Incremental Housing:
Solutions to Meet the Global Urban Housing Challenge

Nicole Beattie   Campbell Mayer   Aylin Brigitte Yildirim

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**GLOBAL UNIVERSITY CONSORTIUM
EXPLORING INCREMENTAL HOUSING**

THE CHALLENGE:
Take all the world's housing units from the past 6000 years, and now build them again by 2030.

INTRODUCTION

The exponential growth of the global population and the increasing rate at which societies are urbanizing presents a monumental challenge to all major cities of the developing world. The growth of urban populations is happening at a rate many times faster than the capacity to plan, build and manage urban settlements to meet this demand. This means the majority of new housing stock in the developing world is being built informally; a piecemeal development process that can result in hazardous neighborhoods lacking the basic conditions to create economically vibrant communities and strong societies. Informal settlements are often built with substandard materials and without sufficient infrastructure to ensure standards for the health, safety and sanitation of its residents.

In reality, informal settlements satisfy the huge demand for low-income housing units, a market often neglected by the formal housing sector in developing world cities. The advantage of informal housing construction is the pace and self-sufficiency in which housing units are constructed, and the simplicity of the final product meets the financial constraints of the multitude of low-income and impoverished urban residents. By combining the positive aspects of informal housing developments with an innovative support structure from governments and development institutions to mitigate the impacts and dangers of informal settlements, it is possible to produce decent housing units to meet the immediate and future needs of expanding cities in the developing world. "Incremental Housing" is a strategy to achieve these goals by combining the tools, services and expertise to build safe and vibrant urban communities with the resourcefulness and motivation of the informal sector. Incremental housing is a successful urban development strategy because it harnesses knowledge about the critical stages of informal development and provides various support interventions to guide development toward positive outcomes.

The Global University Consortium was founded with the goal of re-establishing incremental housing (core housing, self-help housing, etc.) as the proactive strategy for satisfying housing demand in rapidly urbanizing places and the logical alternative to the inefficiencies of slum-upgrading. The concept is to bring together experts from a variety of backgrounds and regional contexts to build a pool of knowledge from combined expertise and grow a network of practitioners empowered by collective wisdom. The consortium is based at the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts, and currently includes over 22 participating universities from all over the

world. In March of 2010, the Global University Consortium presented three signature events at the United Nations World Urban Forum (WUF) in Rio de Janeiro, Brazil, as a platform for its first gathering of international housing practitioners who are successfully applying incremental housing programs around the world.

One of the signature events at the WUF, the Networking Session, showcased incremental housing experts from nine different universities. The experts presented case studies, research and project overviews of incremental housing developments from around the world to initiate an on-going dialogue for utilizing pertinent data, designing effective policy and adjusting practices to refine low-income housing strategies. The presentations spanned the last 40 years of incremental housing ideas, from site & services projects built in the early 1970's to today's most innovative housing concepts. This retrospective highlighted the ability of incremental housing to be a dynamic concept that achieves good results in many settings. The dialogue identified tools and strategies that proved successful in one context, was then applied in another context, and continued to meet with success. For example, the "core house" concept of providing a fully serviced plot of land to low-income families was pioneered in Central America in the early 1970's and continues to be a main factor in successful incremental housing projects across the world. The common tool that practitioners are using to understand and improve the incremental housing process is the "longitudinal survey." These surveys have been used to capture valuable data that provides a comprehensive insight into the various social, economic and personal forces that influence a family's incremental housing decisions. This on-going research details how the incremental housing process is producing efficient and successful housing in a wide range of contexts and locations around the world.

The following sections of this paper focus on each presentation from the Networking Session given by the practitioners who gathered at the WUF to launch the Global University Consortium. Each presentation highlights positive trends and continuing challenges that show incremental housing works as a universal strategy and has a proven ability to meet current and future housing challenges throughout the developing world.

LATIN AMERICA

EAST AFRICA

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Incremental Housing: The CHILEan Experience

Presented by: Professor Margarita Greene
Pontificia Universidad Católica de Chile

In understanding the process of incremental housing, it is useful to look at how it occurs both as a historical phenomenon and within its specific context. Incremental housing in Chile for example, has been well documented, and shows an interesting growth pattern that parallels that of the country. In the 1950s incremental housing occurred informally and was a result of individual and/or small groups self-help initiative. In the early 1960s there was an unsuccessful government initiative to eradicating informal settlements. This quickly morphed into "site allocation" program, where families were given a small piece of land, in an attempt to control informal growth and manage them at an urban scale.

In the early 1970s the socialist government of Salvador Allende took power only to be overthrown 1973 by the military coup of Augusto Pinochet. This political turmoil saw shift and instability that greatly impacted incremental housing initiatives in Chile, with informal settlements being regularly raided by the army. As the political situation stabilized itself, new government initiatives emerged to address housing shortage in the country. The end of the 70s saw an official settlement of land tenures for poor families which extended well into the 1980s.

Once land tenure was more established the next step for improvement was 'neighborhood' improvements. Street paving, handing of land titles, sidewalks and community centers were among the early implementations to this program. These earlier plans were followed up through the years with different government backing, and community building. Today Chile has practically eradicated informal settlements, and has established solid government programs that help build, implement and maintain public housing.

