción-Participativa* (Fourth edition ed.). Buenos Aires, Argentina: Grupo editorial Lumen Hvmanitas.

Anzellini, M. (2014). Towards a new vernacular architecture: an answer from built-academic projects. *7th International Seminar On Vernacular Settlement. Re-assesment of vernacular architecture: theory and practice* (p. 783-796). Istambul: Istambul Technical university.

Anzellini, M. (2016). El Nuevo Arquitecto Vernáculo. *Revista Dearq, 19*, 166-185.

Anzellini, M., & Garcia-Reyes Röthlisberger, M. I. (2015). *Técnicas vernáculas.* Bogotá, Colombia: Fondo Patrimonio Natural.

Arango Escobar, G. (2004). Una mirada estética de la arquitectura popular. Montevideo: Barrio Taller. Retrieved from https://repositorio.unal.edu.co/handle/unal/8414

Aravena, A., & Iacobelli, A. (2016). *Elemental: manual de vivienda incremental y diseno partecipativo = incremental housing and partecipatory design.* Santiago del Chile, Chile: Hatje Cantz.

Attaianese, E., & Acierno, A. (2017). La progettazione ambientale per l'inclusione sociale: il ruolo dei protocolli di certificazione ambientale. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 76-87. doi:DOI: 10.13128/Techne-20797

Augé, M. (2009. Original work published in 1992). *Nonluoghi : introduzione a una antropologia della surmodernità* (Italian edition ed.). Milan, Italy: Elèuthera.

Ayala García, J., & Meisel Roca, A. (2017). Cartagena libre de pobreza extrema en 2033. *Revista del Banco de la República, 90*(1076), 9-28. Retrieved from https://publicaciones.banrepcultural.org/index.php/banrep/article/view/156 17/16016

Balcazar, F. E. (2003). Investigación acción participativa (iap): Aspectos conceptuales y dificultades de implementación. *Fundamentos en*

Humanidades, *IV*(7-8), 59-77. Retrieved from http://www.redalyc.org/articulo.oa?id=18400804

Baratta, A., Calcagnini, L., Finucci, F., & Magarò, A. (2019, March). Design strategies for emergency housing in Colombia. *Architecture is a Common Good. Journal of Biourbanism, VII*(2), 19-31.

Baratta, A., Calcagnini, L., Finucci, F., Magarò, A., & Minella, O. (2016b). La questione abitativa in Colombia. Aspetti normativi e proposte progettuali. In A. Catalano, & C. Sansone (Ed.), *IV Incontro internazionale Concrete. Architettur e Tecnica* (pp. 359-368). Termoli: Luciano Editore. Retrieved from https://www.researchgate.net/publication/322836030_La_questione_abitat iva_in_Colombia_Aspetti_normativi_e_proposte_progettuali

Baratta, A., Calcagnini, L., Finucci, F., Magarò, A., Minella, O., & Piaggio, J. (2016a). Mitigate the housing deprivation in the informal cities: modular, flexible and prefab houses. *3rd International Academic Conferences on Places and Technologies* (pp. 141-147). Belgrade: University of Belgrade - Faculty of Architecture. Retrieved from https://www.researchgate.net/publication/322835931_Mitigate_the_housin g_deprivation_in_the_informal_cities_modular_flexible_and_prefab_hous es

Baratta, A., Calcagnini, L., Finucci, F., Magarò, A., Molina, H., & Quintana Ramirez, H. (2017). Strategy for better performance in spontaneous building. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 158-167. doi:DOI: 10.13128/Techne-20797

Bauman, Z. (2004. Original work published in 1999). *Modernidad Líquida* (3 ed.). Buenos Aires, Argentina: Fondo de Cultura Económica. Retrieved from https://catedraepistemologia.files.wordpress.com/2009/05/modernidad-liquida.pdf

Bermúdez, D., & Bermúdez, D. (2018). Facing the water. In A. Dameri, R. Giordano, S. Gron, P. Mellano, L. M. Rodelo Torres, & C. J. Rossi González, *The culture of the city* (p. 351-366). Turin, Italy: Politecnico di Torino.

Blas, S. M. (2015, Diciembre). ¿El tiempo construye la arquitectura? Construcción y autoconstrucción en la arquitectura de vivienda social. *Revista A&P Continuidad, 3*(2), 80-89.

Boano, C., & Vergara Perucich, F. (2016, November). Bajo escasez. ¿Media casa basta? *Revista de Arquitectura, 21*(31), 37-46. doi:DOI: 10.5354/0719-5427.2016.42516

Bottero, M., Gangemi, V., & Ranzo, P. (A cura di). (1987). *Il governo del progetto. La tecnologia per la formazione dell'architetto.* Bologna, Italy: Edizioni Luigi Parma.

Calvino, I. (2012 (1972)). *Le città invisibili.* Milan, Italy: Mondadori.

Calvino, I. (2012. Original work published in 1972). *Le città invisibili.* Milan, Italy: Mondadori.

Carrera Maldonado, B., & Ruiz Romero, Z. (2016). *Abya Yala Wawgeykuna. Artes, saberes y vivencias de indígenas americanos.* Sevilla, Spain: Acer-VOS. Patrimonio Cultural Iberoamericano.

Carrión, F., & Erazo, J. (2016). *El derecho a la ciudad en América Latina. Visiones desde la política* (First edition ed.). México D.F.: Universidad Nacional Autónoma de México.

Carvalho, J. J. (2010). Los estudios culturales de América Latina. *Tabula Rasa*(12), 229-251. doi:https://doi.org/10.25058/20112742.394

Castillo Ospina, O. L. (2007). *El desarrollo ¿progreso o ilusión? Aportes para el debate desde el ámbito rural.* Bogota, Colombia: Ed. Universidad Javeriana.

