



# Incremental housing as a node for intersecting flows of city-making: rethinking the housing shortage in the global South

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**ABSTRACT** Incremental housing drives urbanization worldwide, and is recognized as the basis for socially relevant solutions to housing shortages in the global South. However, scholarship on incremental housing continues to focus largely on tenure, building materials and housing conditions at a local level, while incremental housing is embedded in – and dependent on – larger urban and regional systems and flows. We argue that a further reconceptualization of incremental housing is needed that acknowledges the embeddedness of local incremental building practices within broader industries, markets and practices of city-making. Starting from this observation, we suggest an extended framework for understanding the city-wide industries and flows around incremental housing, in relation to five dimensions: 1) land, 2) finance, 3) infrastructure, 4) building materials and 5) labour. Mapping these dynamics is necessary to understand fundamental questions of where, how and why initiatives aimed at improving or developing incremental housing advance or get stuck.

**KEYWORDS** global South / housing policy / incremental housing / informality / urban flows / urban systems

## I. INTRODUCTION

Developing sustainable urban housing stands at the nexus of multiple Sustainable Development Goals (SDGs) – especially SDG 11 on sustainable cities and communities. The imperative is framed by spectacular urban growth, exacerbating inequality, environmental degradation and housing shortages, particularly in developing cities.<sup>(1)</sup> Incremental housing, a key driver of contemporary urbanization in developing cities, could be the starting point for socially relevant, realistic solutions for persistent housing shortages.<sup>(2)</sup> According to Adler and Vera,<sup>(3)</sup> incremental housing is a strategy based on a progressive system, where construction is incomplete but in conditions of habitability. The houses are designed in such a way that the users finish them by their own means and according to their own needs and tastes. Based on this definition, incremental housing is the process by which people transform their habitable space through time.

The majority of research on incremental housing generally – and incremental building practices in particular – focuses on poverty or informality. Incrementalism is seen as an antidote to challenges of affordability, allowing low-income families to pay for housing construction over time, and to operate outside of prohibitively expensive formal building codes and regulations. Work on incremental housing is still dominated by concerns with tenure and housing conditions at a local level.<sup>(4)</sup> Many studies – both historically and more recently – focus on how poor people build housing in precarious conditions.<sup>(5)</sup> This work is essential and enables us to understand the tight relationship among informality, urban survival, and the ways in which states render the poor illegitimate.

However, it is not just the poor who engage in incremental (or even informal) housing in cities in the global South.<sup>(6)</sup> People of all income groups engage in incremental practices that are subject to both informalization and formalization by state actors. This is because supply-side housing models are largely inadequate in terms of affordability, timing of payments, and other needs of the majority of the world's city dwellers. Indeed, the current housing challenge is not only a quantitative housing shortage, but, to a large extent, a qualitative one where essential infrastructure such as safe water, wastewater disposal, energy and integration into the urban fabric are the main challenges.<sup>(7)</sup> International organizations' approaches towards incremental housing, and those of some governments, have long shifted towards more supportive perspectives on incremental housing, and in fact the recognition of incremental housing as an effective housing strategy is almost 50 years old.<sup>(8)</sup> Despite an apparently widespread acceptance in policy, however, in practice systems of land tenure and building codes still penalize incremental housing in many cities. How incrementalism both functions and can best be supported and managed is still under debate.<sup>(9)</sup> For example, it is increasingly acknowledged that much incremental housing is not self-built (as much of the literature on self-help housing assumes), but rather part of a larger process managed by the owner-dweller, and undertaken in partnership with other stakeholders. Nevertheless, a key question that remains is how to combine such inclusive, flexible and adaptive strategies of building and urban development with formal city-making practices.

Current urban studies scholarship provides conceptual innovations for understanding cities as complex sociotechnical systems "*where numerous actors and processes interact, often across geographic, institutional and governance scales*".<sup>(10)</sup> Within this systems approach, a relational or flow perspective is deeply attentive to the material, social, political and institutional interworkings of complex systems, as well as the power dynamics that exist between actors.<sup>(11)</sup> Urban researchers, particularly those who operate through a more relational lens,<sup>(12)</sup> recognize that contemporary cities are not the stable products of past planning decisions "frozen in space", but are constantly in flux and created and recreated through various flows and relations of people and materials.<sup>(13)</sup>

Such perspectives are difficult to apply to empirical research as this would require a mix of methodologies, disciplines and types of data. The result has been limited application of this sort of sociotechnical and techno-political work to the study of incremental housing in developing cities. This is a major shortcoming in the field of housing studies, as improved responses to incremental housing could benefit from more complex understandings of city-making. These insights are even more

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1. UN-Habitat (2012).
2. Bredenoord and van Lindert (2014); Greene and Rojas (2008); SPARC (2013).
3. Adler and Vera (2018), page 485.
4. Amoako and Frimpong Boamah (2017); Chioldelli (2016); Grubbauer (2017).
5. Turner (1972); Greene and Rojas (2008); Bredenoord and van Lindert (2010); Roy (2005).
6. Roy (2009).
7. Adler and Vera (2018).
8. Turner (1972).
9. Bredenoord and van Lindert (2014).
10. Amin and Thrift (2016); Bai et al. (2016), page 70.
11. Derickson (2015); Massey (2005); Robinson (2002); Ward (2008).
12. McFarlane (2011); Brenner et al. (2011).
13. Schramm and Wright-Contreras (2017).
14. Amin and Cirolia (2018).
15. de Soto (2000).
16. The Peruvian economist Hernando de Soto, in his famous work *Mystery of Capital* (2000), argues that capital markets fail to work for the poor, mainly because they often lack formally titled property.

difficult to apply in practice and have thus hardly been incorporated into city planning/management policies or programmes. Urban planning tools, methods and procedures often continue to reflect the idea of planning as the creation of something relatively stable and long-lasting, such as zoning or land-use plans. Although ongoing urban planning processes and the creation of new plans can account for changes to some extent, the tools tend to emphasize stability instead of dynamic connections, interlinkages and movement. In many ways, this is because urban governments – by their very nature – struggle to respond to complexity, informality and dynamism. The result is a disjuncture between the theoretical/conceptual progress made on understanding city dynamics, and the tools and instruments of urban management, including those related to housing.