This time-line is helpful in establishing the success of incremental housing initiatives, when backed up with appropriate governmental support, and economic growth. As Prof. Margarita Greene pointed out in her lecture, by following incremental housing in Chile, her research team has been able to locate key moments within the incremental process that are crucial in determining the success or failure of the initiative. The three most critical points they found were:
1. To reach a minimum space of 10m2 per person
2. Construction must occur as an improvement process and,
3. The above two must be achieved within an approximate 7 year period.

These three 'requirements' are specific to the Chilean context, but what is interesting is that with some slight variations these key points might impact incremental housing globally. In the case of Chile, if a family is not able to obtain the minimum space per person, and make improvements to the construction within the first seven years, Prof. Greene's research shows these families will be less likely to have successful homes.

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Prof. Greene's presentations was extremely complete and took the research data of forty years on incremental housing in Chile and converted it into useful policy, housing and governmental information. It is crucial information gathered through the longitudinal surveys produce information such as what Prof. Greene's team has produces: a clear time-line for incremental housing construction (seven years) and a minimum area per person to live in (10m2). While this information might be specific to the Chilean context, it can be found across all the case studies. Thanks to this information the Chilean government is now working on implementing programs and policies based on these findings in a way that they might support a family precisely at these key moments. The intention is to created support networks that help a greater number of families to arrive at the seven year mark with greater likelihood for success.
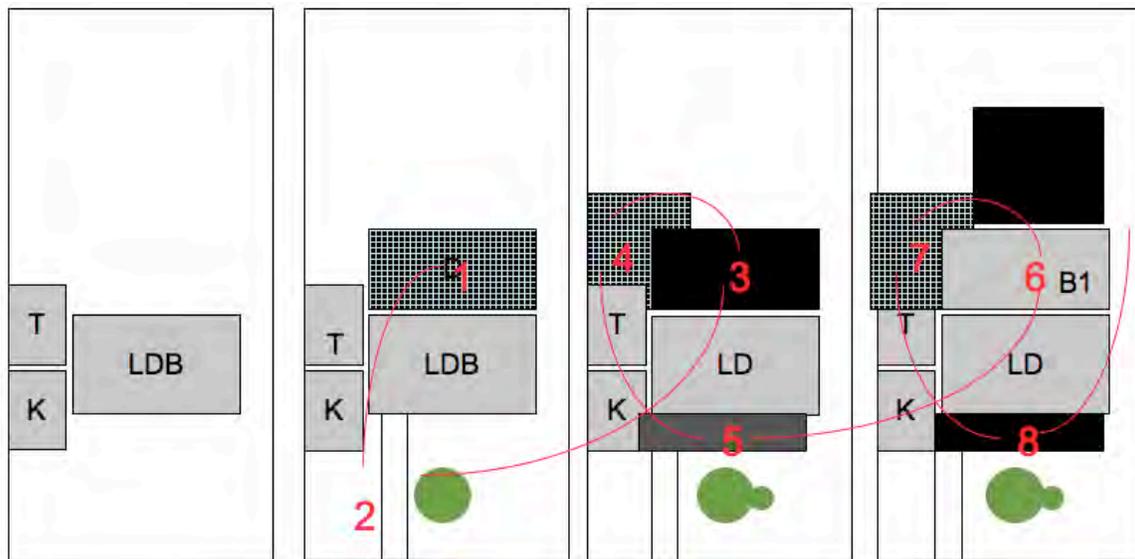
Example of non-linear incremental housing process in Chile.

Informal Settlements at Morelos: Transformations on Self-help Housing

Presented by: Professor Maria Isabel Vargas Mata
Secretaria del SEPI-FAUAEM, Cuernavaca, Morelos, Mexico.

The incremental housing process of the Ruben Jaramillo settlement in Southern Mexico presents a interesting example. Professor Maria Isabel Vargas Mata illustrated the historical context of Ruben Jaramillo well in her presentation. On March 30th 1973 six families were led by Guero Medrano to settle what is today Ruben Jaramillo. By the end of Sept. of that same year, there were 25,000 families living in the site, and the lots had been divided equally into 200m2 lots.

The political turmoil that hit Chile in the early 1970s was also experienced by several other Latin American countries, and Mexico was no exception. As a consequence, there was an attempt by the Mexican military to eradicate the squatters of Ruben Jaramillo. Two thousand armed soldiers entered the settlement taking with them 200 prisoners.

These military actions however, did not succeed and by 1977 the government began the process of land title legalization.

With land tenure secured, Ruben Jaramillo flourished and today this area is a middle class neighborhood. Approx. fifty percent of the original settlers sold their land titles and have relocated elsewhere, but there were important lessons learned from the incremental housing at Ruben Jaramillo:

1. Greater success is achieved if there is a well-organized population with clear settlement guidelines.
2. Basic infrastructure (sewage, water and electricity and street layout) should be in place and,
3. Economic growth local leadership should be identified.

Example of successful incremental housing in Ruben Jaramillo, Mexico.

From Shacks to Homes: Learning From 40 Years and 30 House Examples in Chihuahua, Mexico
Presented by: Professor Emilio Benjamin Guerra Sousa
Tecnologico de Monterrey, Chihuahua, Mexico

Incremental housing in Chihuahua, Mexico share many similarities to both the Chilean example and the Ruben Jaramillo settlement in Southern Mexico. Some of the similarities are the importance of community organization, establishment of basic infrastructure and governmental legitimization. There are however important differences that make Chihuahua a unique case study for incremental housing, the most important of which is its proximity to the U.S. border.