Certeau, M. (1984. Original work published in 1980). *The practice of everyday life* (English edition ed., Vol. I). (S. Rendall, Trans.) Berkeley and Los Angeles, United States: University of California Pres. Retrieved September 3, 2022, from https://monoskop.org/images/2/2a/De_Certeau_Michel_The_Practice_of_Everyday_Life.pdf

Colmenares E, A. (2012). Investigación-acción participativa: una metodología integradora del conocimiento y la acción. *Voces y Silencios: Revista Latinoamericana de Educación, 3*(1), 102-115.

Concepts of Vernacular Architecture. (2012). In C. G. Crysler, S. Cairns, & H. Heynen, *The SAGE Handbook of Architectural Theory* (p. 340-355). Bodmin, Cornwall, England: SAGE Publications Ltd.

CONPES, Consejo Nacional de Política Económica y Social. (2021, 06 02). *Departamento Nacional de Planeación DNP.* Retrieved from 3604: Lineamientos para la consolidación de la política de mejoramiento integral de barrios MIB: https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3604.pdf

Corona Industrial S.A.S. (2015). *Premio Corona Pro Hábitat, Convocatoria professional, categoría arquitectura vivienda rural cafetera.* Bogota, Colombia: Premio Corona Pro Hábitat.

Coy, M. (2006, September 23). Gated communities and urban fragmentation in Latin America: the Brazilian experience. *GeoJournal*(66), 121-132. doi:10.1007/s10708-006-9011-6

Dabaieh, M. (2013). Participatory action research as a tool in solving desert vernacular architecture problems in the Western Desert of Egypt. *Action Research, 11*(3), 279-298. doi:https://doi.org/10.1177/1476750313484504

Daglio, L., & Gambaro, M. (2017). Per una nuova dimensione strategica della progettazione tecnologica. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 13*(7), 119-125. doi:DOI: 10.13128/Techne-19750

Dameri, A., Giordano, R., Gron, S., Mellano, P., Rodelo Torres, L. M., & Rossi Gonzalez, C. J. (2018). *The Culture of the City.* Turin, Italy: Politecnico di Torino. Retrieved from http://hdl.handle.net/11583/2704437

DANE. (2017). *Colombia. Número y proporción de hogares que habitan en asentamientos precarios, según año.* Departamento Administrativo Nacional de Estadística, Bogota.

De Boeck, F., & Baloji, S. (2017). Positing the Polis: Topography as a way to De-centre Urban Thinking. *Urbanisation, 2*(2), 142-154. doi:DOI: 10.1177/2455747117736418

De Oteiza, I. (1987, July-August). Tecnología y participación del usuario en la vivienda. *Informes de la Construcción, 39*(390), 87-92. Retrieved from http://informesdelaconstruccion.revistas.csic.es

De Sousa Santos, B. (2010). *Descolonizar el saber, Reinventar el poder* (Traduction from portuguese to spanish ed.). (J. Exeni R, J. Gandarilla Salgado, C. Morales de Serién, & C. Lema, Trad.) Montevideo, Uruguay: Ediciones Trilce.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011, September 27). The Social Dimension of Sustainable Development: Defi ning Urban Social Sustainability. *Sustainable Development, 19*(5), 289-300. doi:https://doi.org/10.1002/sd.417

Departamento Nacional de Planeación. (s.d.). Tratto il giorno 2021 da Plan Nacional de Desarrollo 2018-2022: https://colaboracion.dnp.gov.co/CDT/Consejo%20Nacional%20de%20Pla neacin/Vivienda%20Rural.pdf

Díaz-Polanco, H. (2007, December). Identidad, globalización y etnofagia. *Claroscuro. Revista del Centro de Estudios sobre Diversidad Cultural, VI*(6), 19-65. Retrieved from https://rephip.unr.edu.ar/xmlui/handle/2133/13267?show=full

El Tiempo. (2020, May 27). Los seis barrios de Cartagena que Gobierno ordenó cerrar por covid-19. *El Tiempo*. Retrieved from https://www.eltiempo.com/politica/gobierno/coronavirus-en-cartagena-ministerio-del-interior-cierra-seis-barrios-499908

Ellen MacArthur Foundation. (2013). *Towards the circular economy. Economic and business rationale for an accelerated transition.* Ellen MacArthur Foundation. Retrieved from https://emf.thirdlight.com/link/x8ay372a3r11-k6775n/@/preview/1?o

Escobar, A. (2014). *Sentipensar con la tierra: Nuevas lecturas sobre sobre desarrollo, territorio y diferencia.* Medellín, Colombia: unaula.

Escobar, A. (2018). *Designs for the Pluriverse. Radical Interdependance, Authonomy and tne Making of Worlds.* Durham and London, England: Duke University Press.

EZLN. (1996, January 1). Comité Clandestino Revolucionario Indígena-Comandancia General del Ejército Zapatista de Liberación Nacional. *Cuarta Declaración de la Selva Lacandona*. Mexico.

Fals Borda, O. (1995). *Conocimiento y poder popular.* Bogotá, Colombia: Siglo veintiuno editores, s.a.

Fals Borda, O., & Rodríguez Brandao, C. (1987). *Investigación Participativa.* Montevideo, Uruguay: La Banda Oriental.

Faroldi , E. (2017b). L'Architettura come spartito della memoria. In M. Loi, A. Lorenzi, & V. Uccelli (Eds.), *Sabbioneta, Teatro all'Antica. Omaggio a Scamozzi* (pp. 113-123). Florence, Italy: Aión Edizioni. Retrieved from https://re.public.polimi.it/retrieve/handle/11311/1099957/405705/emilio%20faroldi_L%27architettura%20come%20spartito%20della%20memoria.pdf

Faroldi, E. (2017a). Architettura come materia sociale. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 11-17. doi:DOI: 10.13128/Techne-20797

Filippi, M., & Fabrizio, E. (2011, January). Il concetto di Zero Energy Building. *Conference: Verso gli edifici a "Energia quasi zero": le tecnologie disponibili*, (pp. 1-14). Retrieved from https://www.researchgate.net/publication/235636968_Il_concetto_di_Zero_Energy_Building

Fonseca Martínez, L. (2006). Indicadores para la evaluación de proyectos de vivienda social. In A. Saldarriaga Roa, & R. Carrascal, *Vivienda social en Colombia* (p. 46-48). Colombia: Premio Corona.

