Ciudad Disidente: Addressing social and infrastructural deficiencies in villa salvador-- Part 1

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CIUDAD DISIDENTE

ADDRESSING SOCIAL AND INFRASTRUCTURAL DEFICIENCIES IN VILLA EL SALVADOR
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Within the next twenty years, the Global South will account for 95% of urban growth, and nearly half of that will be within the informal sector.\(^1\) The population living within slums is expected to increase to two billion people by 2030, and if left unchecked, it may reach three billion by 2050.\(^2\) This extreme growth requires an URGENT response in order to offset its adverse effects on the urban environment.

Thus far, architects’ interventions in informal settlements have focused almost entirely on designing housing in order to improve the quality of life, and to meet the demands of the growing population. This, however, is only a temporary fix if the larger economic and social problems are not addressed.

Providing increased agency through community participation in the design and construction processes will encourage residents to be INVESTED in their neighborhood’s future. They will be more likely to focus on the maintenance and development of their homes, businesses, and public spaces.

Villa El Salvador faces many of the characteristic challenges of a typical slum. Its periphery lacks proper infrastructure as well as social and governmental facilities.

In order to address these deficiencies, architects are morally obligated to develop the commercial, social, and industrial sectors in addition to the residential in order to improve the HEALTH OF THE CITY.
LIVELIHOOD
The means to support oneself, one’s family and one’s community.

QUALITY OF LIFE
The standard of living of a given person or persons.

SLUM
A settlement on appropriated land, often working outside of the legal system and established societal norms.

FAVELA
Brazilian term for a slum settlement located on hilly terrain.

GROWTH
A term that refers to an increase in the capacity of an economy to produce goods and services from one period of time to another. Generally associated with economic growth.

PROPERTY
The established definition of property is “something that is owned by a person, business, etc.” or “a piece of land often with buildings on it that is owned by a person, business, etc.”

OWNERSHIP
The legal relationship between a person (individual, group, corporation, or government) and an object. Since the objects of property and the protected relationships are different in every culture, and vary according to law, custom, economic system, and the relative social status of those who enjoy its privileges, it is difficult to find a common definition of “ownership”.7

(SUSTAINABLE) GROWTH
Growth measured in terms of a population’s capability to sustain all of its members’ well beings as it changes over time. Advances the notion of balance and equality in society. Efficiently uses human capital and available resources.3, 4, 5, 6, 7

PARTICIPATION / PARTICIPATORY
Inclusion of non-architects/community inhabitants in the design process and implementation of a project. A collaborative effort between architect, inhabitant, and government bodies in order to create a functional, cohesive intervention.

INCREMENETAL ADDITION
A community is provided a base frame or building that allows the inhabitants to add to it as their needs change and as they gain the resources to do so. It gives individuals agency and control over their homes.

INFILL INTO A FRAME
Community members are provided a frame that they then fill in with any type of program and materials they choose.

KIT OF PARTS
A community is provided a kit of parts to use in order to build their homes, businesses, and public buildings. The parts can be assembled in a variety of ways, and allow for a multitude of programs.

COMMUNITY DESIGNED / CONSTRUCTED
Communities completely design and construct their homes, businesses and public amenities, often with no help from architects or government officials.

SITES AND SERVICES
Architects in collaboration with government bodies provide basic services to homes and businesses in order to provide safe conditions for the inhabitants. The community can then add to and create their buildings around the provided site and services.

BARRIO
The word for neighborhood in Spanish.

CONCEPTS

KEY WORDS
Icons
The established definition of squat (v.) is to be or become a squatter or to occupy as a squatter. For example, “the urban poor squat in the abandoned building”.

To squat is more commonly used informally to describe the action of occupying a previously uninhabited piece of land or building. Over time squatters can begin to see themselves as the owners of their occupied space. Squatting can encourage the establishment of permanent or semi-permanent residences and businesses and ultimately has the potential to generate communities.

The established definition of occupy (v.) is to take up (a place or tent in space), to take or hold possession or control of, and to reside in as an owner or tenant. For example, “this chair is occupied” or “a family occupies this apartment”.

In an informal sense, the word occupy (v.) refers to the act of taking control or residing in a previously unused space. In many cases, this occupation is illegal. For example, “during the monsoon season, the urban poor occupy the abandoned hospital”.

The organization of small resident-built structures around social contacts, friends, family, and the provision of a particular service. For example, selling foodstuffs, street vendors, tailors, mobile phone kiosks, printing, or offering expertise in mechanical repair or construction. As one service comes online, other related or support services will grow, building a network of immediate need-based economic networks that are directly tied to social connections and familial relationships. Residents typically own their own home/business structure, yet lack any legal claim to property that can be used against a government entity, and subsequently lack the right to make physical changes to that property.