The significance of the U.S. border to the development of incremental housing in Chihuahua is paramount. Much of Chihuahua's growth is due to internal migration of people trying to cross over the border into the U.S. A whole 23% of the city's income comes from assembly plants for used products such as electronic devices, car parts, textiles and weapons. In addition, unlike most growing urban centers in the world, that are becoming more densely populated Chihuahua is spreading out. This sprawl is in great part due to the import of old American cars that are disposed of in Chihuahua. These cars

have decreased the demand for public transportation creating a city highly dependent on private car ownership.

As the research team for Prof. Emilio Benjamin Guerra Sousa established, there is a close relationship between incremental housing growth and a family's internal dynamic. As the family grows, so does the need for more living space, and hence a new or bigger space is added to the existing construction. As the children get older and are able to work, greater improvements can be made to the homes. In the case of Chihuahua many families have at least one family member living in the U.S. that send money back to his/her family.

Despite the differences to each of these three cases in Latin America, there are a few requirements that are common to all, if they are to succeed:
1. Well organized community with political relevance
2. Basic infrastructure and sanitation
3. Planning for future expansion
4. Government support
5. Economic growth

Incremental housing can and is adaptable and flexible to a variety of different social, economic and climatic conditions. There is space for design relevance and the participation of architects, planners and landscape architects, but most importantly there has to be room for autonomy, self-determination and sensitivity to local natural conditions.

Timeline and context sensitive analysis of one incremental housing project in Chihuahua, Mexico.

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Lessons from Incremental Housing Surveys Collected in Brazil:

Presented by: Professor Benamy Turkienicz & Andrea Mussi, PhD candidate
Federal University of Rio Grande do Sul, Brazil

The Brazilian experience highlights themes about how government institutions and professional practitioners affect the success of families pursuing the incremental housing process. Direct government financing opportunities had produced a stream of successful incremental housing projects, but housing production was not keeping pace with demand for low-income units. Brazil has a long history using incremental housing as its predominant housing morphology and recent research tracing this history analyzes what criteria have the greatest influence on home expansion and overall success of incremental builders in Brazil.

Using research collected over forty years; shifting trends show how the government sector has stepped back from guiding the low-income housing market with direct financing programs. Instead, the government now prefers to allocate public funds to private housing contractors as the intermediary to continue incremental housing programs. This is intended to improve construction efficiency for building a high volume of housing units, but private contractors have been slow to respond, choosing instead to satisfy housing demand in more profitable housing sectors. By removing direct financing opportunities for low-income builders, low-income projects must compete in the same market with highly profitable projects, resulting in the marginalization of incremental housing customers. This shift in government policy has resulted in an estimated housing debt of 7 to 8 million low-income units.

Photos: Incremental housing neighborhoods, Brazil

Additional research has focused on four approaches for understanding which factors cause incremental housing projects in Brazil to succeed and continue growing. Of the four research foci, three; environmental attributes, building technologies and design strategies account for about 50% of the research effort, and encompass the technical challenges inherent in incremental housing. Reducing the ecological impact and material costs, as well as designing for efficient plot utilization, increase the ability of the incremental process to meet the needs of low-income builders. However, these interventions only support the incremental builder after the decision has been made to build or expand their home. Analyzing the home dweller's behavior throughout the incremental building process using longitudinal surveys and interviews comprises the majority of research efforts and includes detailed analysis of when and why individual households choose to expand their home. In this way, incremental housing in Brazil is not viewed as a design challenge, but a challenge of connecting individuals with the

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information and resources to enable them to be successful home owners however they choose to apply incremental housing strategies.

Photos: Capturing the incremental process over time through on-going data collection in partnership with homeowners.

Research into the home dweller's behavior provides valuable insight for the housing practitioner in order to plan incremental expansion from the initial core-house design and anticipate future construction costs. Aggregated data from longitudinal surveys is harnessed into a computer model that generates a variety of design responses for expansion, thus streamlining the incremental process and avoiding many of the design issues that are compounded by piecemeal expansion. Automation of core-house expansion can achieve two important goals. One, is reducing costs by achieving greater construction efficiencies for the homeowner, and two, is by providing cost models to the homeowner that enable them to acquire appropriate financing to complete the work properly. Automation is proving to be an efficient strategy for empowering the homeowner by linking design control and identity with innovation and flexibility that combines to achieve the overall goals of the homeowner.

40 Years of Site & Service Housing Projects: Nairobi
Presented by: Professor Tom Anyamba
University of Nairobi, Kenya

Incremental housing has a long history in Kenya because of the general lack (until recently) of secure financial institutions accessible to middle and low-income populations. Houses have long been the repositories of excess family wealth as the annual inflation of land and material prices make home improvements a source of strong returns on investment. In the mid 1970's, the World Bank and USAID introduced "site and services" housing projects into Kenya (large, urban scale housing strategies successfully introduced in Latin America) as a strategy for slum eradication. The Dandora and Umoja housing projects were constructed on the (then) outskirts of Nairobi as an alternative housing development strategy that hoped to prevent the proliferation of urban slum conditions. Today, despite the forty years that have passed since the Dandora