In this paper, we make the case for reading incremental housing through the lens of urban flows and systems.<sup>(14)</sup> In other words, we aim to provide a scaffolding that merges the longstanding debates about incremental housing with more recent innovations within urban studies. A real understanding of the practice, including the associated opportunities and barriers, will result from mapping the embeddedness of local incremental and self-managed building practices within broader industries, value chains and city-making practices. For example, the opportunities for incremental housing depend on the availability and affordability of industrial building materials. Furthermore, flows of finance and labour are more diverse than assumed. Overall, we need to better understand the interests and functions of different actors such as self-builders, suppliers of materials and finance, and informal brokers. Questions of land and infrastructure, though not “flows” as such, mediate or enable flows of materials, people and energy that constitute (urban) space. Therefore, we argue that they need to be researched from a novel dynamic and city-wide perspective in relation to flows of labour, materials and finance.

The question of why and how dwellers develop housing incrementally has long been at the centre of debates on incremental housing. Yet paradoxically, focusing on very localized household needs, opportunities and challenges may fail to provide adequate and scalable solutions in the absence of a solid understanding of the broader urban system. Drawing from and consolidating themes within urban studies (particularly complex systems) and incremental housing literature, we aim to unpack this paradox and provide a framework for understanding the city-wide industries and flows around incremental housing through five interrelated areas: land, finance, infrastructure, building materials and labour. By using this multidimensional and multiscale perspective we can better understand how incremental housing is embedded in the flows and systems of cities. On the basis of a variety of case material we analyse how these different aspects of incremental housing are related to broader processes of city-making and how they interlink with the other dimensions. In the conclusions, we reflect upon how this framework can: 1) inform how incremental housing opportunities and challenges are studied in particular urban contexts and 2) be used to develop more comprehensive and responsive policies.

## II. LAND AND DENSITY ON A CITY-WIDE SCALE

Owing to the work of de Soto<sup>(15)</sup> – and even more importantly, the ways in which de Soto’s work was picked up by lending institutions like the

World Bank<sup>(16)</sup> – land, and more specifically secure land tenure, has been regarded as one of the main bottlenecks in improving housing provision. The incremental housing process tends to start with land occupation and building, while servicing and infrastructure development are arranged at a later stage, often depending on the regularization of land tenure. Similarly, the extent to which dwellers invest in improvements is dependent on dwellers' perceptions of secure tenure. Likewise, access to finance is often thought to increase with secure land tenure, although this is fiercely debated.<sup>(17)</sup> Secure tenure is also a precondition for the active involvement of corporations, state provision via municipalities, and the involvement of lending institutions and other social networks. It has been key to most informal settlement upgrading programmes since the 1960s. The sites-and-services schemes that were implemented in many developing-country cities in the 1970s and 1980s (even later in some African countries like South Africa) were predicated on the importance of secure and legal tenure. Nevertheless, it is important to recognize that incremental housing cannot be equated with informal settlements; many homes built through incremental methods are located on legal lots with secure land tenure.<sup>(18)</sup> Furthermore, it is increasingly recognized that formal land titling is not the main or the only way to achieve secure tenure: de facto tenure security can be achieved without it.<sup>(19)</sup> In many cases, the incremental housing process often continues for many years without formal tenure, particularly in countries or cities where evictions are uncommon.<sup>(20)</sup> In Mexico City, for example, incremental dwellers can be quite secure about their tenure, since previous experiences show that in time, settlements that started informally will often be regularized.<sup>(21)</sup>

Overall, paying attention to secure tenure for households in the incremental housing process is justified, given the links to service and infrastructure provision, the flows of building materials and labour, and particularly institutions providing formal loan finance.<sup>(22)</sup> However, it is important to consider land from a broader city-wide perspective. We consider land from two additional angles: first, the ways land for incremental housing is made available in the context of land markets and increasing urban land scarcities; and second, the opportunities and challenges of densification in relation to land tenure, regulations and land markets.

The first line of enquiry starts from the observation that available urban land is becoming increasingly scarce, and struggles around urban land, while not new, seem to be intensifying.<sup>(23)</sup> This presents an increasing challenge for financing incremental housing, as the value of the land represents a significant proportion of the total cost.<sup>(24)</sup> Incremental housing boundaries keep shifting. It moves continuously to places where land is cheaper – further into the peripheries, and into more precarious or disaster-prone places.<sup>(25)</sup> Older incremental neighbourhoods become consolidated and better connected, and as the city expands, these neighbourhoods acquire relatively central positions in the city, and thus land there increases in value. As a consequence, these neighbourhoods risk becoming subject to the processes of urban regeneration and gentrification that often result in displacement, as Rio de Janeiro's evictions around the 2014 FIFA World Cup and the 2016 Olympics clearly demonstrated.<sup>(26)</sup> As a result, investments in public space and urban services can paradoxically lead to indirect displacement via land value increases. This phenomenon has been identified by Steel et al.<sup>(27)</sup>

He goes on to argue that this inability to convert assets into capital is the main thing that makes the poor unable to benefit from capitalism. International institutions such as the World Bank were quick to adopt these conclusions and promote large-scale property titling programmes. Naturally this argument and the related policies have also attracted widespread criticism.