An urban condition of spontaneous growth, unincorporated into the spatial, economic, and financial systems of a governing municipality. A territory of highly productive and diversified economic activities that replace tabular and regulated forms of economy with those of flexible and negotiated agreements.
URGENCY
“In the next twenty years subtropical and tropical countries will account for 95% of urban growth and a large portion of this growth (nearly half) will be driven by non-formal architectures.”

“State and private professions such as architects and engineers, act as enablers, resulting in a shift in thinking that valorizes experience and local know how over technocratic and professionalised forms of knowledge.”

“At the same time, it is well acknowledged that architects today contribute to only 3% of the worlds built environment.”
URGENCY
Urban Issues

RAPID POPULATION GROWTH
Large influx of refugees from the sierras.

LIMITED SPACE FOR CITY EXPANSION
Location in a valley, limited to the east by the Pacific Ocean, to the west by the Andes.

UNCONTROLLED URBAN DEVELOPMENT
Development of the periphery without government/planner intervention.

INFORMAL URBAN DEVELOPMENT
People settle on the land before it even has been developed, legally have no land titles.

DIVISION OF LIMA INTO 44 DISTRICTS
Each with its own mayor and municipality, making joint decisions very difficult.

UNDERDEVELOPED INFRASTRUCTURE
Poverty in poorer areas and slums with little or no access to infrastructure in the periphery.

UNDEREMPLOYMENT
Economic market can no longer provide for, nor support increase in population.

HEAVY AIR POLLUTION
Caused by industrial zones and burning waste.

LACK OF PUBLIC TRANSPORT SYSTEM
There is immense traffic on main highways that serve metropolitan Lima. In the informal settlements, few roads are paved, and even fewer are maintained.

LACK OF RAIN
5% humidity throughout the year, but receives almost no rain.

INEQUALITY
Urban elite control much of the wealth, land and political power. Rural peasant population viewed as unsophisticated.

PREVALENCE OF GANGS
Gangs are common in Lima, and are causing increasing amounts of violence, particularly in the informal settlements on the periphery of the city.

SLUM CLEARANCE
Massive slum clearance and forced relocation of residents, often to distant locations far from employment and social services.

SOCIAL NORMS
Cultural and economic segregation stems from ideas implanted during Spanish Colonialism.
Informal Population Growth

Slums have grown exponentially over the past 25 years, and this trend is only going to continue. “The number of people living in slums might triple by 2050 if no policy framework is established to address this issue.” 17

Today there are almost one billion people in the Global South living in slums and informal settlements, which are “characterized by substandard and/or informal housing, inadequate access to clean water and sanitation, and insecure land tenure.” 18

“The number of Slum-Dwellers is expected to double by 2030; slums are now the dominant form of urban land use in much of the developing world.” 19
Mega-cities of the Global South are growing exponentially, and their populations are now exceeding the available resources’ carrying capacity.

These Mega-cities’ densities are expected to reach those of the developed world. In the case of Villa El Salvador, which follows the pattern of Lima as a whole, the population is expected to double by 2030, to nearly 850,000 people, with a density of 21,250 ppm/km², a comparable figure to that of Manhattan, and already greater than that of London.

There is no longer any more space for horizontal expansion in many of the world’s cities. The only solution now is to increase density through vertical expansion.

There is a sense of urgency unique to the Global South, since unlike the developed world’s cities, they do not have the infrastructural capability nor the available resources to support similar growth.20
Children living in slums face a wide variety of social hazards. Often they are forced to walk through unsafe areas in order to get to and from school each day. Without after school activities and safe routes home, youth can be caught in the crossfires of, or even become involved in, gang violence.

Additionally, young people are often left with no safe place to play. Their playgrounds commonly become derelict spaces turned into battlefields for gang disputes and drug deals. This forces the children to play in the streets, which tend to be unpaved, and perilous because of both car traffic and violence.

When exposed to danger in their own neighborhoods, it is increasingly likely that youth will become involved in the violence themselves. Being a member of a gang can easily become a source of income, which further encourages gang members to drop out of school.

Educating children and keeping them off of the streets and in productive after-school programs will allow them to improve their own futures. They will have better training, and thus more opportunities to be successful.21, 22
Giving the people in a community the opportunity to get involved in the design and construction of their own neighborhood gives them a sense of entitlement and pride. It is more likely that they will feel a connection to, and have a stake in what they have helped to create, and will thus be motivated to maintain and improve their homes, businesses, and public spaces.

Increased accountability will ultimately encourage community growth, both within the built environment and the social structure.
"We have a lot to learn from squatter communities - about making due with less, about efficient uses of materials and space. But designers can bring a great deal of expertise to the alleviation of slum conditions, mediating among various interested parties and giving spatial form to their ambitions. In particular, they might be able to facilitate the transformation of vernacular slum typologies directly into 21st century sustainable communities, with on-site energy generation, storm water collection, and sewage treatment wetlands."
This UN sponsored housing project in Lima, Peru was an experiment in participatory design. The architects were asked to create designs for low income housing that the inhabitants could add on to over time. They created not only housing, but an overall urban scheme for the neighborhood.24, 25, 26, 27

**SCALE**
Housing, neighborhood

**AMOUNT OF PARTICIPATION**
Occupant infill/addition

**YEAR**
1968-1975

**ARCHITECT**
Various

**MATERIALS**
Concrete, etc. - not local

**TACTIC**
Incremental Addition

**AGENCY OF ARCHITECT**
The architect provides basic home that inhabitants can add to as their needs change. Architect leaves quickly after completion of designs, thus there is no direct participation between them and the inhabitants. This disconnect does not encourage the planned growth the architects specified for the expansion of the houses.