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and Umoja projects were built, Nairobi continues to endure a large debt of low-income housing units and slum conditions continue to affect large parts of the city.
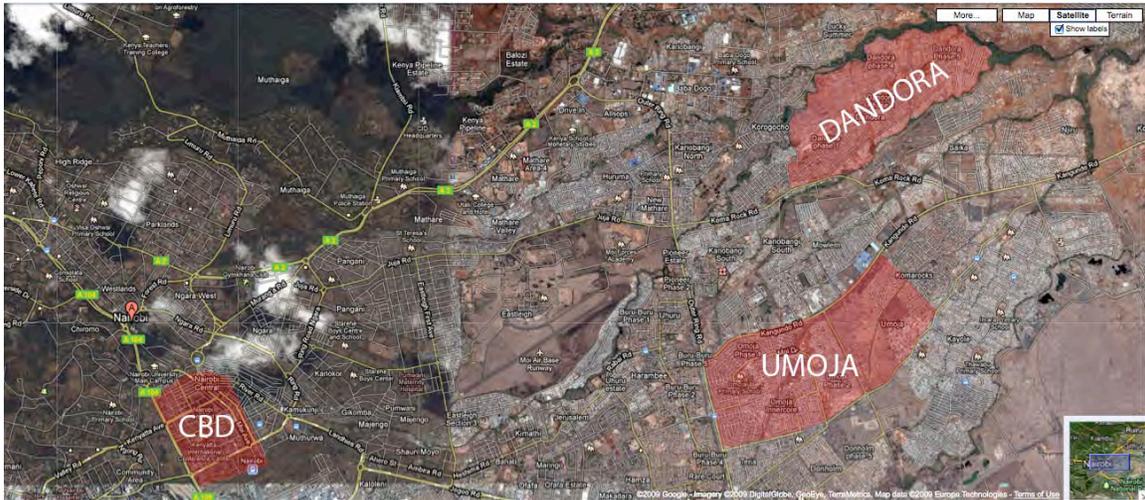

Photo: Aerial view of Nairobi, Kenya. Central Business District (CBD) and Umoja & Dandora Project Sites

The World Bank designed and built Dandora, a large-scale attempt to provide 6,000 low-income housing units to the growing urban population of Nairobi. Dandora tried to stimulate the incremental process by providing only utility-serviced plots in a master-planned community that also made accommodations for communal amenities to serve the residents. Those who qualified for plots were expected to mobilize their own resources to build a house to suit their needs. This project failed to achieve its goals because many who qualified for a plot were unable to raise capital to build a house. Even though they had acquired a plot of land, families were limited by having to make double payments for housing as they paid fees for their new land at Dandora and had to continue renting elsewhere while trying to mobilize construction of their new house. The majority of original Dandora plot owners sold their plots on the formal real estate market where eager speculators bought the plots and created large blocks of rental housing units.

Photos: Dandora neighborhood incremental housing development, circa 2009.

USAID constructed the Umoja co-housing project after Dandora and used a similar strategy of large, utility-serviced and master-planned community plots where residents would assume responsibility for the completion of their own house. Unlike Dandora, plots of land in Umoja were offered to low-income families with a small, finished core house and compound wall that allowed new residents the ability to move in immediately. This allowed the incremental process to steadily increase the density of dwelling units in

the area, but resulted in creating mostly unsafe and unsanitary living conditions. The utility connections were not sufficient for the density Umoja generated and the building typologies did not utilize best practices strategies. Today, Umoja is still a very dense neighborhood within Nairobi that is predominantly rental housing because many of the original residents have retained their property in Umoja, but no longer reside in Umoja, preferring instead to collect rental income to support a village lifestyle.

Photos: Umoja neighborhood- mixed density rental units and various stages of individual/family expansion progress.

The lessons from the Dandora and Umoja projects are fundamental to the incremental housing process being successful in any context. The World Bank and USAID used western designed, utilitarian development patterns to achieve cost efficiencies when master-planning these projects. The lack of cultural context in these designs inhibited the development of endemic community dynamics. Once plots were occupied and the incremental process began, the lack of support for the residents to plan and design their incremental stages led to a breakdown of urban form and a breakdown of the infrastructure supporting the community. The Nairobi City Council has no will or capacity to enforce building codes and political patronage allows lax regulation as a way of preserving political power. Unsanctioned incremental construction proliferated, was not engineered properly and utilized poor-quality building materials. Land tenure was provided unconditionally despite the reduced cost at which plots were offered to low-income residents of Nairobi. Many residents sold their land to speculators for a one-time windfall profit and returned to living in the same conditions that the Dandora and Umoja projects were intended to help them escape. Others achieved significant success with incremental building, adding additional rooms to their house, but only to the point where the plot was maximized horizontally for rental income and then allowed to deteriorate as rental profits went to support the absentee owner's rural lifestyle. While this situation increases urban rental units that are in high demand, absentee ownership limits reinvestment and further expansion of the plot and leads to living conditions for renters reverting back to slum conditions.

Possible solutions to mitigate these problems begin with land tenure and urban design. Land banking or community land trusts that are more representative of Kenyan traditions such as communal land ownership, or possibly sectional ownership, would reduce the impact that land speculators and absentee owners had on the long-term outcomes of the Dandora and Umoja projects. The problem of absentee ownership also limits the ability of urban residents to organize and petition their government for decent services as political power remains with the property owners. Establishing, and more importantly, enforcing urban design regulations continue to pose significant hurdles as the institutional

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capacity to maintain an equitable and transparent system of code regulation remains difficult to achieve. Recent trends in Nairobi have pointed to the success of vertical "shell only" housing blocks built by private developers to maximizing density as land values in the city have become prohibitive to horizontal low-income housing projects.