Fonseca Martínez, L., & Saldarriaga Roa, A. (1980). *La arquitectura de la vivienda rural en Colombia Vol. I* (Vol. I). Bogotá, Colombia: Editorial Carrera 7a. Ltda.

Fonseca Martínez, L., & Saldarriaga Roa, A. (1984). *La arquitectura de la vivienda rural en Colombia: Vol. 2. Minifundio cafetero en Antioquia, Caldas, Quindío y Risaralda* (Vol. II). Cali, Colombia: Editorial de CEAM Ltda. and Ediciones PROA.

Frampton, K. (1987. Original work published in 1983). Towards a critical regionalism. Six Points for an Architecture of Resistance. In H. Foster, *The Anti-Aesthetic. Essays on Postmodern Culture* (Fifth Printing ed., pp. 16-30). Port Townsend, Washington, USA: Bay Press. Retrieved from https://monoskop.org/images/0/07/Foster_Hal_ed_The_Anti-Aesthetic_Essays_on_Postmodern_Culture.pdf

FRANCIS. (2015, May 24). Encyclical Letter Laudato SI. Rome, Italy. Retrieved from https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Gallina, F., & Quaglio, B. (2019). EURECA. Guida all'uso dello strumento di calcolo per la valutazione degli impatti energetico ambientali del ciclo di vita degli edifici. *EURECA. Un modello di analisi evalutazione parametrica degli impatti energetico ambientali del ciclo di vita degli edifici (M.Sc. Thesis)*. Turin, Italy: Politecnico di Torino.

Gallina, F., & Quaglio, B. (2019). EURECA. Un modello di analisi evalutazione parametrica degli impatti energetico ambientali del ciclo di vita degli edifici (M.Sc. Thesis). Turin, Italy: Politecnico di Torino.

Gallo, P., & Romano, R. (2018). Ripensare il margine: ambiente costruito e resilienza nella città informale. *TECHNE. Journal of Technology for Architecture and Environment, 15*, 279/290. doi:DOI: 10.13128/Techne-22109

García García, M. (2017). Toward the synthetic metamorphosis of the coast. Designing resilient landscapes (PhD Thesis). *I-II*. Madrid, Spain: Universidad Politécnica de Madrid. Escuela Técnica Superior de Arquitectura.

García, R. (2006). *Sistemas complejos. Conceptos, método y fundamentación epistemológica de la investigación interdisciplinaria* (1st edition ed.). Barcelona, Spain: Editorial Gedisa, S.A.

García-Reyes Röthlisberger, M. I., & Anzellini Fajardo, S. (2019, January). Collective knowledge on the environment: architecture for a rural landscape. *Revista Dearq, 24*, 34-47. doi:https://doi.org/10.18389/dearq24.2019.03

Gaspari, J., & Busacca, M. (2017). Tra innovazione tecnologica e innovazione sociale: una nuova dimensione di progetto e di processo. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation*. doi:DOI: 10.13128/Techne-22150

Geertz, C. (2003. Original work published in 1973). *La interpretación de las culturas* (Spanish translation. 12th reprint ed.). (A. Bixio, Trad.) Barcelona, Spain: Gedisa Editorial.

Geertz, C. (2003. Original work published in 1973). *La interpretación de las culturas* (Spanish translation. 12th reprint ed.). (A. Bixio, Trad.) Barcelona, Spain: Gedisa Editorial.

Gehl, J. (2017). *Città per le persone* (Italian edition ed.). Santarcangelo di Romagna, Italy: Maggioli Editore.

Germán Montenegro, M. (2018). *Arquitecturas insurgentes: Academia, resistencias y prácticas artísticas en arquitectura y urbanismo.* Bogotá, Colombia: Pontificia Universidad Javeriana. doi:https://doi.org/10.2307/j.ctv893j19

Giordano, R. (2018). The culture of the smart city among past, present and future. In A. Dameri, R. Giordano, S. Gron, P. Mellano, L. M. Rodelo Torres, & C. J. Rossi González, *The culture of the cty* (p. 65-79). Turin: Politecnico di Torino.

Giuffrè, R. (2014, September 26). La Progettazione Ambientale, una disciplina umanistica, non un mestiere tecnico. *lectio*, 19. Napoli, Italia. Retrieved from http://diarc.unina.it/index.php/20-in-evidenza/429-lectio-la-progettazione-ambientale-una-disciplina-umanistica-non-un-mestiere-tecnico

González, D. (2006). Arquitectura culta vs. arquitectura popular en la vivienda. *Arquitectura y Urbanismo, XXVII*(2-3), 57-62. Retrieved from http://www.redalyc.org/articulo.oa?id=376839850008

Gouverneur, D. (2015). *Planning and Design for Future Informal Settlements: Shaping the Self-Constructed City.* New York, USA: Ed. Routledge.

Granados Dueñas, D. M., & Nieto Castillo, C. (2017). Análisis y diseño de lineamientos para la transferencia de tecnologías sociales en el parque científico de innovación social de Uniminuto (M.Sc Thesis). Bogota, Colombia: Corporación Universitaria Minuto de Dios. Retrieved from http://hdl.handle.net/10656/5793

Groat, L., & Wang, D. (2013. First edition published in 2002). *Architectural research methods* (Second edition ed.). Wiley.