**VALUE OF PARTICIPATION**
The unique additions to each building give individuals agency, ownership, and pride in their own homes.

**TYPE OF PARTICIPATION**
Addition to the existing homes and reappropriation for a variety of programs.

**FRAMEWORK FOR PARTICIPATION**
Specified growth outside of original structure.

**HOW WOULD THE PROJECT HAVE BENEFITED FROM ADDITIONAL ARCHITECT INVOLVEMENT THROUGHOUT THE INCREMENTAL ADDITION?**
PREVI
Lima, Peru

HOUSE RECIPIENTS

- Fernandez
- amora
- Carcamo
- Espinoza
- Sra. Teresa
- Ramo
- Frias
- Garces
- Linares
- Villegas
- Arnao
- La Rosa
- Castro

EDUCATION
BUSINESS
WORKSHOP
E TENSION
ORIGINAL RESIDENTIAL

CHARLES CORREA
ORIGINAL PLANS ( 78)

GROUND FLOOR

FIRST FLOOR

TRANSFORMATION ( 3)

GROUND FLOOR

FIRST FLOOR

SECOND FLOOR

INFORMATION INTO A FRAME
INCREMENTAL ADDITION
COMMUNITY DESIGNED/ CONSTRUCTED
KIT OF PARTS
SITES AND SERVICES

CHARLES CORREA
ORIGINAL PLANS ( 78)

GROUND FLOOR

FIRST FLOOR

TRANSFORMATION ( 3)

GROUND FLOOR

FIRST FLOOR

SECOND FLOOR

INFORMATION INTO A FRAME
INCREMENTAL ADDITION
COMMUNITY DESIGNED/ CONSTRUCTED
KIT OF PARTS
SITES AND SERVICES

Lima, Peru
SCALE  
Multi-Family Residential

PARTICIPATION  
Community Infill, Adaptability

YEAR  
2004

ARCHITECT  
Alejandro Aravena

MATERIALS  
Concrete Blocks

TACTIC  
Incremental Addition

This housing project was designed to shelter 100 families legally on the same site which previously held that many illegally. The design was such that a bare bones structure was to be created and then filled in by those who call it home however they see fit.

AGENCY OF ARCHITECT  
The architect provides the basic home that the inhabitants can add on to as their needs change.

VALUE OF PARTICIPATION  
Gives individuals agency, ownership, and pride in their own homes.

TYPE OF PARTICIPATION  
Addition within voids between buildings.

FRAMEWORK FOR PARTICIPATION  
Addition within given parameters.

IS THERE A WAY TO BROADEN THE FRAMEWORK TO INCORPORATE MULTIPLE PROGRAMS?

User determined infill expansion  
Initial Framework

Addition of rigid frame allows for structured expansion, as well as stand alone unit  
Re-Developed Framework

Creation of new program including small business and commercial units as well as small scale industry  
Future Program

QUICK圖

Iquique, Chile

SCALE
Multi-Family Residential

PARTICIPATION
Community Infill, Adaptability

YEAR
2004

ARCHITECT
Alejandro Aravena

MATERIALS
Concrete Blocks

TACTIC
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Future Program

QUICK圖

Iquique, Chile
**ARANYA HOUSING**

*Indore, India*

**SCALE**
Housing, neighborhood

**PARTICIPATION**
Volunteer construction, occupant infill/addition

**YEAR**
1995

**ARCHITECT**
Balkrishna Doshi

**MATERIALS**
Primarily concrete, but anything may be added on

**TACTIC**
Site and Services

This design improves and upgrades an already existing informal settlement, as well as provides serviced sites for future development of the area. It includes the base for 6,500 homes that residents are encouraged to build upon as needed.29

**AGENCY OF ARCHITECT**
The architect gives the inhabitants a basic framework and services to build upon using a designed kit of parts.