Paradigm Shifts in Social and Incremental Housing in Sudan
Presented by: Professor Gamal Hamid
University of Khartoum, Sudan

Sudan's experience with incremental housing is closely linked to the country's political history from its colonial past to a large public sector apparatus that provides housing for its employees and only later engages in low income housing. A decisive share of the population is hired in the public sector which is typical for countries in the Middle East-North Africa region. Professor Hamid exemplifies the paradigm shift in incremental housing with the case of Khartoum from informal housing, sites and services to core housing strategies.

Around the 1950s the existing formal housing is colonial and low income groups had to take care of building their own housing. After independence was declared in 1956 the government would primarily provide housing for senior government employees and only very few for low income groups. In the mid-1970s the government changed to a sites and services approach. Due to the limited budget they could allocate for housing, 85% of planned housing at this time followed the sites and services strategy. Since the government is owner of most of the urban land, water and sewage are provided by the government, yet the houses themselves are generally completely built by the new residents and subsidizes by these beneficiaries. Social services were instituted by the communities through communal help. The sites and services scheme was discontinued due to diminishing subsidies and a growing number of incoming labor. Subsequently only one third of the housing was built for a low cost clientele which resulted in the expansion of informal settlements in order to meet the demand for housing.

In the 1990s 60% of Khartoum's residents lived in informal housing made from mud bricks and timber roofs. Nevertheless, the housing deficit increased substantially which finally led to a shift in housing policies and ambitious schemes of regularization. The government adopted core housing as a new strategy for low income residents. A core unit (30m²) would generally consist of one bedroom, a kitchen, and a pit latrine. It was decided to use local building materials and techniques; this way it would be easier and more feasible for residents to expand the units themselves with local material available and beautify the houses in an incremental process according to funds available to them. During the period of 2002- 2007 42,000 people qualified for core housing, but only 34% of them could be supplied. Since the strategy has proven to be viable and could provide housing to at least a part of the eligible residents so far, the National Housing Fond is used to replicate the Khartoum experiment at a national level and implement it all over the country to meet the affordable housing demand since 2008. A five year target foresees 150,000 units to be planned and financed over four years with an allocated

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budget of one billion dollars. The first phase of this country-wide project will be completed this year.

The Sudanese experience very well shows the range and shift in housing strategies from the 1950s government employee housing and informal settlements, 1970s sites and services or site only approaches to recent core housing strategies. It seems from the pictures that the core house is expanded to a traditional courtyard house with one to two stories and improved in terms of material quality and aesthetics, but it is not clear if this is a result from changes in the user structure. In order to be able to reconstruct the incremental process of the Sudanese core housing in terms of horizontal or vertical expansion, images of layouts and sections should be added.

Government employees' housing   Informal settlement in Khartoum

Incremental Housing before and after

Over 50 Years of Socio-Spatial Transformation: The Gecekondu Settlements of Turkey
Presented by: Professor Aytanga Dener
Istanbul Technical University, Turkey

The experience from Turkey shows the history of informal settlements since the 1950s, and exemplifies the processes in the Yeni Sahra case (1969-2009). Interesting in the Turkish case is that the residents discovered their political and voting potential to consolidate and improve their settlements on one side, and to expand it vertically and densify the settlement on the other, resulting in the loss of spatial and structural quality. The later "post-gecekondu" settlements create the highest risk in the case of earthquakes.

Based on a typical push-pull migration, the workers moved from rural to urban areas in large numbers in the 1950s due to unemployment in the villages and rapid industrialization of Turkey's primate cities that would also provide better education and

health facilities. At this point the state was unable to provide sufficient housing for the increasing population which led, as in so many other developing countries, to the emergence of informal settlements. The squatter housing took place at the periphery of the city and was later densified. The residents migrated from all over Turkey and the Balkans; the later waves settled where their fellow countrymen had done so before. A series of amnesty laws regarding these settlements started with the first legalization in 1953. After the first military coup the new institution foresaw affordable housing provided to low income groups by the government. It should be mentioned in this regard that the government was unable or unwilling to pursue their goals, partly due to economic and political crises that happened at least once a decade until the mid-1980s, when the Mass Housing Administration was set into place to provide low income housing, yet it was almost idle until the new government turned it into a public sector body that provides low cost/ public as well as market-price/ private housing since 2002.

In the 1980s the squatter residents' voter potential was discovered, and title deeds were treated for support of a local politician. In this second phase of squatter housing the residents expanded their units vertically and horizontally due to receiving amnesty or title deeds for votes. It should be added that the usual procedure was to approach a small contractor, demolish the old house and substitute it with a multi-storey building, whereas both the "owner" and the contractor receive a share of the units. Depending on how much importance was attached to quality of the house, these settlements were up- or downgraded through the process.

With the urbanization of the big cities like Istanbul and the expansion of the city borders, the in initially peripheral settlements "moved" closer to the core and exist side by side with high rise buildings of banks, international corporations or high end residential towers today. The disparity of the life quality and feelings of inequality results in cultural gaps, identity crises and ultimately crime. Presently there are about two million squatter houses in Istanbul, and another 14 cities in Turkey consist partially of squatter housing.