Grosso, M. (2004). Ecocompatibilità in architettura: concetti, paradigmi e approccio al progetto. In V. Gangemi (A cura di), *Riciclare in architettura. Scenari innovativi della cultura del progetto* (p. 34-39). Naples, Italy: Clean Edizioni.

Grupo de Investigación "Procesos Urbanos en Hábitat, Vivienda e Informalidad". (2007, January-Dicember). Ciudad informal colombiana. *Revista Bitácora Urbano Territorial, 11*(1), 53-93. Retrieved from https://revistas.unal.edu.co/index.php/bitacora/article/view/18631

Grupo de trabajo de Producción Social del Hábitat. (2017). *Utopías en construcción. Experiencias latinoamericanas de producción social del hábitat.* (J. Dìaz, & E. Ortiz Flores, A cura di) Mexico D.F, Mexico: Coalición Internacional para el Hábitat - Oficina para América Latina (HIC-AL).

Guarín Cobos, A. (2003). Cartagena de Indias. Asentamientos informales en la década de los 90. *Revista Bitácora Urbano Territorial*, 101-109.

Guattari, F. (1996 (1989)). *Las tres ecologías* (Spanish translation. 2nd edition ed.). (J. V. Larraceleta, Trad.) Valencia, Spain: Pre-textos.

Guattari, F. (1996. Original work published in 1989). *Las tres ecologías* (Spanish translation. 2nd edition ed.). (J. V. Larraceleta, Trad.) Valencia, Spain: Pre-textos.

Guazzo, G. (2004). La cultura tecnologica della progettazione. In M. Bertoldini, A. Campioli, & A. Mangiarotti (A cura di), *Spazi di razionalità e cultura del progetto* (p. 17-27). Milan, Italy: Libreria Clup.

Guha, R. (1997). *Dominance without Hegemony. History and Power in Colonial India.* Cambridge, Massachusetts, USA: Harvard University Press.

Guidicini, P. (1998). *Nuovo manuale per le ricerche sociali sul territorio.* Milan, Italy: ed. Franco Angeli.

Guidicini, P. (1998). *Nuovo manuale per le ricerche sociali sul territorio* (Collana di sociologia urbana e rurale ed.). Milano, Italy: Franco Angeli.

Hernández Correa, C., Bucheli Agualimpia , J., & Ramírez Ibañez, C. (2018). Emerging heritage and social appropriation experiences in Cartagena de Indias, Getsemaní and Bocachica by the international studies program, PEI and the Project New Territories & Emerging Cartographies. In A. Dameri, R. Giordano, S. Gron, P. Mellano, L. Rodelo Torres, & C. Rossi González, *The culture of the city* (p. 277-306). Turin, Italy: Politecnico di Torino.

Hernández-Correa, C., Cuberos-Acevedo, J., Giordano, R., Muñoz-Veloza, M., & Savio, L. (2020). El Solar Decathlon América Latina y el Caribe 2019: una oportunidad para el desarrollo de actividades innovadoras de capacitación y aprendizaje. *EDUMEET. International Conference on Transfers for Innovation and Pedagogical Change 2020. Conference Proceedings* (pp. 136-147). Online: Universidad Politécnica de Madrid. doi:DOI 10.20868/UPM.book.66588

Huxley, A. (1969). *Un mundo feliz.* Barcelona, Spain: Plaza & Janez S.A.

IDB. (2021). *Inter-American Development Bank Annual Report 2020: The Year in Review.* Inter-American Development Bank. Retrieved from https://publications.iadb.org/publications/english/document/Inter-American-Development-Bank-Annual-Report-2020-The-Year-in-Review.pdf

IDEO.org. (2015). *The Field Guide to Human-Centered Design* (First edition ed.). Canada: IDEO.

Illich, I. (2013. Original published in 1971). *Descolarizzare la società* (First Italian digital edition ed.). Milan, Italy: KKIEN Publishing International.

ILO. (2020). *Impact of lockdown measures on the informal economy.* International Labour Organization. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/briefingnote/wcms_743523.pdf

Imparato, I., & Ruster, J. (2003). *Slum Upgrading and Participation Lessons from Latin America.* Washington DC, USA: The International Bank for Reconstruction and Development / The World Bank. Retrieved from https://documents.worldbank.org/en/publication/documents-reports/documentdetail/277391468765324276/slum-upgrading-and-participation-lessons-from-latin-america

JOHN PAUL II. (1980, 06 02). Speech of Pope John Paul II to the United Nations Educational, Scientific and Cultural Organization UNESCO in Paris. *(6).* Paris, France: Holy See. Retrieved from https://www.vatican.va/content/john-paul-ii/it/speeches/1980/june/documents/hf_jp-ii_spe_19800602_unesco.pdf

Katoppo, M., & Sudradjat, I. (2015). Combining Participatory Action Research (PAR) and Design Thinking (DT) as an Alternative Research Method in Architecture. *Procedia - Social and Behavioral Sciences, 184*, 118-125. doi:doi: 10.1016/j.sbspro.2015.05.069

Klepeis, N. E., & al., e. (2001). The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants. *Journal od Exposure Analysis and Environmental Epidemiology, 11*, 231-252.

Land, P., & al., e. (2015). *The Experimental Housing Project (PREVI), Lima. Design and technology in a new neighborhood.* Bogotá, Colombia: Ediciones Uniandes.

Lanzavecchia, C. (2000). *Il fare ecologico. Il prodotto industriale e i suoi requisiti ambientali.* Torino: Paravia Bruno Mondadori Editori.

Latour, B. (1993. Original work published in 1991). *We have never been modern* (English translation ed.). (C. Porter, Trad.) Cambridge, Massachussetts, USA: Harvard University Press.

Losasso, M. (1991). Architettura e tecnologia. In M. Losasso, *Architettura, tecnologia e complessità.* Naples, Italy: Clean Edizioni.