17. Varley (2017).

18. Greene and Rojas (2008), page 91.

19. Payne et al. (2009); Royston (2013).

20. Payne et al. (2009); Royston (2013).

21. Duhau (2014).

22. However, proponents tend to push this argument too strongly: for example, the 2017 World Bank report *Africa's Cities: Opening Doors to the World* argues that any solution to urban problems will depend on "making land markets work" first. In reality, "solving" the land issue is a highly complex long-term challenge, and other solutions cannot wait for this. Lall et al. (2017).

23. Steel et al. (2017); van Noorloos et al. (2019)

24. Greene and Rojas (2008).

25. Caldeira (2017).

26. Gaffney (2016).

27. Steel et al. (2017)

28. Huchzermeyer (2001).

29. Desai and Loftus (2013).

30. Tijssen (2011); Hamid and Mohamed Elhassan (2014); Kaag and Steel (2019)

31. UN-Habitat (2016).

32. Greene and Rojas (2008).

33. UN-Habitat (2016).

34. See Watson (2016) for a critical analysis of the ideal of dense, compact cities in the New Urban Agenda.

35. Acioly Jr and Horwood (2011).

36. Nohn and Goethert (2016).

as one of three types of urban “land grab”, and by Huchzermeyer<sup>(28)</sup> as “market down raiding”. Indeed, infrastructural upgrading has been argued to cause displacement of the poorest – for example, tenants in informal settlements.<sup>(29)</sup> Interventions focusing on the improvement of public infrastructure and services, therefore, need to take into account the implications for land values and the subsequent dangers of market-led gentrification and displacement. Crude interventions, such as the eight-year restriction on the sale of subsidized housing in South Africa, have proven problematic, leading to the informalization of land markets. More nuanced efforts to ensure inclusive development and access to low-cost land are therefore necessary. For example, collective land ownership may help to preserve long-term affordability.

Incremental development in low-value locations, such as increasingly peripheral, vulnerable or peri-urban locations, causes several problems including increased disaster risk. It also impacts issues of labour and building materials, which ideally need to be specialized and adapted to the location. Additional problems include the encroachment on rural or agricultural land, and the lack of transport infrastructure and other types of services. In the case of external interventions such as sites-and-services schemes and core house developments, peripheral locations are also an important cause of programme failure, as plots and core houses may remain empty.<sup>(30)</sup>

There is much scope for public interventions to make land markets work better for incremental housing. Regulations on building, such as minimum plot sizes and height restrictions, are in fact among the greatest impediments to upgrading housing in affordable ways and accessing finance.<sup>(31)</sup> These regulations often result from outdated and unsuitable planning practices designed for rich countries. Initiatives such as stimulating the supply of low-cost land through land value capture (recovering and reinvesting land value increases that result from public investments), requiring low-cost land in new developments, conducting land readjustment, and simplifying land subdivision, land use and building regulations for the particular purpose of affordable housing, have shown positive results.<sup>(32)</sup> In the field of land readjustment, Asian experiences have become a reference for how to implement land-sharing models and engage in public-private partnerships to develop affordable solutions.<sup>(33)</sup>

The second line of inquiry relates to density. The challenges related to sprawl have been well documented and form the basis for the rising fixation with urban densification and compaction. While the New Urban Agenda and urban policies worldwide often adopt the planning ideal of compact cities,<sup>(34)</sup> incremental housing is more often achieved through horizontal consolidation. Vertical incrementalism is certainly one way of achieving increased densities; however, it has many potential pitfalls. For instance, the capital hurdle of multi-storey development and the tenure arrangements required to support multi-family habitation are prohibitive. As Acioly Jr and Horwood note,<sup>(35)</sup> for vertical, multi-storey incremental housing to succeed, a mutual consensus or understanding on the use of common resources has to be in place. For example, (1) there must be land regulations that allow for collective property or sharing; (2) there must be an agent willing to invest considerable capital and address technical complexities; and (3) the dwellers have to be willing to organize to occupy the building gradually and to compromise on cultural and economic preferences, such as the attachment of street-based businesses.<sup>(36)</sup> In

terms of finance, vertical construction may in theory be more financially viable for better-located and serviced land, as households can share the high land price burden with an increased floor area ratio.<sup>(37)</sup> This is the case in Du Noon, Cape Town, where individual dwellers are buying up several plots side by side, demolishing all of the single-storey units on them, and developing two-storey blocks with very small units for rental housing.<sup>(38)</sup> Nevertheless, initial investment is much higher, due to higher technical complexity including safety concerns, and the resultant need for higher-quality building materials and skilled personnel. As the vertical construction process advances slowly and incrementally, cost recovery may only be realized at a much later stage. Therefore, innovative financing models, as well as innovations in construction techniques and affordable yet adequate materials, become more necessary.