The case study of the Yeni Sahra settlement is presented in detail to exemplify squatterization processes in Turkey. The first migrants settled in the 1960s. Yeni Sahra is one of 17 settlements in the Atasehir disctrict on the Asian side of Istanbul. The highway E 5 constitutes the urban divide between rich and poor- squatters are in the west, a luxurious satellite settlement in the east. The urban context is similar to other cases of informal settlement where natural or man-made borders (walls, valleys, highways, etc) separate neighborhoods of different socio-cultural and socio-economic backgrounds. The case study examines six houses in detail according to the categorizations expanded (extra storey), minimal adaptations, considerable change (addition of third floor). Furthermore, the headman's house is analyzed. In order to house the multi-generational family of the headman, the initial house had to be demolished and rebuild with more units for the whole family. Residents of the informal settlement chose to live there for two major reasons; they either have no other option to find affordable housing or they prefer to live there because it is close to friends, relatives and family. (The neighborhood bond in these settlements is generally very strong and residents depend on these communal support networks as a traditional form of lifestyle.)

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The spatial and social context is very well illustrated, and the images of the layout and inside view of the houses allow a good understanding of the situation. The houses are both owned or units rented out to newly arriving migrants which brings in a new dimension of informal/ incremental housing. The rented unit fell under the category of "minimal adaptations" in the study that leads to the presumption that renting might apprehend the resident from expanding and upgrading the unit, but has yet to be supported with evidence.

Yeni Sahra 1984 and at present

Example house 1

Example house 2

Typologies According to Housing Initiation and Tenure Status: The Thailand Experience
Professor Wijitbusaba Ann Marome, Professor Supredee Rittironk; Presented by: Aylin Yildirim in representation of the authors
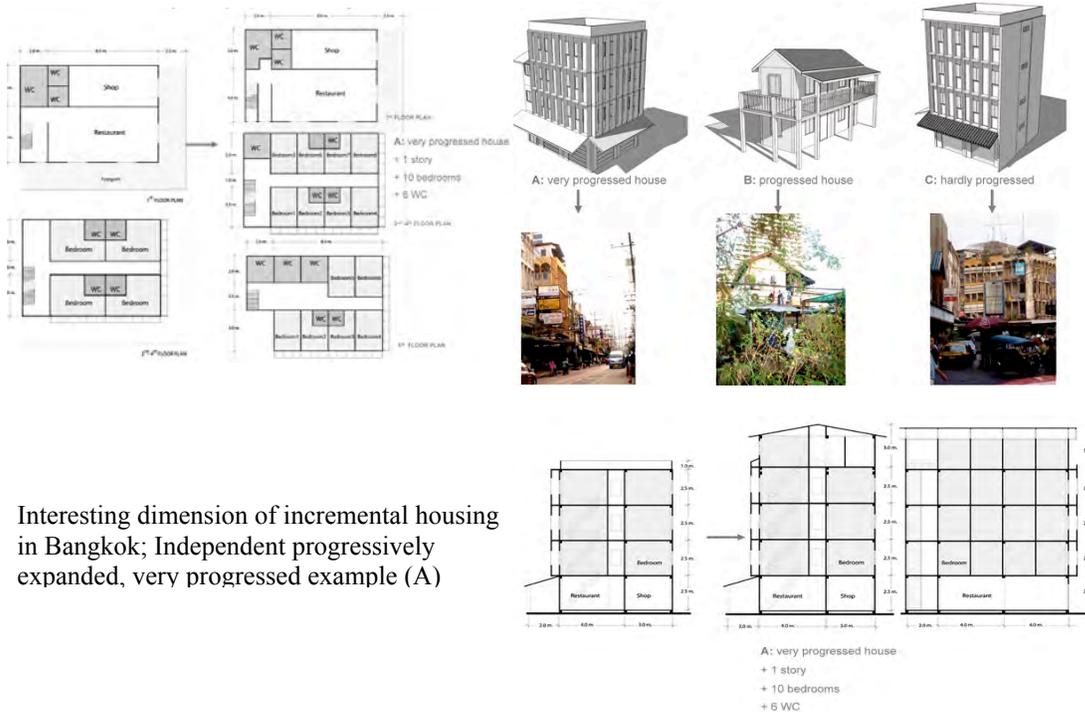Thammasat University Bangkok, Thailand

The experience of informal settlements in Thailand is explained in the context of Bangkok, Thailand's primate city. With a population of about six million, it is 50 times bigger than the next biggest city Chiang Mai. 60% of Thailand's population lives in Bangkok, producing half of the country's GDP. The informal settlements in Bangkok are scattered throughout the city, found along the Khlongs (canals) or close to the CBD.

The case studies are divided into types according to housing initiation from public to private, and land tenure variations. The three types of incremental housing resulting from this division are firstly the sites and services approach where houses are legally built and land is secure, secondly slum upgrading where the state supports self-help housing and squatter settlements, and thirdly independent progressively expanded housing. In the 1960s slum improvement projects consisted of core housing approaches. Whereas the number of rooms increased and the quality of construction materials improved, the number of users stayed the same in the case study example. The 1980s' example is a high-rise, detached town house that was expanded by an additional storey and a shop with the intention to work at home.