**VALUE OF PARTICIPATION**
The participation gives individuals agency, ownership, and pride in their own homes

**TYPE OF PARTICIPATION**
Addition to the framework using a kit of parts.

**THE INFRASTRUCTURAL AND COMMERCIAL CORES PROVIDE NECESSARY SERVICES, BUT DOES A KIT OF PARTS HINDER THE CREATIVITY AND AGENCY OF THE INHABITANTS?**

**FRAMEWORK FOR PARTICIPATION**
Kit of parts with infrastructure.

“A kit of meaningful building elements is developed. Form variations on a standardized plan is achieved through permutation combination of various elements which are to be exercised by users”

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**INHABITANTS**

**GOVERNMENT**

**ARCHITECT**

**SITES AND SERVICES**

**INFILL INTO A FRAME**

**INCREMENTAL ADDITION**

**COMMUNITY DESIGNED/CONSTRUCTED**

**SELF INITIATIVE**
Users decide how much to build

**INCREMENTAL**
Users choose how to build

**CUSTOMI ATION**
Users make their own combination of elements
TORRE DAVID
Caracas, Venezuela

SCALE
Housing

PARTICIPATION
Design / infill

YEAR
1994-present

ARCHITECT
Inhabitants of Caracas

MATERIALS
CMU, recycled materials, etc.

TACTIC
Infill into a framework, Community designed/constructed

This project is an unfinished housing tower that has been illegally occupied and infilled since 1994. Inhabitants use the unfinished office tower as a framework for their own interventions. They have created a variety of programs ranging from housing, to commercial spaces, to restaurants.30

AGENCY OF ARCHITECT
This project was done entirely without the help of an architect. While the framework was designed by an architect, its purpose was not originally to house those living in the unstable slums nearby.

WHAT WOULD HAVE CHANGED IF AN ARCHITECT HAD BEEN INVOLVED OTHER THAN THE ADDITION OF NECESSARY INFRASTRUCTURE?

VALUE OF PARTICIPATION
Without the participation of all of its inhabitants, Torre David would not exist as a settlement.

TYPE OF PARTICIPATION
Infill within an empty shell.

FRAMEWORK FOR PARTICIPATION
User driven design.
PUNE HOUSING
Pune, India

SCALE
750 Dwellings, only 156 completed

PARTICIPATION
Incremental housing / addition

YEAR
2008 - 2011

ARCHITECT
Felipe Balestra, Sara Goransson

MATERIALS
Reinforced Concrete, Local Materials

TACTIC
Incremental Addition, Infill into a frame, icommunity designed/created, sites and services

Felipe Balestra and Sara Goransson partnered with SPARC as their local community outreach in Pune, India in order to gain support for in-situ slum rehabilitation. This slum upgrading system consists of rebuilding and gradually improving at scale of the individual family unit, instead of demolition and rebuilding. 31

AGENCY OF ARCHITECT
The architect facilitates discussions with the inhabitants in order to create a design that is appropriate for their needs.

VALUE OF PARTICIPATION
Community participation allows for a design that truly fits the needs of the community.

TYPE OF PARTICIPATION
The community assists in the design process as well as the addition/infill after construction.

FRAMEWORK FOR PARTICIPATION
Sites and services, infill into a frame with community design.

USE OF A FRAMEWORK AT A SINGLE UNIT SCALE AND A SITE AND SERVICES APPROACH WITHOUT MAJOR DISPLACEMENT OF THE INHABITANTS.

3 HOUSING TYPOLOGIES

HOUSE A
Two story home, structured like a 3 story home to ensure safety in future vertical tension

HOUSE B
Incremental ground floor, which is left open for either parking or for the family to turn that open space into a shop

HOUSE C
Incremental middle floor, to hang clothes or to be used like a living room
Comparing the stage of the design/build process that the community became involved with each case study helps determine the most effective type of architect / inhabitant interaction.
The Architect’s Handbook for Participatory Design takes the most successful steps from each of the above projects and puts them in a generic context.

This creates a simple set of guidelines for any designer hoping to involve a community in design / construction to use.

These steps provide for an inclusive and effective design. They both encourage the use of designers in the growth of cities, as well as the training of the local population in order to allow them to be involved in the process.

**STEP 1**
A population in need of help
Criteria
- High density population
- Lack of horizontal space for expansion
- Lack of services
- Lack of access
- Lack of safe public spaces

**STEP 2**
Work with local government to gain access to all
- Negotiate with government officials to provide reasonably priced and accessible water, sewage system, electricity, waste collection
- Needs and implementation vary depending on site

**STEP 3**
Enter into contact with the inhabitants to determine their needs
- Meet with community leaders
- Hold open public forums
- Do not impose your design ideals/ideas on the community
- Decide which constituent groups to collaborate with

**STEP 4**
Determine scale of project with input of the community
- Identify scale of project
- Identify specific sites
- Identify networks and systems to work with and link
- Identify program(s) desired
- Program should focus on all issues affecting the area, not just housing

**STEP 5**
Begin with government, engineer, and architect supervision
- Negotiate with government and community - what services are needed/desired
- Infrastructure is required for future urban growth
- Distribute services appropriately with the idea of topography, access and cost

**STEP 6**
Plan with the citizens and the government according to design framework
- Analyze local ability to generate income
- Framework of growth addresses issues of expansion, incremental growth, and customization
- Once residents have enough funds, they can expand their neighborhood incrementally
- Assign different types of expansion/linking appropriate to scale of expansion
- Allow for growth of entire community with residential, industrial, commercial, transport, services, and public space