Another example of vertical incrementalism can be found in Egypt's new town, 6th of October.<sup>(39)</sup> In 2008, the programme known as Build Your Own House was implemented to upgrade the housing situation of the 6th of October dwellers. In this project, the owner acts as the contractor to develop a two- or three-storey building: one floor to inhabit, and the other(s) to finance the operation through the market. If selected, the owners receive the construction blueprints and are offered the chance to buy a serviced plot at 0 per cent interest over seven years. Once they accept this condition, they have to pay 10 per cent of the cost of the land to activate the programme. Gradually, the owners can access formal loans and incremental subsidies based on the completion of construction phases established by the government. The intention is to monitor the quality of the construction and to motivate the speed of development. Furthermore, the owners have the support of the 6th of October City Council to assist in the technical specifications of the development. By 2012, 80 per cent of the owners had finished the ground floor.<sup>(40)</sup> However, the majority of the dwellings remain uninhabited, which seems to be a general problem of new towns. Reasons for their failure include overestimation of the population influx, lack of affordability for the poor, and lack of viable infrastructure, which leaves the towns unserved and unconnected from existing cities and job opportunities.<sup>(41)</sup>

Vertical incrementalism experiments cannot solve such profound problems as land speculation or the lack of transport and services.<sup>(42)</sup> Therefore, thinking about vertical incrementalism in a broader sense might be useful, as the prevalent practice of squatting or reusing existing multi-storey buildings such as in Cairo or São Paulo<sup>(43)</sup> could be a basis for enhancing the reuse of buildings and materials in a more sustainable way.<sup>(44)</sup> While hardly discussed in the incremental housing literature, and as will be further elaborated below, the financial dimension and flows of capital certainly influence these forms of incremental urbanization.

### III. FINANCE

Longstanding debates in research and practice have been concerned with connections between incremental building and housing finance.<sup>(45)</sup> It is clear that people with diverse financial backgrounds engage in incremental building. However, as it is the poorer residents with fewer resources who regularly struggle to access finance for their incremental construction activities, the literature focuses on how the poorer sections

37. Nohn and Goethert (2016).

38. McGaffin et al. (2015)

39. Nohn and Goethert (2016).

40. Nohn and Goethert (2016).

41. van Noorloos and Kloosterboer (2018)

42. Hegazy and Mustafa (2013); Sims (2015).

43. Nohn and Goethert (2016); World Habitat Awards (2007).

44. Bhan (2019).

45. Smets (2006).

46. Turner (1967), page 167.

47. Datta and Jones (2001).

48. Amoako and Frimpong Boamah (2017).

49. Frimpong Boamah and Murshid (2019).

50. Greene and Rojas (2008).

51. Boamah (2009); Boamah (2014).

52. Smets (2018).

53. Smets (2018).

54. Mitlin (2011), page 1224.

55. World Bank (2014). The term “slum” usually has derogatory connotations and

of urban societies can afford incremental construction. For Turner, incremental housing was affordable because it enabled households “to synchronize investment in buildings and community facilities with the rhythm of social and economic change”.<sup>(46)</sup> However, for many years following Turner’s work on self-help housing, the relationship among housing consolidation and the management of different types of finance, the role of savings, and the costs of self-help housing was hardly addressed.<sup>(47)</sup> In particular, Amoako and Frimpong Boamah<sup>(48)</sup> point to a lack of clarity on the topic for two reasons. First, sources of housing finance are not defined or consistent, and it is not clear which strategies are the most sustainable. Second, investments and structures from the formal housing finance sector often eclipse informal actors and processes. As the literature points out, such financing schemes are diverse. The finance issue of incremental housing is however an important point of attention, especially as flows of finance have become more diverse, including non-standard types of end-user finance such as community credit groups and consumer credits in construction stores. At the same time, the use of mobile phones, and the rise of information and communications technology more generally, has created new avenues for housing finance.<sup>(49)</sup>

We will first elaborate on the household level. Given the lack of access to formal finance, informal mechanisms for securing money for building are common in the context of incremental housing. In such cases, dwellers without access to affordable credit from formal financial institutions seek alternative financing strategies that enable them to incrementally improve their housing conditions, such as expanding their house depending on what that they can afford. This can allow poor dwellers to move away from stigmatization and marginalization.<sup>(50)</sup> Changes to housing units frequently reflect the need to integrate income-generating activities.

Incremental housing is also financed gradually from a myriad of sources that are often not clearly defined and challenging to track. For example, in a study of Ghana’s housing conditions, Boamah<sup>(51)</sup> found that incremental housing development was financed by “do-it-yourself” financing processes adopted by households to meet their housing needs, involving several individuals, institutions, and different social and financial transactions through a shared process.

To bring some structure to a messy debate, Smets<sup>(52)</sup> distinguishes between individual housing finance – money from friends, neighbours, relatives, moneylenders, pawnbrokers, employers and colleagues – and community-based housing finance. Community-based finance can involve rotating savings and credit associations, savings associations, and accumulating savings and credit associations.<sup>(53)</sup> Mitlin argues that through savings groups, “finance, rather than being the means by which poverty is defined and low-income individuals and households are excluded from realising their shelter aspirations, becomes the organising mechanism to present and strengthen a political challenge from the landless populace to the state”.<sup>(54)</sup> The Asian Coalition for Community Action’s (ACCA’s) approach to slum upgrading, an initiative by the Asian Coalition for Housing Rights, is widely recognized as a best practice for arranging finance and support for slum upgrading based on community organization and joint ownership.<sup>(55)</sup> It provides a variety of grants, loans and assistance to communities for infrastructure, housing and secure tenure. A major element of the ACCA programme is community

savings. By taking a city-wide approach and linking savings into a larger City Development Fund, including government funding, it adequately addresses the complex mix of market and government failures.<sup>(56)</sup>