Whereas these examples are typical for developing countries, the case of the canal communities is an interesting policy approach from the government. Public land is leased to the communities along the canal with a tenure term of 30 years and options to renew it. One could guess that this temporary security has led to the vertical extension, readjustments, reutilization and change of spatial functions that have taken place in the example. A different 1980s' case along the canal shows the incremental process of a canal community that was not supported by the government, but a community cooperative. The lack of need to rely on state subsidies results from the higher standard of economic wellbeing in the community. It would be informative to compare both types of canal communities and tests the benefits and disadvantages against each other.

Progressively expanded housing can be found in Bangkok's CBD along the Sukhumvit Road. The space has been expanded and intensified due to changes on land use and building codes. Thus more bedrooms can be rented out by an increase of tenant spaces from 25 to 65. This is another case of incremental housing that is rented, not owned. We can assume that the spaces are smaller and of lower quality than those that are owned, yet this would need evidence.

Graphically and content-wise the research convincingly presents the situation of incremental housing in Thailand. Different scales from settlement to house, as well various public and private strategies towards informal/ incremental housing are well explained, set into the urban context and supported by before/ after evidence from layouts and sections. Current examples of incremental and low cost housing such as Baan Eua-Arthorn (recent core housing) could be included as well.

Interesting dimension of incremental housing in Bangkok; Independent progressively expanded, very progressed example (A)

Responding to Disaster: Incremental Housing in Poland
Presented by: Professor Lech Kłosiewicz
Warsaw University of Technology, Poland

The history of incremental housing in Poland provides us with an alternative perspective and a reminder that incremental housing is successful in more than a tropical or developing world context. Recent natural disasters from the 2004 tsunami to earthquakes in China, Iran, Haiti and Chile have presented massive reconstruction challenges, each with unique circumstances to be overcome with creativity and ingenuity. When considering practical responses to recent natural disasters, the experience from Poland presents a constructive example of successful redevelopment interventions applied to the disaster resulting from World War II.

Following the conclusion of WWII, many Poles reconstructed their houses on the periphery of destroyed cities using primarily self-help methods and creativity with locally available materials. The abundance of rubble was recycled into prefabricated building elements by large-scale public-works programs and the socialist government, using available communal land, initiated massive public housing projects. As reconstruction gained momentum, funding became available for restoration of Poland's major cities, but restructuring of the urban form meant very little of the old cities would actually be restored. Government led reconstruction and housing programs continued until the political shift of 1989 that radically transformed the development process. A democratic government, free market economics and private land ownership instantly became the new principals of the development industry in Poland. This political shift led to the fragmentation of peri-urban lands and rapid development of farmland into sprawling residential suburbs, but also brought increased access to development financing for

middle and upper-income housing. Low-income housing was primarily limited to urban apartment blocks remaining from socialist housing programs of the former government institutions.

Photos: Self-help housing post-WWII, government-housing blocks pre-1989, planning for private land ownership.

Today, incremental housing in Poland incorporates many principals of "grow houses" which are primarily completed exterior shell houses with low-quality interior finishes that allow for initial occupation and low up-front costs, but require continual upgrading by homeowners to ensure durability. As financial products become more available to low-income people, modest housing in the rural and village zones have been upgrading by full replacement of out dated structures. Older houses built after WWII with mostly natural materials are replaced on the same plot of land with complete new houses of masonry/cinderblock construction that achieve much greater efficiency and durability. For new construction, private developers are building two; three and four unit prefabricated steel houses as a way to provide low-income families with access to new construction that meets their financial constraints.

Photos: Multi-unit grow houses, full replacement housing and pre-fabricated multi-family housing.

The housing development trends in Poland are shaped by extreme historical events, each of which represented fundamental changes in the housing sector of the entire country. The political climate in Poland after WWII favored large-scale public works projects and relatively equitable reconstruction policies that benefited from a strong central governing authority to forge ahead into resolving the crisis. The approach many not have been perfect or achieved every goal, but initiating comprehensive redevelopment plans within a particular context provided a continuity which could be refined at later stages to meet the evolving needs of the Polish people. By geographic location and economic infrastructure, Poland is unlike most incremental housing situations in the developing world, but serves as a model to inspire other countries that now face similar challenges at the same scale Poland faced after WWII. Making major public investments into housing, restructuring the urban form and reshaping the cultural identity of an entire country is an incredibly daunting task, but not one without successful examples.

Conclusion:

Developing countries are facing unprecedented population growth, housing shortage and rapid urbanization. As illustrated in the nine examples presented in this document, each country approaches this problem from a slightly different angle; one that fits their particular situation. However, the consequences of this new urban expansion are felt globally because the common conditions shared cross-culturally in addressing housing shortage and informal settlements. This indicates there is an urgent need to have a common platform from which to draw practical lessons. This common platform and knowledge center is the role of the Global University Consortium.

One of the major differences that can be appreciated in addressing housing shortage is the issue of scale. The major difference concerning scale regards the level of governmental involvement in the housing problem. The approach to housing shortage is very different under a totalitarian (federal) government, such as that experienced under communist Poland until 1989, or in Chile (1973 – 1990). While smaller scale local government interventions, such as the cases presented by Thailand or Mexico, take alternative approaches. Globally, in the last forty years, countries have followed the smaller scale approach; evident in the proliferation of NGOs. In many instances these NGOs have begun to take over a role previously assumed by the federal government, formulating their own housing solutions for the poor. While the smaller scale approach is achieving success using the incremental housing approach, how can these successes be translated into comprehensive housing policies to meet the growing demand for low-cost housing?