**STEP 7**
Determine at regular intervals to assess the success and results of the project
- Assess the project through all phases of construction, and afterwards check if the original goals of the project were maintained.
- Analyze if the planned framework for expansion was successful

**STEP 8**
Locals the necessary skills and techniques to construct and maintain the project
- Taught by trained professionals through workshops when applicable
- Use traditional building techniques

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**SCENARIO**

Architect’s Handbook for Participatory Design

These steps provide for an inclusive and effective design. They both encourage the use of designers in the growth of cities, as well as the training of the local population in order to allow them to be involved in the process.
**LIMA, PERU**

*Expansion of Lima*

**GROWTH**

Over the last forty years, Lima has become an increasingly dense city, with 44 districts situated on only 2672.2 km². Its immediate growth resulted from mass migration of rural populations into coastal cities.32

Lima’s plains, which early in the city’s life allowed for rapid horizontal growth, are now reaching their maximum capacity, creating a need for increased vertical density. However, this option is not viable in many of Lima’s informal settlements, which sit on unstable soil at the periphery of the city, and do not have skilled laborers to construct large-scale projects.33

**WATER**

Since its founding in 1535, Lima - the second driest city in the world - has struggled with gaining access to fresh water. The city quickly formed around three major rivers - Río Rimac, Río Chillón, and Río Lurin - but there are millions of inhabitants who live on the periphery of Lima with no access to the rivers.34

**TOPOGRAPHY**

Lima’s topography prohibits a direct link between the upper plain and the coast, dividing the city into two isolated areas of independent, and competing economic development.
Historically, Lima was divided into two factions, the conquistadores, and the natives. The urban elite controlled much of the wealth of the nation, land, and political power. The rural peasant population from the Andes were viewed as un-educated and dirty. The stigma against the natives that grew from this early inequality has carried through to this day, with those with lighter skin in places of power, fostering continued prejudices between the two groups.

The educated elite often see the less-educated lower class as inferior, particularly with regard to their knowledge of English. Since the education systems in poor areas of Lima do not have the resources to teach English, the students are not granted the same opportunities as their English-speaking counterparts.

As with the majority of the world’s cities, the center of Lima is its wealthiest area where those with power live, and the less desirable land on the periphery is left for the lower classes.

The growing gap between the rich and the poor is becoming increasingly problematic in Lima. Those living in areas on the periphery of the city, such as Villa El Salvador, are separated from the wealthy living in the city center. There is little formal government, and policing in the poorest areas is often scarce.

The growing density of Lima’s periphery only worsens the many issues facing the city. With hundreds of thousands of people living in a confined area, it can be incredibly difficult to create healthy living conditions.35, 36

Social Inequality

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Public expenditure per pupil as a percent of GDP per capita. Primary/secondary/tertiary is the total public expenditure per student in primary/secondary/tertiary education as a percentage of GDP per capita. Public expenditure (current and capital) includes government spending on educational institutions (both public and private), education administration as well as subsidies for private entities.\(^{38}\)

Out-of-school children of primary school age. Male/female is the total number of male/female primary-school-age children who are not enrolled in either primary or secondary schools.\(^{37}\)

Gross enrollment ratio. Total is the total enrollment in primary, secondary, or tertiary education, regardless of age, expressed as a percentage of the total population of official primary, secondary, and tertiary education age. GER can exceed due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition.\(^{3}\)
April 8th, 7
Silently, without warning, at midnight, 8 families armed with sticks and crude tools invaded the private lands of Pamplona in the Southern Cone of Lima. By morning, the police were contacted as hundreds of provincial migrants joined the initial invaders.

May 4th, 7
By May 4th, law enforcement had conducted two unsuccessful evictions of the new residents. In an act of desperation, the authorities blocked off all resources, including food and water from entering the Southern Cone of Lima in order to prevent the arrivals of new invaders.

May 5th, 7
General Artolla, Minister of the Interior, ordered another forced eviction. Violence ensued, and by the afternoon, the police had once again left without completing the evacuation. Among the carnage, 7 people were wounded, 3 Civilians, 57 Policemen and one death, Edilberto Ramos, the first martyr of Villa El Salvador. The church protested the violence to President Velasco.

May 8th, 7
On Saturday, the eve of the homily for Edilberto Ramos, three council members of Christ Church Parish were arrested for their actions in the protest. Government agents arrested Father Carmelo La Mazza under the pretense of a meeting with the Prefect of Lima.

May 9th, 7
Over night two other church leaders were taken by force to the prefecture for their support of the rebels occupying Pamplona. By now, there were nearly 600 invader families, a number that continued to grow by the hour. Bishop Bambaren delivered a homily for Edilberto Ramos. The crowd should not be considered invaders, but seen as founders of new peoples and lands.