Many studies suggest that low- and moderate-income households often use a combination of alternative sources to incrementally build their homes.<sup>(57)</sup> Moreover, savings, including those outside the formal system, such as consumer items, jewelry and cash rotating schemes, as well as investment in housing itself, also play a role.<sup>(58)</sup> Finally, housing microfinance provides new possibilities to source financial resources beyond traditional mortgage loans, such as community-based finance savings and loan groups and non-mortgage micro-loans.<sup>(59)</sup> Such microfinance schemes should be seen in the context of the construction sector, which is increasingly targeting low-income customers. In Mexico, for example, large building material suppliers such as CEMEX are tapping into a very significant but underserved market by combining microcredits with construction technical assistance, seeking to establish linkages with construction companies.<sup>(60)</sup>

To reach the poorest households (and as a potential way to serve untapped markets), calls have been made for finance that is sensitized to the housing process by providing housing finance incrementally to support urban livelihoods and asset formation.<sup>(61)</sup> This also means adapting loans to household needs through low interest rates and flexibility in repayment. An alternative approach to housing finance is clearly not the sole solution to improve housing conditions and urban development for the urban poor. Also needed is a “kaleidoscope” of different arrangements and institutions, such as access to components in the building process including materials, but also land and construction skills.<sup>(62)</sup> Therefore, debates on housing finance oriented to incremental housing have to account for the process of housing itself, and how it evolves over time.

In addition, many countries have experimented with subsidizing incremental housing in various ways. Notably, the design of the subsidy system plays a key role in how incremental housing is developed. One of the major distinctions is between supply-side and demand-side subsidies. Supply-side subsidies are provided to those who supply housing by means of free land, services or capital grants for the development of components of the home. By contrast, demand-side subsidies are those given to households to increase their effective demand. South Africa has experimented with both demand- and supply-side subsidies for incremental housing at scale.<sup>(63)</sup> However, while provision has been made in South Africa’s National Housing Code for both, the majority of subsidies have gone to the private sector to deliver large-scale housing projects to provide starter houses for low-income families. Smaller allocations have been made to programmes such as the Consolidation Subsidy, the Individual Subsidy, and the Finance Linked Subsidy, which aim to increase the effective demand of households.

A systems perspective would enable us to analyse housing finance markets at the scale of the city and beyond, and how these can influence the development of instruments through which incremental homeowners can engage with housing finance more effectively and at scale. Rather than focusing only on financial tools at the household level, the broader financial markets and institutions need more explicit attention in order to provide scalable solutions. The question is how institutions – including microfinance institutions and commercial banks, but also less traditional

can suggest that a settlement needs replacement or can legitimate the eviction of its residents. However, it is a difficult term to avoid for at least three reasons. First, some networks of neighbourhood organizations choose to identify themselves with a positive use of the term, partly to neutralize these negative connotations; one of the most successful is the National Slum Dwellers Federation in India. Second, the only global estimates for housing deficiencies, collected by the United Nations, are for what they term “slums”. And third, in some nations, there are advantages for residents of informal settlements if their settlement is recognized officially as a “slum”; indeed, the residents may lobby to get their settlement classified as a “notified slum”. Where the term is used in this journal, it refers to settlements characterized by at least some of the following features: a lack of formal recognition on the part of local government of the settlement and its residents; the absence of secure tenure for residents; inadequacies in provision for infrastructure and services; overcrowded and substandard dwellings; and location on land less than suitable for occupation. For a discussion of more precise ways to classify the range of housing sub-markets through which those with limited incomes buy, rent or build accommodation, see *Environment and Urbanization* Vol 1, No 2 (1989), available at <http://journals.sagepub.com/toc/eau/1/2>.

56. World Bank (2014).

57. Ferguson and Smets (2010).

58. Gilbert (1999).

59. Grubbauer (2019); Ferguson and Smets (2010).

60. Grubbauer (2019); Ferguson and Smets (2010).

61. Smets (1999).

62. Smets (1999).

63. Hoek Smit and Cirolia (2019).

sources such as impact investors and suppliers of consumer credit – can (in collaboration with other stakeholders such as the state) develop useful lending instruments that address questions of risk, return, cash flow and exposure. This requires a broad view at either the city or national level. An assemblage approach proves useful to provide such an understanding. As defined by McFarlane, an assemblage approach situates housing practices as acts of “*coproduction between those who are housed and the variant technologies that do the work of housing*”, including “*architecture and bricks and mortar, sanitation and communication technologies, too, but also housing policies and practices, mortgage lending and insurance, credit scores, and all the other lively ‘things’ of finance*”.<sup>(64)</sup> It is therefore particularly fitting to conceptualize the under-researched flows of finance within incremental housing practices and, more broadly, a relational perspective for the city.

64. McFarlane (2011), page 657.

#### IV. INFRASTRUCTURE

Cities across the globe have come to depend on infrastructure networks for the provision of services such as transportation, water, energy, sewage and waste.<sup>(65)</sup> However, these networks have not been able to address the complex requirements of incremental housing. This is because large-scale and networked infrastructures have a particular organizing logic that contradicts incremental housing practices; the installation and maintenance of infrastructure networks require centralized and long-term planning, decision-making, investment, operations and maintenance. However, it is also evident that municipal governments and other actors tasked with service provision in cities are regularly overwhelmed with the complex and expensive task of providing infrastructure services in rapidly growing areas. This is especially true for rapidly urbanizing regions of Africa and Asia.<sup>(66)</sup>

65. Dupuy (2011).

66. Acioly Jr and Horwood (2011).

Traditionally, a way for municipalities to provide networked infrastructures for incremental housing areas has been to service plots and allow (and even encourage) households to build incrementally in these areas. This sort of process was the basis for the World Bank’s sites-and-services schemes of the 1960s and 1970s. In these schemes, state, lender and donor engagement focused on the provision of adequate and affordable plots, legal titles, and access to roads and main infrastructure – leaving shelter up to the household to develop.<sup>(67)</sup> However, these projects had mixed results. Overall, the approach has provided improved shelter for large numbers of poor households in quite effective ways, but indirect benefits to employment, health and the like have not been demonstrated.<sup>(68)</sup> In addition, there is debate on the affordability of the plots and the extent of subsidies needed, and therefore the replicability of the programmes.<sup>(69)</sup> Recent work has exposed the need to rethink infrastructure and services in the context of incrementalism.