Losasso, M. (2017). Cultura tecnologica e dimensioni del sociale. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 6-10. doi:DOI: 10.13128/Techne-20797

Loyo Martínez, J. C., & Márquez Martín, S. (2014, April-September). Dignificación y mejoramiento de técnicas vernáculas para el empoderamiento constructivo y el acceso a la habitabilidad básica: el caso de la familia Sánchez y el programa VACA del Tecnológico de Monterrey en Puebla. *Sinapsis Social: Revista Científica de Sostenibilidad, 1*(1), 43-66.

Lucas Alonso, P. (2015). El concurso del tiempo. Las viviendas progresivas del PREVI-Lima (PhD. Thesis). Madrid, Spain: Universidad Politécnica de Madrid.

Lucas, R. (2016). *Research methods for architecture.* London, England: Laurence King Publishing Ltd.

Manzini, E. (2015). *Design, When Everybody Designs: An Introduction to Design for Social Innovation* (English edition ed.). (R. Coad, Trad.) London, England: MIT Press. doi:https://doi.org/10.7551/mitpress/9873.001.0001

Marini, S. (2017). Lo stile antropocene. lo spazio della partecipazione e il linguaggio dell'architettura. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 46-50. doi:DOI: 10.13128/Techne-20797

Marseglia, M. (2018). *Progetto, sostenibilità, complessità. Metodi e Strumenti per la progettazione di prodotti e servizi.* Florence: didapress Università degli Studi di Firenze.

Martí Olivé, J. (2002). La investigación: acción participativa, estructura y fases. In J. Martí Olivé, M. Montañés Serrano, & T. Rodríguez-Villasante Prieto, *La*

investigación social participativa (pp. 79-123). Barcelona, Spain: El Viejo Topo. Retrieved from https://dialnet.unirioja.es/servlet/libro?codigo=3695

Martín Díaz, N. (2016). Arquitectura tradicional colombiana como sistema pasivo de aprovechamiento energético (M.SC Thesis). Valencia, Spain: Universitat Politècnica de València.

Martín López, L. (2014, November). Yo crezco, tú creces, él crece…Nuestra casa crece. Mecanismos de ampliación en la vivienda contemporánea. *[I2] Innovación e Investigación en Arquitectura y Territorio, 2*(1), 53-64. doi:10.14198/i2.2014.2.04

Martinelli, M. (2020). Informalità e Patrimonio. Il caso di pachacamac (M.SC. Thesis). Turin, Italy: Politecnico di Torino. Retrieved from http://webthesis.biblio.polito.it/id/eprint/15551

Max-Neef, M. A., Elizalde, A., & Hopenhayn, M. (1986). *Desarrollo a escala humana, una opción para el futuro.* Santiago, Chile: Cepaur Fundacion Dag Hammarskjold.

Meadows, D., Meadows, D., Randers, J., & Behrens III, W. (1972). *The Limits To Growth. A report fort he club of rome's project on the predicament of mankind.* New York: Universe Books. Retrieved from http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf

Meadows, D., Randers, J., & Meadows, D. (2013). *Limits to Growth: The 30-Year Update.* London, UK: Chelsea Green Pub Co.

Meh, L. (2020). Habitats for Inhabitants Prototype housing for slum settlements in Lima, Peru (M.SC Thesis). Turin, Italy: Politecnico di Torino.

Mellano, P. (2018a). The fifth dimension of architecture. In A. Dameri, R. Giordano, S. Gron, P. Mellano, L. Rodelo Torres, & C. Rossi Gonzalez, *The cultrure of the city* (p. 31-47). Turin, Italy: Politecnico di Torino.

Mellano, P. (2018b). Towards a new direction. In A. Dameri, R. Giordano, S. Gron, P. Mellano, L. M. Rodelo Torres, & C. J. Rossi Gonzalez, *The culture of the city* (p. 381-385). Turin, Italy: Politecnico di Torino.

Meneses Copete, Y., & Mena Lozano, A. (2019, October-November). *Revista Universidad de Antioquia, 337*, 50-53.

Mignolo, W. (2011). *The darker side of western modernity. Global futures, decolonial options.* Durham & London, England: Duke University Press.

Milano, P., & Mastrolonardo, L. (2013). Trasformazione eco-industriale. In R. Di Giulio (A cura di), *Paesaggi periferici. Strategie di rigenerazione urbana* (p. 198-207). Macerata, Italy: Quodlibet Studio.

Millones Segovia, Y. (2017). La otra mitad de la Quinta Monroy. *Revista de Arquitectura, Concepto-Contexto, 22*(32), 67-72. doi:https://doi.org/10.5354/0719-5427.2017.46147

Montaner, J. M. (2014). *Del diagrama a las experiencias, hacia una arquitectura de la acción.* Barcelona: Gustavo Gili.

Mora, A., Atawallpa Oviedo, F., Avella, A., Vega Sillo, E., Campuzano Rodríguez, C., Simbaña Pillajo, F., . . . Solano Salinas, R. (2020). *Buenos vivires y transiciones: la vida dulce, la vida bella, la vida querida, la vida sabrosa, la vida buena, la vida plenitud: convivir en armonía.* Bogotá, Colombia: Corporación Universitaria Minuto de Dios – UNIMINUTO. Retrieved from https://tinyurl.com/bibi99563

Morales Soler, E., & Alonso Mallén, R. (2012, May). La vivienda como proceso. Estrategias de flexibilidad. *Habitat y Sociedad, 4*, 33-54.

Moravánszky, Á. (2017). Regionalism: a manner of perception or a development strategy? (D. Leśniak-Rychlak, A cura di) *Autoportret. A quarterly on good space. Regionalisms / Modernism / Postmodernism, 2*(5), 5-10.