May 10th, 7
To end hostilities after a long and tense meeting between the invaders, the Ministry of Housing, and General Velasco, the people agreed to be relocated. At 5pm that day, Major Ande de las Casas ordered the transfer of the first group of families to Hoyada Baja de la Tablada in 5 army trucks. This coastal panse of desert land is the birth place of Villa El Salvador.
The World Bank allowed installation of water and drainage lines across all of Villa El Salvador.

The First Convention of Villa El Salvador was held with 700 delegates and 67 general secretaries. The local governing organization changed its name from CICA to the “Comunidad Urbana Autogestionaria de Villa El Salvador” (CUAVES). The Self-Managing Urban Community of Villa El Salvador (CUAVES) was held to plan for structured future urban and community growth.

The Senate approves the creation of Villa El Salvador as the 4th District of the Province of Lima.

First mayor of Villa El Salvador was elected, Michel Azcueta. He held the first town meeting, and ushered in a time of peace. Led to coordination of group and sector leaders to achieve the community objectives.

Began the construction of asphalt for roads across Villa El Salvador.
Plaza de Solidad, traditionally where the town meetings, including CUAVES took place. Used as a place for mourning after the assassination of activist and mother of Villa El Salvador, Maria Elena Moyano, by The Shining Path, a terrorist organization.

Water was originally transported by truck, with large scale piping introduced in 2001. Many areas of Villa El Salvador are still un/under-served for basic services.

The organizing grid of Villa El Salvador is reinterpreted and expanded upon through the construction of infrastructural and social nodes of public interaction.
CUAVES

CUAVES formed as the self-governing body of Villa El Salvador after its creation in 1971. The body of delegates is headed by an elected mayor with support of community leaders, commercial investors, and local community activists. Through collaboration they plan every aspect of the development and governance of the city to insure a productive economic and social basis for the healthy growth of the city.

SINAMOS
Sistema Nacional de Mobilización Social - The National System of Mobilization.

SINAMOS formed as a governing agency in response to the large-scale, uncontrolled squatting movements of the 1970’s in Lima. SINAMOS relocated squatters to surveyed plots on the outskirts of the city that fit within the government’s plan for greater Lima. Through negotiations between the inhabitants and the government, these new communities were provided with basic services. SINAMOS gave CUAVES a legal and political voice.

COFOPRI
Comisión de Formalización de la Propiedad Informal - Commission on Formalization of Informal Property.

Formed in 1996, COFOPRI allowed settlers to acquire land titles with more ease than had previously been possible. Although titling still required a detailed bureaucratic process, the fact that the process was run by an office deeply committed to de Soto’s vision meant that settlers often had the state government in their corner. One million land titles were granted within the year.42
ZONING
Villa El Salvador was conceived as more than just a residential neighborhood. It was planned to have three major programmatic zones - residential, agricultural, and industrial - which allow for future urban growth using the grid as a framework.

PLANNING
Originally, Villa El Salvador consisted of only government produced, surveyed plots - a chalk grid drawn in the sand.

Each standard group of 16 blocks is 400 by 400 meters and is centered around a public plaza, many of which have now fallen into disrepair. This necessitates immediate attention in order to improve the quality of life in Villa El Salvador.43, 44, 45, 46
EXTENDING THE GRID
The population of Villa El Salvador has reached its maximum size, and can no longer grow horizontally unless the density can be altered through the translation of the grid onto the sloped terrain, joining the city fabric with the coastal edge. Creating mixed use infrastructural, residential, and commercial installations that serve as hubs for the community will provide the necessary resources and motivation for urban growth.

The selection of this area as a viable testing site for the expansion of the grid is based upon the division and isolation between the historic grid of the residential/commercial zones and the industrial coast, and the lack of infrastructural resources, which hinder development.

RECLAIMING VILLA EL SALVADOR’S PARKS
This test site contains some of the newest and most dangerous neighborhoods in Villa El Salvador, and many of its parks have either become dangerous because of deterioration or violence, and thus have been gated and closed off to the public. There are few public amenities in the area, and many fewer schools than in the central sectors.

This requires an intervention to revitalize Villa El Salvador’s parks and return them to the city, while creating safe spaces for the children living nearby. SOFT POLICING is a necessity in this situation, and it will require extensive community participation and interaction with local organizations, specifically CUAVES.
Many of Villa El Salvador’s neighborhoods have turned to gating their communities in order to avoid the danger that comes along with their proximity to gang territories.

This gatedness closes off the public parks to anyone but those living in the surrounding buildings, creating an inward-looking, isolated, and underutilized public space.

Many of these parks have fallen into disrepair because no one will take ownership of them.

While these gated neighborhoods are often seen as safe havens for those avoiding getting caught in the middle of others’ disputes, employing SOFT POLICING techniques such as community watch groups, and protection of public parks will keep areas at risk safe. However, this technique can only function if the entire neighborhood agrees to work together to keep their homes safe.
Villa El Salvador has a dramatic crime problem, particularly with regard to gang violence, murder, shootings, and child abuse.

