

Article

The Significance of Community Training Centers in Building Affordable Housing and Developing Settlements

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Abstract: This paper examines the visions and the roles of community training centers (CTCs) in community development and housing provision in developing countries from the perspective of assisted self-help housing. It reviews a Korean community center that contributed to community-led self-help housing for low-income groups in the 1970s. It also reviews a few notable CTCs from India, Uganda, Nepal, and three countries in Central America to examine the functions and contributions of the CTCs. It was found that CTCs play a central role in community empowerment and the production of affordable building materials receiving technical or financial assistance from non-governmental organizations (NGOs) and governments. The paper makes a compelling case for CTCs by drawing on these exemplary cases to provide a development model that has the potential to facilitate the improvement of the living environment in developing countries.

Keywords: community participation; community center; community training center; sustainable building material; low-cost housing; assisted self-help housing

1. Introduction

As a result of their rising population rates, many developing countries face housing shortages and rising land prices in urban and rural areas [1]. The housing production systems in most developing countries comprise two components: first, housing production by private parties; second, housing production for and by low-income households that can be public housing or subsidized individual housing. The former comprises ready-to-use housing produced by private builders and housing developers, while the latter can comprise incremental housing. When private parties participate in public housing, they can rely on governmental subsidies. However, even these rare projects mainly focus on middle-income households, such as government officials. Housing provision for low-income groups in developing countries is mostly carried out in a self-help incremental manner, often with technical and financial assistance [2]. UN-Habitat [3] estimates the proportion of the self-help incremental housing in total housing stock as nearly 70% in developing countries. Many low-income individuals and groups prefer self-help incremental housing because it is affordable, and helps them improve their housing situation gradually when time and resources become available [4]. Affordability based on the sweat equity feature of self-help housing can contribute to ease the housing shortage

problem for low-income households in emerging cities with greater effect when it matches with appropriate external assistances.

The hypothesis of this paper is that a community center has a significant role in self-help housing and the effect through this is boosted when this is assisted by external organizations in terms of building technic and finance. This paper examines the functions of a community center in community development and housing provision from the perspective of assisted self-help housing from housing development practices. This paper also investigates how low-cost housing production can be supported by the establishment of a community center, more specifically a community training center, (CTC) focusing on the relationship with NGOs and governments in technical, organizational, and financial assistance through this center. We use CTCs as a place or space for communal use, such as meetings and workshops, the function of which can be extended to a place for training or production for self-help housing.

Park et al. [5] suggested a comprehensive community center that has multiple functions as follows. A CTC can play a central role in involving the residents of settlements or development areas, both in upgrading and streamlining collective housing and home-renovation processes. It may also engage in the provision of temporary 'transit houses' for those who are waiting for a new or renovated house, and/or are participating in a mutual house building or renovation process. A CTC can also have evolving and dynamic functions. Initially, it can operate as a community space for group meetings, such as education and training seminars held by NGOs, and then it can move on to function as a normal community center or neighborhood facility. The presence of a CTC can stimulate households to participate in neighborhood development and the construction of safe affordable homes. The sense of "belonging" or ownership over communal facilities and the houses can grow, and this is beneficial for future owners and residents. A production unit to build materials and transit homes can also form a part of it. These functions are essential for stimulating the building process and the social coherence.

The sustainability of the building materials is also considered in this paper in support of both the economic and the environmental aspects. The housing provision with sustainable building materials is necessary throughout the world. Moreover, the residents can develop their building skills coupled with using local building materials and techniques [6]. Professional inputs can strengthen local practices. Sustainable building materials, for example, Earth Technologies, are increasingly being produced in several countries, such as Uganda, India, Thailand, and Nepal. One can make use of a CTC for education, training, and meetings of groups of residents, and it can also function as a production facility for sustainable building materials.

We focus on two research questions: the first is which visions on CTCs are available in terms of housing and habitat where community participation is central, and the second is what the core values of CTCs are in sustainable housing in assisted self-help housing. For this, we investigate CTCs in the cases in terms of (1) main facilities, (2) community activities, (3) building activities, and (4) external assistance. This would base the extraction of the vision and role of a CTC in community development and provision of sustainable housing in assisted self-help housing. The rest of this paper is structured as follows. In Section 2, a literature review identifies the research gap in the studies on self-help housing. Specification of the data and research methods in Section 3 is followed by the examination of seven pioneering practices in Section 4. This section focuses on the early Korean experiences of a community of self-help housing with a community center and the other six practices of CTCs and building low-cost housing. The latter practices expose various contemporary examples of CTCs, such as Area Resource Centers in India, Jinja Community and Training Material Center in Uganda, community building in Nepal on housing reconstruction, and CTCs for housing cooperatives with mutual aid in Central America. In Section 5, we focus on visions concerning communities and CTCs. In Section 6, we extract the role of CTCs in community development and sustainable housing and materials. The focus in Section 7 is on CTCs and incremental housing from the perspective of assisted self-help housing. The paper ends with conclusions in Section 8.