67. Chiodelli (2016).

68. Kaufmann and Quigley (1987); Mayo and Gross (1987).

69. Greene and Rojas (2008); Mayo and Gross (1987).

An emerging and important debate within the study of urban infrastructure and cities in the global South relates to incremental and heterogeneous infrastructure systems. This body of work stresses the importance of incremental extensions to urban infrastructure, improvisation of infrastructure systems, decentralized material networks, labour-intensive service delivery systems, and the development of more “circular” economies. By using concepts such as prefigurative (or future-looking) urban infrastructure, scholars point to a growing valorization of the incremental practices of “knitting” and “suturing” the city.<sup>(70)</sup> For

70. Pieterse (2008); De Boeck and Baloji (2016); Simone and Pieterse (2017).

example, Silver discusses “material improvising” of electricity systems in Accra.<sup>(71)</sup> Likewise, De Boeck and Amin<sup>(72)</sup> explore the “absence-presence” of urban infrastructure, reflecting on the ways in which missing large-scale infrastructure actively shapes urban dynamics.

Reflecting on the perpetual consolidation and multiplicity of sociotechnical systems in cities, Bhan<sup>(73)</sup> argues that scholarship should “begin from existing practices of service delivery on their own terms, recognize the contexts that they come from, understand why they have emerged, and then reassess whether the network is the most feasible (and not just the most theoretically desirable) mode through which to reach the outcomes we want”. However, the ability and willingness of governments to direct, manage or support urban service provision depends on growth patterns but also on the service itself, its technological requirements and material characteristics.

More effort is needed to not only integrate urban planning and infrastructure systems, but to also take into fuller account the incremental practices of service access in which citizens flexibly combine centralized network provision with everyday practices of accessing basic services.<sup>(74)</sup> This, in turn, requires a perspective on infrastructure that breaks away from the modern ideal of service provision focusing on large networks and municipal governance. This perspective considers infrastructures as heterogeneous constellations consisting of diverse technologies, actors and organizational structures.<sup>(75)</sup> These technologies include large technological networks and artefacts, but also semi-centralized satellite networks and decentralized technologies. This breaks down infrastructure into 1) bulk development and 2) distribution (services). In this perspective, *service providers* are not only municipal companies or those contracted by governments, but also urban dwellers, small entrepreneurs and community organizations. In terms of governance, the approach goes beyond state planning and regulation to include co-production, market regulation and self-regulation. It is important to engage with the everyday ways that urban dwellers access services in order to avoid romanticizing practices of service provision beyond the state, which are often exploitative and repressive.<sup>(76)</sup> Therefore, municipalities, state-owned enterprises, privatized service providers and researchers need to base their interventions and recommendations on a thorough analysis of the ways different actors and technologies mediate the flows of materials (water, sewage and electricity) through the city. This systems approach overcomes divides between planned provision and incremental practices, and considers them together as heterogeneous infrastructure constellations.<sup>(77)</sup>

The connection of incremental housing to networked infrastructures needs to be flexible enough to accommodate the specific needs and capabilities of self-builders in terms of consumption patterns and finance. This requires an active and accommodating position by city governments towards everyday practices of service access beyond state planning, allowing citizens and organizations to work with the state to incrementally extend provision. This is based on a perspective on infrastructure that goes beyond modern ideals of networked systems and considers them as heterogeneous constellations of technologies, actors and organizational arrangements. This perspective conceptualizes people not just as users of externally provided services, but as active co-providers of infrastructures. At the same time, the question of bulk infrastructure finance remains an important challenge at the city-wide scale. Thus, while the new focus on

71. Silver (2014).

72. De Boeck (2013); Amin (2014).

73. Bhan (2019), page 11.

74. Schramm and Wright-Contreras (2017).

75. Jaglin (2014).

76. de Bercegol and Monstadt (2018).

77. Jaglin (2014).

people’s engagement in their own service provision is useful practically and conceptually, analyses and practical interventions still need to consider the larger sociotechnical systems within which everyday practices in the provision of services operate, as these larger systems shape the space of possibility within which different actors access basic services.<sup>(78)</sup>

## V. BUILDING MATERIALS

Building materials are a crucial element in the housing chain. It is important to engage with ongoing debates about how households can access more sustainable building materials, but to view these practices from a systems perspective we need to understand the city-wide building materials industries and to follow the actual flows of building materials across scales. The available research often focuses on new innovative building materials that may replace “unsustainable” ones, such as cement blocks.<sup>(79)</sup> Replacing high-tech yet energy-inefficient building materials with such innovative materials as compressed stabilized earth blocks (CSEBs), adobe blocks or bamboo is on the agenda of a number of international organizations and NGOs working on incremental housing. For example, in Jinja, Uganda, the local slum dwellers federation, together with SDI (formerly Shack/Slum Dwellers International) and the municipality, have started using CSEBs for housing and community infrastructures in slum upgrading projects, using their own savings.<sup>(80)</sup> The site has become a learning centre for the manufacturing of innovative, climate-friendly building materials often based on locally available raw materials, and employing and training local youth.<sup>(81)</sup>