The danger has become so great for the residents of Villa El Salvador that they have been forced to gate their public parks in order to keep illicit activities away from their homes, thus stripping the public of an amenity that is essential in any dense urban environment - open green space.

Often, the major safety concern is that of children. If children are playing in the streets because the parks are gated, dilapidated, or used as gang meeting spots, they are far more likely to get caught in the cross fires of any violence in the streets, or even become involved in it themselves.

The majority of the violent crimes in Villa El Salvador occur in the newest sectors, which are on the periphery of the district.

These sectors, specifically IV, VI, VII, and IX, have few or no government buildings. Additionally, since they are newer, the sense of community is weaker than in some of the more established sectors.
Villa El Salvador’s primary and secondary education system is extensive in many of the oldest and most established sectors, but in the newest, periphery sectors, there is an immense gap in the system. Sectors IX, X XI, XII, XIII, XIV have no primary nor secondary schools, leaving the children living there with the choice of either walking significant distances, possibly through dangerous neighborhoods to get to school, or not attending school at all. This is a choice that no child should have to make.

In the entirety of Villa El Salvador, there is only one higher education institution. This is an utterly inadequate encouragement for the residents of the district to continue their education past secondary school. For the majority of Villa El Salvador’s inhabitants, moving away from home to attend school is not a viable option away from time that could be spent making money instead of studying.
In order to meet the exponential population growth, and address the infrastructural and social deficiencies of Villa El Salvador, the city must expand incrementally past the geographic boundaries that separate the coast from historic grid.

As one gets closer to the periphery of the city, there is an increase in crime, decrease in social services and decrease in access to infrastructure. The periphery, built on the steep and un-traversable slopes of Villa El Salvador, is becoming increasingly marginalized because of its inaccessibility.

The goals of extending the grid are to accommodate for the needed room for expansion, increase density, connect the coast to the grid of the city, and provide access to social and infrastructural nodes that will be the catalyst for urban growth.

The extension of the grid begins with scaling down the 400 x 400 meter groups to 100 x 100 meters. This accommodates the size and physical restrictions of the slope.

The grid of the city is rotated 90 degrees to create ease of access for the circulation route between the historic city and the coast. Once the new grid reaches the flat coastal plain, it is reoriented to its original formation.

The groups themselves are split into upper and lower terraces to accommodate the slope. The mixed-use infrastructural and social nodes link the multiple levels to promote a sense of community.
“On earth, lack of water is not an issue; the issue arises from the shortage of drinkable water. Seventy percent of the Earth’s surface is covered by water, but over ninety-six percent of this water is undrinkable saline water contained in oceans”

“1 out of every 6 people living today does not have adequate access to water”

70% of Peru’s population lives on the arid Pacific coast, where less than 2% of the country’s water resources are located. 98% of potable water in Peru rests on the eastern side of the Andes, away from the developing coast.

In order for future residential, commercial and infrastructural development along Peru’s coast to occur, this infrastructural deficiency must be remedied.
These nodes of community activities, and outlets for future urban infrastructural development provide the much needed, and hard to access health services, education and infrastructure to Villa El Salvador.

Ica is the second driest city in the world after Cairo, with an annual rainfall of less than 9 mm. It is almost completely dependent on the already overexploited groundwater and Andean rivers. However, much of the water supply is contaminated by mining activities in the mountains.56

Water supply and management in most of Ica is carried out by a government water company, SE APA. Electricity is provided by a private company, E E E. 91% of Ica’s population is connected to public water supply network.58

It is estimated that between 30 and 40% of water lost through the piping system is a result of leaks and illegal connections to the system. The residents of Ica consume nearly double the per capita amount of water than ma or European cities.53

With a commercialized approach towards water infrastructure and maintenance, communities can rehabilitate their unutilized areas for new mixed use infrastructural hubs, which will foster future urban development along the translated grid.

Less than half of the residents of VES have any access, either by truck or water pipe, to potable water. Many people at home or at work face a lack of clean hygiene facilities. This is especially detrimental to children and the elderly.

These nodes of community activities, and outlets for future urban infrastructural development provide the much needed, and hard to access health services, education and infrastructure to Villa El Salvador.
Large cities exist on the Pacific Coast as a result of the depleting rivers that bring water from the mountains to the coast. The desert plains do not receive rain, despite being in desperate need of it. The desalination of seawater can prove to be beneficial to the developing countries. Chile is known as the father of Modern desalination in Latin America for its use of desalinated water generated for municipal use, military use, mining, and railways. The first desalination plant built was as Salinas solar desalination plant, constructed in 1878, which operated continuously for about 50 years.\(^{59}\)

Latin America misses the publicity that her western counterparts receive for desalination plants because of its lack of eye-catching large applications. Instead, Latin America has an advanced desalination community, based on many smaller scale applications, and less widely known techniques.