Moreno Escárraga, O. (2019, July-Dicember). Prácticas poéticas y micropolítica: "Mi Casa Mi Cuerpo", "La Casa de la Frontera" y "Radio Conversa". *Cuadernos de Música, Artes Visuales y Artes Escénicas, 14*(2), 103-124. doi:doi 10.11144/javeriana.mavae14-2.ppym

Mosquera Torres, G. (2014). *Vivienda y arquitectura tradicional en el pacífico. Patrimonio cultural afrodescendiente.* Cali, Colombia: Programa Editorial Universidad del Valle. Retrieved from https://www.hchr.org.co/afrodescendientes/media/LibroAecid.pdf

Mumford, L. (1964). Authoritarian and Democratic. *Technics. Technology and Culture, 5*(1), 1-8. doi:https://doi.org/10.2307/3101118

Mumford, L. (1999. Original work published in 1938). *La cultura delle città* (Italian translation ed.). (M. Rosso, & P. Scrivano, A cura di) Milan, Italy: Edizioni di Comunità.

Muñoz Veloza, M., Dadati, M., Giordano, R., & Savio, L. (2022). Water security: the "new normality" of informal settlements. Nature-Based Solutions as sustainable mitigation and adaptation strategies. *VITRUVIO International Journal of Architecture, Technology and Sustainability, 7*(1), 62-77. doi:ttps://doi.org/10.4995/vitruvio-ijats.2022.17437

Naranjo Botero, M. E. (2018). Aportes de los viviendistas colombianos a la paz en el posacuerdo: un ejercicio de Investigación Acción Participativa con fundadores barriales. *Revista Colombiana de Sociología, 41*(1), 157-174. doi:https://doi.org/10.15.446/rcs.v41n1.66673

Navarro Morales, M. (2018). Between water and stone. Spatial answers to social, environmental and cultural issues in the city of Cartagena. In A. Dameri, R. Giordano, S. Gron, P. Mellano, L. M. Rodelo Torres, & C. J. Rossi González, *The culture of the chity* (p. 321-334). Turin, Italy: Politecnico di Torino.

Niglio, O. (2020, 09 19). Conference "El siglo XXI: Valoración contemporánea del patrimonio cultural latinoamericano". *Cátedra academia & patrimonio: Contexto internacional y latinoamericano, visión contemporánea sobre patrimonio cultural*. Bogota, Colombia: Universiad de La Salle.

Norberg-Schulz, C. (1979). *Genius Loci. Paesaggio Ambiente Architettura* (Italian edition ed.). Milano, Italy: Electra.

OECD. (2014). *2014 Report on the implementation of the OECD strategy on development.* Organization for Economic Co-operation and Development, Paris. Retrieved from https://www.oecd.org/mcm/C-MIN(2014)14-ENG.pdf

OECD. (2020). *From containment to recovery: Environmental responses to the COVID-19 pandemic.* Organization for Economic Co-operation and Development . Retrieved from Organization for Economic Co-operation

and Development: https://read.oecd-ilibrary.org/view/?ref=126_126460-1tg1r2aowf&title=From-containment-to-recovery_Environmental-responses-to-the-COVID-19-pandemic

Organización para la Cooperación y el Desarrollo Económicos OCED. (2019). *Perspectivas económicas de América Latina 2019: Desarrollo en transición.* Paris, France: OECD Publishing. doi:https://doi.org/10.1787/g2g9ff1a-es

Ortner, S. (1999). *The Fate of "Culture". Geertz and beyond.* Los Angeles, USA: Univertisty of California Press.

Osma-Pinto, G., Sarmiento-Nova, D., Barbosa-Calderón, N., & Ordóñez-Plata, G. (2015, August). Energy considerations of social dwellings in Colombia according to the NZEB concept. *DYNA, 82*(192), 120-130. doi:https://doi.org/10.15446/dyna.v82n192.48587

Osma-Pinto, G., Sarmiento-Nova, D., Barbosa-Calderón, N., & Ordóñez-Plata, G. (2015, August). Energy considerations of social dwellings in Colombia according to the NZEB concept. *DYNA, 82*(192), 120-130. doi:https://doi.org/10.15446/dyna.v82n192.48587

Pallasmaa, J. (2017). Tradition and newness. (D. Leśniak-Rychlak, A cura di) *Autoportret. A quarterly on good space. Regionalisms / Modernism / Postmodernisms, 2*(57), 29-37.

Pauli, G. (2015). *The Blue Economy: 10 years – 100 innovations – 100 million jobs* (Italian edition ed.). Milan, Italy: Edizioni Ambiente.

PEI Máquina Verde-El Arca. (2019). *Project Manual.* Cali, Colombia: Pontificia Universidad Javeriana and Politecnico di Torino.

Pérez-Pérez, A. L. (2016, January-June). El diseño de la vivienda de interés social. La satisfacción de las necesidades y expectativas del usuario. *Revista de Arquitectura de la Universidad Católica de Colombia, 18*(1), 67-75. doi:10.14718/RevAr.2016.18.1.7

Perriccioli, M. (2017). Innovazione sociale e cultura del progetto. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 25-31. doi:DOI: 10.13128/Techne-20797

Petrillo, A. (2013). *Peripherein: pensare diversamente la periferia.* Milan, Italy: ed. Franco Angeli.

Potenza, D. (2017). Architettura Informale. Biennale di Venezia e Mostre Internazionali di Architettura. *EWT - Eco Web Town, II*(16), 121-130. Retrieved from http://www.ecowebtown.it

Pozzebon , M., & Fontenelle, I. (2018). Fostering the post-development debate: the Latin American concept of tecnologia social. *Third World Quarterly, 39*(9), 1750-1769. Retrieved from https://www.tandfonline.com/doi/full/10.1080/01436597.2018.1432351

Pradilla Hosie, S. (2010). *Cartografías Emocionales. Aproximación a la Vivienda de Interés Cultural.* Bogota, Cundinamarca, Colombia: Editorial Universidad Nacional de Colombia.