Global solution for successful incremental housing is a challenge, but a challenge that is in desperate need of addressing. Looking at the nine examples presented here, and the work done at WUF in Rio through the Global University Consortium some initial guidelines can be drawn. For example, the "core house" concept, as mentioned earlier, which provides fully serviced plot of land to low-income families has proven successful across nations and scales. In other words, being prepared for future urban growth through well laid out "core houses," land distribution and clear urban grids has consistently worked. In the example of "Ruben Jaramillo" a small community organized itself for the informal land takeover so that it occurred on a well laid out grid system. In the Sudanese example, we can see how an increase in scale, under well-organized planning continues to be successful, as sites and services are well laid out in preparation of the population growth. Finally, Chile serves as an example where well-planned governmental action has worked to alleviate housing shortage at a national scale.

Future planning requires reliable data that can help access the extent and magnitude of the intervention needed. Looking at the nine examples presented at the Rio WUF, one thing becomes clear: the need to have standardized central data collation mechanism. Regardless of the varying political, economic or social context, it is important to understand the common denominators to housing the poor. As stated earlier, the use of "longitudinal surveys" as a tracking device for incremental housing can be a valuable measuring tool for collecting and distributing information that enhances the outcomes of incremental housing projects across the globe. However, to make these surveys valuable

in any context, a minimum standard for measurement needs to be established, so that useful cross-contextual information can be shared and practical conclusions be drawn from them.

These longitudinal surveys capture valuable data and provide a comprehensive insight into the various social, economic and personal forces that influence a family's decision-making process when constructing a home. The incremental housing process has been shown to produce efficient and successful housing solutions in a wide range of contexts and locations around the world. We propose that by centralizing knowledge and setting clear measuring standards, the Global University Consortium can become a much needed platform for better understanding of the conditions that make incremental housing a successful strategy for the world's urban poor. As we prepare to meet the challenges presented by our accelerated world urban expansion, centralized-information sharing and data evaluation become critical. It is imperative that such an organization exists, if we are to devise comprehensive and sustainable solutions to the pressing housing shortage worldwide.

The presentations made at the Networking Session show that the incremental housing approach works. First, because of its flexibility in expansion or subdivision according to the evolving needs of the occupants; second, through the increased quality of the house as family income grows by improving, upgrading or beautifying the building without growth of user structure; and finally, because the growth happens along the individual family's ability to divert money into the building process, so that the construction process usually happens in several steps. Today we are in the position to look back at 50 years of research and can proof the point that has been made by these scholars as early as the 1960s and 1970s.

THE AUTHORS

Nicole Beattie
Doctor of Design 2012, Harvard University, GSD

Nicole Beattie's objective is to contribute to architectural design and urban planning strategies that promote a healthy built environment. Her doctoral work will examine architecture as a cultural reflection of health and well-being. Specifically, she will focus on the evolution of housing-form within two specific regions of South America. Current rates of development are creating regions of rapid urbanization and population growth at an unprecedented scale. Local governments and international organizations have implemented policies to address the pressing demands these settlements have on public health. How successful have these policies been and what novel designs could be incorporated in future policies? Can we generate hybrid design solutions fusing vernacular architecture with advanced building science technologies? What are some of the hybrid designs that emerge from this cross-cultural information exchange? How does this exchange link design methods, housing, shelter, and urban design to a population's health and well-being?

Email: nicole.beattie@gmail.com

Campbell Mayer, AICP
MCP 2011 Massachusetts Institute of Technology (MIT)

Campbell Mayer, AICP, is currently a Master of City Planning (MCP '11) candidate in the Dept. of Urban Studies and Planning 'International Development Group' at the Massachusetts Institute of Technology (MIT). He earned his B.A. in Planning from the University of Oregon (PPPM '98). He has been a community development planner since 1998 and earned his certification from the American Institute of Certified Planners (AICP)

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Nicole Beattie   Campbell Mayer   Aylin Brigitte Yildirim

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in 2002. Campbell was a housing consultant in Uganda (2005-2009) where he developed housing programs to transition vulnerable and displaced families into permanent homeownership opportunities. Campbell also developed housing and appropriate technology programs in Honduras, Nicaragua and Nepal and works primarily in partnership with local NGOs and government agencies to liberate people from the poverty trap. Campbell resides in Colorado and enjoys many outdoor activities for all seasons.
Email: cmayer@MIT.EDU

Aylin Brigitte Yildirim
Doctor of Design 2011, Harvard University, GSD

Aylin Brigitte Yildirim received her graduate engineer diploma in Architecture in Germany in 2003. She has been working as an architect on public and private projects ever since. Her knowledge includes green design standards and technology as well as universal design. She received her Master of Science degree in 2007 after researching on informal settlements in Istanbul/ Turkey where she carried out case studies and proposed an alternative design for upgrading informal settlements.

During her course of studies, she has been working as teaching assistant, preparing and conducting lectures and grading assignments. Courses include design studios, building construction and technical equipment.

As a Doctor of Design Candidate, her areas of research are informal urban dynamics, housing typologies, as well as comprehensive and cross-disciplinary urban design approaches to issues resulting from rapid urbanization and internal migration.
Email: yildirim@gsd.harvard.edu

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Nicole Beattie   Campbell Mayer   Aylin Brigitte Yildirim

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