Despite ongoing innovations, however, large-scale concrete materials are still the most affordable and accessible for many incremental builders worldwide, while more sustainable materials have remained niche products. For example, one of the most successful support programmes of incremental upgrading was the Piso Firme programme in Northern Mexico, implemented starting in 2000. The programme provided subsidies to households to replace dirt floors with cement, which has shown impressive results in terms of health and wellbeing. The programme was later scaled up to the national level.<sup>(82)</sup> In spite of the high price volatility of building materials<sup>(83)</sup> and a sand scarcity crisis that might affect the affordability of cement,<sup>(84)</sup> there are few signs of financial incentives to move towards more sustainable materials. Moreover, urban dwellers’ ideals of “modern” lifestyles often prevent them from using traditional materials such as bamboo.<sup>(85)</sup> Indeed, Grubbauer<sup>(86)</sup> criticizes the “fetishization of the vernacular” evident in socially driven design and architecture competitions, including the search for innovative building materials, on housing in the global South. By accepting the idea that local building materials and styles equate with social improvement,<sup>(87)</sup> the actual preferences of people – as embedded in complex and dynamic political and social environments – are ignored. At the least, researchers should have a deeper look into the actual flows of building materials used in incremental housing, which will certainly uncover important links with larger commercial construction industries in and beyond the city. For example, construction waste and debris is one of the major material sources for incremental housing. Many innovations have come from this source, and mosaic tiles are a classic example.

78. Schramm and Ibrahim (2019).

79. Bredenoord (2016).

80. Personal communication with Bredenoord in 2019.

81. Personal communication with Bredenoord in 2019.

82. Cattaneo et al. (2009); Center for Global Development (undated).

83. CAHF (2017).

84. UNEP (2014); Torres et al. (2017).

85. Bredenoord (2016).

86. Grubbauer (2017).

87. Grubbauer (2017).

A few studies take seriously the idea of analysing actual existing building practices, providing a starting point for considering possibilities for more sustainable incremental building practices. For example, Grubbauer<sup>(88)</sup> found that in Mexico in the last 10–15 years, commercial interests have led retailers and construction enterprises such as CEMEX and Holcim to tap into the market of low-income customers and incremental construction, including by providing increased opportunities for commercial microcredit. The incremental housing process in places such as Ecatepec (Mexico City) therefore crucially depends on industrial building materials such as cement, which are sourced from large supply shops on the urban periphery.

In following cement through the West African urban corridor, Choplin<sup>(89)</sup> shows how this material is a “binder”. It not only supports urbanization but also creates social and economic relations and distinctions, given the particular meanings people attach to this material that was initially introduced by colonial powers, but is now produced locally. Her account shows how a perspective on the material transcends the local–global divide, as cement is closely linked to global markets in terms of production technologies, pricing and the wealth it generates for some. At the same time, cement is locally produced, marketed and used.<sup>(90)</sup> Similarly, recent research on metal shows how following building materials allows us to overcome conceptual binaries such as formal–informal. For instance, metal has been used in construction before and after its use as rebar, while other building materials regularly travel through diverse landscapes of city–regions and beyond, from marginalized scrap heaps to industrial plants.<sup>(91)</sup> This perspective shows the inadequacy of the notion of an isolated informal construction sector catering to incremental housing that can be clearly distinguished from industrial, “professional” construction.

A city-wide flows perspective needs to “follow the material” and understand the development of cities and regions through specific materials, how these materials interact and compete with one another, and how the markets for these materials are shaped in different cities. Beyond the city itself, there is a clear need to engage with broader urban, regional and global flows of materials if we seek to understand incremental building practices. Interventions in the supply chains of key materials can have important knock-on effects for the affordability, durability and ecological impact of incremental housing. While innovations in sustainable building materials are important, it is key to consider affordability and suitability, and this again leads back to supply chains of materials at the city-wide level or beyond.

## VI. LABOUR

In the context of urban development and city-making, studies on labour flows largely focus on migration dynamics and the inflow of highly skilled and unskilled migrant workers towards cities.<sup>(92)</sup> Indeed, many scholars have argued for a long time that urbanization has generated the so-called rural exodus of unparalleled migration flows towards cities.<sup>(93)</sup> In more recent studies on urbanization, this focus on labour migration is still predominant. Malecki and Ewers,<sup>(94)</sup> for instance, indicate that organized labour flows – channelled through recruitment networks and agents – have significantly contributed to the growth of cities in oil-rich

88. Grubbauer (2017).

89. Choplin (2019).

90. Choplin (2019).

91. Schramm and Bize (2019).

92. For example, Sassen (1988); Friedmann (1986).

93. Davis (2006).

94. Malecki and Ewers (2007).

95. Beaverstock (2004).

96. Sassen (1991).

97. Bredenoord and van Lindert (2014).

98. Kaag and Steel (2019).

99. Gough and Jankson (2011).

100. Steel and Guerrini (2019)

Gulf states. Elsewhere in the world, migrants also have a crucial role in shaping built city space.<sup>(95)</sup> In line with Sassen,<sup>(96)</sup> scholars have argued that global economic and employment structures have contributed to social polarization and increased disparities between the rich and poor.