Pradilla Housie, S. (2020, 06 19). Conference "Vivienda de Interés Cultural: Una propuesta desde la arquitectura para el posconflicto en el campo colombiano". *Virtual forum Arquitectura y vivienda cultural Patrimonio nacional, Sociedad Colombiana de Arquitectos*. Bogota, Colombia.

Quiceno Toro, N. (2016). *Vivir Sabroso. Luchas y movimientos afroatrateños, en Bojayá. Chocó, Colombia.* Bogotá: Editorial Universidad del Rosario.

Regatero Ortiz-Cañavate, A. (2020). Autonomías del habitar. Autoconstrucción en el barrio del Pozón (MSc. Thesis). 106. Madrid, Spain: Escuela Técnica Superior de Arquitectura de Madrid, Universidad Politécnica de Madrid.

Riach, G. K. (2017). *An Analysis of Gayatri Chackravorty Spivak's Can the Subaltern Speak?* London, England: Routledge.

Rincón Bonilla, L. H. (2017). *La Investigación Acción Participativa: Un camino para construir el cambio y la transformación social.* Bogota, Colombia: Ediciones desde abajo.

Risler, J., & Ares, P. (2013). *Manual de mapeo colectivo : recursos cartográficos críticos para procesos territoriales de creación colaborativa* (First Edition ed.). Buenos Aires, Argentina: Tinta Limón.

Rodrigues, A. (2018, October 10-13). Analysis of a resilient housing project: Quinta da Malagueira (1977) by Álvaro Siza. a lesson to retain. *42st IAHS World Congress. The housing for the dignity of mankind*.

Rojas Parada, S. (2019). Técnica y tradición. Laboratorio de técnicas vernáculas para soluciones arquitectónicas contemporáneas (B.Sc Thesis). Bogotá, Colombia: Pontificia Universidad Javeriana, Facultad de Arquitectura.

Romero-Roncancio, C. (2013, July-Dicember). El Proyecto SUR con Bogotá: una estrategia de inclusión territorial y social. *Bitácora Urbano-Territorial, 23*(2), 105-116. Retrieved from https://revistas.unal.edu.co/index.php/bitacora/article/view/40200

Rosas Díaz, R., & Sebastián Balmaceda, C. (2008). *Piaget, Vigotski y Maturana: Constructivismo a tres voces.* Buenos Aires, Argentina: Aique Grupo Editor. Retrieved from https://www.uv.mx/rmipe/files/2016/08/Piaget-Vigotski-y-Maturana-Constructivismo-a-tres-voces.pdf

Rossetti, M. (2008). Il trasferimento tecnologico come motore dell'innovazione. In V. Tatano (Ed.), *OLTRE LA TRASPARENZA. Riflessioni sull'impiego del vetro in architettura* (pp. 13-17). Officina Edizioni. Retrieved from https://www.academia.edu/1918878/Il_trasferimento_tecnologico_come_motore_dell_innovazione

Rudofsky, B. (1964). *Architecture without architects, an introduction to nonpedigreed architecture.* New York, United States: The Museum of Modern Art'.

Sala, M., & Ceccherini Nelli, L. (2017). Climate Adapted in NZEB Retrofitting for Residential Buildings. (A. Sayigh, Ed.) *Mediterranean Green Buildings & Renewable Energy, XXVII*, 19-31. doi:10.1007/978-3-319-30746-6_2

Saldarriaga Roa, A. (2016). *Hábitat y arquitectura en Colombia. Modos de habitar desde el prehispánico hasta el silgo XIX.* Bogotá, Colombia: Universidad de Bogotá Jorge Tadeo Lozano.

Sánchez Arias, J. (n.d.). Architecture Inverse. Lecciones de barrios autoconstruidos a la arquitectura sostenible.

Sánchez Steiner, L. M. (2008, June-Dicember). "Éxodos rurales y urbanización en Colombia. Perspectiva histórica y aproximaciones teóricas". *Revista Bitácora urbano/territorial, 13*(2), 57-72.

Sauquet Llonch, R. (2013, September). La autoconstrucción como sistema. Entre el proyectista y el usuario. *Palimpsesto*, 14. Retrieved from http://hdl.handle.net/2117/21622

Schön, D. A. (1983). *The reflective Practitioner. How professionals think in action.* New York, USA: Basic Books, Inc.

Schumacher, E. F. (1993. Original work published in 1973). *Small Is Beautiful: A Study of Economics as if People Mattered* (English edition ed.). London, United Kingdom: Vintage Publishing.

SITd A (Società Italiana della Tecnologia dell'Architettura). (2017). *TECHNE Journal of Technology for Architecture and Environment* (Vol. 14). Florence, Italy: Firenze University Press.

Smith, A., Fressoli, M., & Thomas, H. (2014, January). Grassroots innovation movements: challenges and contributions. *Journal of Cleaner Production, 63*, 114-124. doi:doi.org/10.1016/j.jclepro.2012.12.025

Spadolini, P. (1974). Design e tecnologia: struttura e contenuti di un campo di indagine. In P. Spadolini, & P. Spadolini (Ed.), *Design e tecnologia: un approccio progettuale all'edilizia industrializzata.* Bologna: Edizioni Luigi Parma.

Szewczyk, J. (2017). The five legs of the chameleon. (D. Leśniak-Rychlak, Ed.) *Autoportret. A quarterly on good space. Regionalisms / Modernism / Postmodernisms, 2*(57), 22-28.

Téllez, G. (1993). *Casa campesina. Arquitectura vernácula de Colombia.* Bogota, Colombia: Villegas Editores.

Tessari, A. (2016). Informal rooting: informal permanences in the contemporary city (PhD Thesis). Venice, Italy: Università Iuav di Venezia.

Tessari, A. (2020). *Informal Rooting.* EU: LIStLab.