The two most efficient methods of seawater desalination used in Latin America employ the use of loose reverse osmosis and nanofiltration membrane technologies.\(^{60}\)

Desalination plants growing in number, size and efficiency are supplying more and more water with lower energy requirements, more attention to environment and lower cost.\(^{61}\)

To lower energy requirements and cost.

Solar energy paired with desalination.
Water desalination for domestic and industrial use involves the conversion of saline water into a fresh water stream with a low concentration of dissolved salts, and a concentrate or brine stream containing the remaining dissolved salts from the transformation process.

Desalination Plants require vast amounts of energy to operate, and employ a number of different technologies for saline water treatment. The amount of feed water discharged through brine varies from 20-70% depending on the type of technology and initial salinity of the water.\(^\text{62}\)

Regardless of the production method, all desalinated water must be stabilized for domestic uses. It is necessary to increase the salinity up to a few hundred ppm and to increase the hardness of the water through the addition of lime, sodium carbonate, calcium chloride, and CO\(_2\). Additionally, there may be a necessary pH shift.\(^\text{63}\)

MULTI-STAGE FLASH

Intake
Seawater enters the intake pump and travels to the brine heater through a series of tubes, which have condensed steam on the outside of the pipes.

Stage 1
The heated seawater flows to the first stage, where it is flashed. Some of the water vapor (steam) is removed. The flashed vapor is then condensed onto the outside of the tubes that feed the brine heater. The condensed steam then enters the condensate collector as fresh water.

Stage 2
The unflashed seawater contains a higher concentration of salts, and is sent to the second stage for further flashing. The second stage is run at a lower pressure/temperature than the first, in order to lower the boiling point of the water.

Stage 3+
The process repeats, and the condensing tubes recover fresh water from the steam. Repeat until desired amount of water is collected.\(^\text{64}\)

REVERSE OSMOSIS

Pretreatment
Incoming feedwater is pretreated to be compatible with the membranes by removing suspended solids, adjusting the pH, and adding a threshold inhibitor to control scaling caused by constituents such as calcium sulfate.

Pressurization
The pump raises the pressure of the pretreated feedwater to create a pressure differential to force the water through the membranes.

Separation
The permeable membranes inhibit the passage of dissolved salts while permitting the desalinated product water. Applying pressured feedwater to the membrane, results in a freshwater product stream, and a concentrated brine rejection stream.

Output
The concentrate brine is partially recycled via the high pressure pump, and the remaining brine is discharged. The permeate or product water is then ready for storage before distribution or further treatment.\(^\text{65}\)
This prototype acts as a node within the urban fabric that rehabsitates the derelict public spaces of Villa El Salvador. The mixed use units address the lack of clean-water infrastructure, create a network of small-scale commercial ventures, and provide a safe space for children to gather and learn. These hubs bring communities together, encouraging residents to have a stake in their neighborhood’s future development. Creating close-knit communities through shared investment, these hubs make it possible to expand the grid. They serve as generators of social, infrastructural, and economic networks that can be extended across the entirety of Villa El Salvador.
Combining a school, park, and high density homes provides a safe place for children to play and get involved in productive activities after school, such as music, art, or sports. Additionally, it encourages the adults in the community to police their own neighborhood - in order to keep their families safe.

The creation of a modular building typology of a mixed-use Commercialized Infrastructure Unit will rehabilitate derelict community spaces and provide much needed privatized hygiene/water facilities combined with commercial ventures for maintenance, generation of income and community investment. The unit will install into the framework of the grid and create nodes of community which will improve the quality of life. The hubs are designed to be expanded upon incrementally and can be used as generators of the grids expansion.


3. Danielle Foisy and Peter Lee's definition


11. Allen Gillers' definition


32. Gustavo Riofrio, “The Case of Lima, Peru” (DESCO, 2002)


35. Gustavo Riofrio, “The Case of Lima, Peru” (DESCO, 2002)


42. Asociación Amigos de Villa, “La Historia.” Last modified 2013. amigosdevilla.it.


END NOTES


REPURPOSING THE GRID
SOCIAL AND INFRASTRUCTURAL NODES IN VILLA EL SALVADOR, PERU
DANIEL KALINOWSKI AND TORY BREWSTER
VILLA EL SALVADOR, PERU IS A RAPIDLY GROWING CITY THAT Lacks INFRASTRUCTURE AND SAFE PUBLIC SPACE. THUS THERE IS AN INTENSE NEED FOR DENSE URBAN GROWTH, INCREASED INHABitant INVOLVEMENT AND OWNERSHIP OF PUBLIC SPACE. TRANSLATING THE STATIC GRID AND ACTIVATING THE GROUND PLANE WITH A VARIETY OF INFRASTRUCTURE AND SOCIAL AMENITIES THAT ARE HIGHLY FLEXIBLE, WILL BRING INHABITANTS INTO THE UNDERUTILIZED CENTRAL PUBLIC SPACE, MAKING IT SAFER AND MORE FUNCTIONAL.
POPULATION GROWTH