Labour markets and labour flows have, however, been poorly explored in the context of incremental housing. This is because concepts such as “self-builder” and “self-help” intrinsically suggest that people are quite literally building their own houses. Empirical evidence, however, shows that incremental housing development also relies on a number of “experts”, such as brokers and skilled workers.<sup>(97)</sup>

Before real construction starts, brokers are crucial for the selection of an appropriate construction site, for getting access to the land, building materials and day labourers. Kaag and Steel,<sup>(98)</sup> for instance, indicate that in the case of transnational migrants investing in urban land and housing construction in cities in their home countries, brokers are paramount in facilitating and accompanying the process of land acquisition and construction. Elsewhere in the literature, this role of brokers is further elaborated to include caretakers who guard buildings and building materials from vandalism and theft, or who may also work as construction workers while buildings are completed.<sup>(99)</sup> In the case of Khartoum, Sudan, these caretakers are often rural migrants or internally displaced people who do not see alternative opportunities to access shelter in their new living environments.<sup>(100)</sup>

The further construction of incremental housing also relies on a variety of masons, plumbers, painters, electricians and other skilled workers. In many cases, the support of these workers is called in through the owner’s direct network. These workers are not necessarily financially compensated, but rely on each other for an exchange of services. In other cases, external support is called in for purchasing building materials or hiring specialized services. These day labourers might be financially compensated, but in contrast to the caretakers described above, they do not necessarily live on the site and come from other parts of the city. As day labourers generally have no office or specific workplace, they often gather at particular meeting points beside the road in order to be picked up by one of the self-builders. In Khartoum, for instance, a number of male construction workers stand beside the road holding their tools – including paintbrushes, drill machines, hammers, electric cables and lamps – to advertise their services and in the hope of being picked up for a particular job. They contribute to the kinds of precarious labour flows that are often overlooked in processes of auto-construction and self-building. Just like the many people working in repair and recycling, they are common actors in city-making processes in the global South. They operate at the margins of urban society and give shape to crucial labour circuits that are part and parcel of incrementalism.

However, not all labour flows related to incremental housing industries are necessarily precarious or marginal. The problem is that not much attention has been paid to how these labour flows emerge and change. We simply know too little about them. A flows perspective on these activities gives the opportunity to analyse these localized practices in their relationship with city-wide, national and global processes. From a policy perspective, the strength of micro-industries related to incremental housing is important. Unlocking the potential of these industries to support incremental housing processes could enable an overall strengthening

of the system. This could require, among other things, accreditation programmes and processes, accountability frameworks, skills development projects, and other investments that facilitate incremental housing.

## VII. CONCLUSIONS

Recently, the discussion about incremental housing has started to shift from why low-income dwellers develop their housing incrementally to how city-wide systems can be improved to deliver on incremental housing objectives. There has been a move towards addressing institutional development, for instance through good governance and the workings of markets. However, within these institutional approaches, there has so far been no attempt to draw the connections within complex systems: they mostly focus on fixing one issue in isolation – for example, finance or materials – but not the links between them. Hence, there is still a need to assess the flows and systems of cities within which incremental housing takes place, in a systematic and interconnected way. In addition, the interventions that shape these systems need to be addressed.

Starting from this observation, we have provided a framework for unpacking the key components of city development that have direct implications for incremental housing. These include: 1) land, 2) finance, 3) infrastructure, 4) building materials and 5) labour. In this article, we have shown that these flows influence incremental urbanization and make apparent the connections of local practices of incremental housing with broader processes of city-making in the global South. For example, the opportunities for incremental housing depend on the availability and affordability of industrial building materials, which are shaped by marketization and internationalization in the construction sector.<sup>(101)</sup> Similarly, labour involved in incremental housing is not necessarily local, family-based or unpaid as is often assumed; a large diversity of contracting practices exists in relation to incremental housing. Unlocking the potential of micro-industries to support incremental housing processes could enable an overall strengthening of the system. Furthermore, flows of end-user finance are more diverse than assumed. Through a systems perspective, we argue for a focus on the broader financial markets and institutions in which household access to finance for incremental housing is embedded, in order to provide such scalable solutions as new lending instruments. In relation to the increasing scarcity of available urban land, there is much scope for public interventions to make land markets work better for incremental housing. Vertical incrementalism has been proposed as a measure to increase compaction and reduce pressure on urban land, but it also raises problems of finance and regulation. In terms of infrastructure, we need to move away from the modern ideal of service provision focusing on large networks and municipal governance alone, and instead consider infrastructures as heterogeneous constellations consisting of diverse technologies, actors and governance structures. While there is a need to consider the everyday activities of people in accessing basic services where larger infrastructure systems fail, it is important also to account for how larger sociotechnical infrastructure systems shape the ways and possibilities for urban actors to access and provide basic services every day. Elaborating on these five elements as a system has allowed us to move away from traditional household-based approaches and to provide policy

101. Grubbauer (2017).

suggestions that acknowledge the embeddedness of incremental housing in city-wide networks and systems, and that are potentially more scalable.

Further research on these types of flows and interrelated dynamics is needed to better understand where, how and why initiatives aimed at improving or developing incremental housing advance or get stuck. Given the significant time, effort and money invested in these incremental housing flows, engaging in such a flow perspective can offer new dimensions and opportunities for the institutions and actors that are willing to create alternative solutions. By analysing, for instance, the social organization and network structures of incrementalism, such a perspective will show how day labourers are recruited, where they come from, how their use is financed, and what kinds of polarization and inequality structures it (re)generates. It will indicate how labour circuits in different neighbourhoods, cities and countries interact and build upon each other. Additionally, it will likely reveal a whole range of alternative financing structures in which people build on the reciprocal exchange of goods and services for which transactions are extended over space and time. On the other hand, it refocuses our understanding of housing finance markets at a broader scale, eventually as the basis of solutions. It will – overall – give a concrete entry point to analyse the supply chain of building materials and the ways people negotiate access to infrastructure and services, which are embedded in city-wide complex systems.

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