Thomas, H. (2012). Tecnologías para la inclusión social en América Latina: de las tecnologías apropiadas a los sistemas tecnológicos sociales. Problemas conceptuales y soluciones estratégicas. In H. Thomas, M. Fressoli, & G. Santos, *Tecnología, Desarrollo y Democracia. Nueve estudios sobre dinámicas socio-técnicas de exclusión/inclusión social* (1st edition ed., pp. 25-76). Buenos Aires: Ministerio de Ciencia, Tecnología e Innovación Productiva de la Nación. Retrieved from https://www.researchgate.net/publication/268444428_Tecnologias_para_la _inclusion_social_en_America_Latina_de_las_tecnologias_apropiadas_a_ los_sistemas_tecnologicos_sociales_Problemas_conceptuales_y_solucione s_estrategicas

Thomas, H., & Fressoli, M. (2008, November 24-25). En búsqueda de una metodología para investigar Tecnologías Sociales. (R. Dagnino, Ed.) *Tecnologia Social - ferramenta para construir outra sociedade.*, 113-137. Retrieved from https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/47974/IDL-47974.pdf?bitstreamId=80982&locale-attribute=fr

Torres Dueñas, S. (2018). The anti-seismic capacity and enhancement of earthen structures. earthen architecture for the urban context of Bogotá, Colombia (M.SC Thesis). 178. Turin, Italy: Politecnico di Torino.

Torres Tovar, C. A. (2009). *Ciudad informal colombiana. Barrios construidos por la gente.* Bogota, Colombia: Editorial Universidad Nacional de Colombia.

Tortosa, J. M. (2009, June). Maldesarrollo como Mal Vivir. *América Latina en movimiento, 445*, 18-21.

Turner , J. (2018). *Autoconstrucción : por una autonomía del habitar : escritos sobre urbanismo, vivienda, autogestión y holismo.* Logroño, Spain: Pepitas de calabaza.

Tzonis, A., & Lefaivre, L. (1981). *The Grid and the Pathway.*

UN. (1948). *Universal Declaration of Human Rights.* United Nations General Assembly, Paris. Retrieved from https://www.un.org/en/about-us/universal-declaration-of-human-rights

UN. (1986). *Declaration on the Right to Development Adopted by General Assembly resolution 41/128 of 4 December 1986.* United Nations. Retrieved from https://www.ohchr.org/Documents/ProfessionalInterest/rtd.pdf

UN. (1987). *Report of the World Commission on Environment and Development: Our Common Future.* United Nations, Oslo. Retrieved from https://www.are.admin.ch/are/it/home/media-e-pubblicazioni/pubblicazioni/sviluppo-sostenibile/brundtland-report.html

UN. (1992). *Committee on Economic, Social and Cultural Rights : report on the 6th session, 25 November-13 December 1991.* UN. Committee on Economic, Social and Cultural Rights, Geneva. Retrieved from https://digitallibrary.un.org/record/143656

UN. (2015). *Paris Agreement.* United Nations, Paris. Retrieved from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

UN. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015.* United Nations, New York. Retrieved from https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

UN. (2017). *New Urban Agenda, United Nations Conference on Housing and Sustainable Urban Development (Habitat III).* United Nations, Quito. Retrieved from https://habitat3.org/documents-and-archive/

UNCED. (1992). *Agenda 21.* United Nations Conference on Environment & Development, Rio de Janerio. Retrieved from https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

UNDP. (2003). *Human Development Report 2003. Millennium Development Goals: A compact among nations to end human poverty.* United Nations Development Programme. New York: Oxford University Press. Retrieved from http://hdr.undp.org/sites/default/files/reports/264/hdr_2003_en_complete.pdf

UN-habitat. (2009). *The Right to Adequate Housing.* Geneva: United Nations. Retrieved from https://www.ohchr.org/sites/default/files/Documents/Publications/FS21_rev_1_Housing_en.pdf

UN-Habitat. (2016). *Slum Almanac 2015/2016. Tracking Improvement in the Lives of Slum Dwellers.* UN-Habitat. Participatory Slum Upgrading Programme, Nairobi. Retrieved from https://unhabitat.org/sites/default/files/documents/2019-05/slum_almanac_2015-2016_psup.pdf

UN-Habitat. (2017). *Human rights in cities handbook series. The Human Rights-Based Approach to Housing and Slum Upgrading* (Vol. I). Nairobi: United Nations Human Settlements Programme. Retrieved from https://unhabitat.org/sites/default/files/download-manager-files/The%20Human%20Rights-Based%20Approch%20to%20Housing%20and%20Slum%20Upgrading.pdf

United Nations. (s.d.). *Slum Almanac 2015-2016. Tracking Improvement in the Lives of Slum Dwellers.* Tratto il giorno 06 17, 2022 da UN HABITAT for abetter future: https://unhabitat.org/sites/default/files/documents/2019-05/slum_almanac_2015-2016_psup.pdf

Vattimo, G. (1982, November). Abitare viene prima di costruire. *Casabella*(485), 48-49.

Vega Encabo, J. (2004, September). "Traslación" y adaptación de técnicas. Tecnologías apropiadas y procesos de transferencia. *Revista Revista Iberoamericana de Ciencia, Tecnología y Sociedad - CTS, 1*(3), 51-71. Retrieved from https://www.redalyc.org/articulo.oa?id=92410303

Visconti, C. (2017). Misure di adattamento community-based per il Water Sensitive Urban Design in contesti di vulnerabilità socio-ambientale. *TECHNE. Journal of Technology for Architecture and Environment. Architecture and social Innovation, 14*(7), 352-361. doi:DOI: 10.13128/Techne-20797

Webster, K. (2017). *The Circular Economy: A Wealth of Flows* (Second edition ed.). UK: Ellen MacArthur Foundation Publishing.