2. Literature Review

The Habitat Conference in 1976 became a momentum of the spread of pro-self-help housing policies as a measure to address increasing informal settlements in many developing countries [7]. Although seminal debates between a group advocating the self-help housing approach [8–11] and criticizing [12–16] had been on-going, the international conference put the approach in the global limelight. The bottom-up approach, self-help housing, appealed as a sustainable way as it seemed to require less resources based on sweat equity, which term refers the non-monetary contribution such as physical labor and time, compared with one-time based housing projects with limited resources linked with issues of being intermittent and biased beneficiary selection. There has been a series of supportive arguments for self-help housing in the similar context [4,17–22]. Bredenoord and van Lindert [23] pointed out that the commercial value of the developed property and income generation from letting and sub-letting are also the core advantages of self-help housing. UN-Habitat [3] advocated this approach as it provides an opportunity to learn skills for construction in addition to the virtues.

Multiple housing projects based on the principle of self-help had been carried out in either an experimental or systematic way. The cases spanned across most of the Third World, including Brazil, Chile, Colombia, Mexico, Kenya, Indonesia, Pakistan, Philippines, South Africa, Sri Lanka, and Thailand [24–34].

Some of the critical points of self-help housing were raised. First is the tenure security issue. Bhanjee [35] argued that without tenure security, the self-help approach cannot be successful because the fear of eviction would deter financial and labor investment from the residents. This point was also made by a group of studies [19,24,25,30,36,37]. Second is the tenant constraint. Gilbert [38] identified the constraint of the tenants in the informal settlements to be self-helped as the approach is mainly based on the land occupation assumption. This issue of the exclusion of tenants in self-help housing was also pointed out and an inclusive scheme was suggested by Park et al. [5]. Third is the availability of low-cost building materials. Gough [39] argued that the success of self-help housing depends on how to secure low-cost building materials. In the same line, Zhang et al. [40] pointed out the importance of self-finance with low-cost construction materials for infrastructure and housing.

There have been complementary concepts to self-help housing to overcome the limits. The ‘state assisted self-help’ [10], ‘aided self-help’ [27,28,41], ‘organized self-help’ [33], and ‘assisted self-help’ [23] are all in the similar context. In addition, participatory planning schemes, such as community-based needs, identification and prioritization [42–44], and community contracting [45], have been emphasized. By adopting such participatory planning schemes, the accumulated local knowledge and experiences of community members can be utilized, as well as the members of the community can lead the projects rather than merely relying on an external resource.

As Harris [36,41] described, aided self-help as site-and-services was first adopted in European countries after the First World War and widely applied to the Third World later and was focused mainly on the provision of secured land with basic infrastructure. On top of the legitimized land ownership, other features of the site-and-services scheme, such as speeding up house building process at low cost, shared responsibilities, and being consistent with a city growth plan, were also pointed out [4,17]. However, the considerable cost of connecting infrastructure and less job opportunities because of their peripheral location seeking for cheap land became the problems of the scheme [23,29,46]. In addition to this, a top-down or externally motivated approach without consideration of existing communities was found to be less effective [30].

The approach of the assisted self-help had come up in this context of the limits to the site-and-services. UN-Habitat [3] valued assisted self-housing affordable and sustainable as it uses sweat equity in the building process, enables participants to acquire precious skills, and reflects actual needs. Identifying the need for more comprehensive habitat approach, Bredenoord and van Lindert [23] emphasized the active engagement of NGOs and local government with technical, financial, and legal assistance. They also suggested the ‘building advisory bureaus’ for the function of cooperation linking technical advice on building material [23]. In the same vein, Park et al. [5] suggested a comprehensive

community center of 'Self Reliance Centre' that can be used as a training center for building materials, a space for community empowerment, and a temporary shelter for relocated residents in slum upgrade projects. A comprehensive community center can provide a place for community mobilization in self-help housing and the effect through this can be boosted if this is assisted with external organizations in terms of building technic and finance. Although this community center has the potential to be the focal point between external cooperation and the community members in the assisted self-help housing, only a few practices on the centers have been studied. This paper aims to examine the functions and contributions of community centers from a few notable housing projects, and draw implications from the perspective of the assisted self-help housing.

3. Materials and Methods

The paper adopted research methodologies of a literature review, field studies, and interviews. The main research data were obtained on research missions in Latin America and Uganda, and cooperation with NGOs, such as ACTogether in Uganda and Society for the Promotion of Area Resource Centers (SPARC) in India.

The search for relevant literature on the assisted self-help housing, working together in housing cooperatives, training practices for housing, sustainable building materials, and reconstruction processes after disasters was conducted in this study. A series of interviews was conducted with the former community leaders and residents in Bokumjari village in Korea. A review on documents and collected web-based information on the Indian case was confirmed by NGO activists in SPARC. Field study, interview, and literature review were used to collect the data of the Ugandan case in cooperation with ACTogether, a Ugandan NGO. The field study on CTCs and incremental and affordable housing was carried out between 2015 and 2016, through a joint research project of the World Bank and the Korea Research Institute for Human Settlements (KRIHS). The data of Nepal's case of housing reconstruction was mainly collected through literature review and web-based information, which was confirmed by an NGO, Build-up-Nepal. The data of cases in Nicaragua, Guatemala, and Honduras were collected during the field survey and interviews in a research mission with We Effect, a Swedish NGO in 2016.

In the following section of the case review, we examine the functions and the contributions of CTCs in housing and habitats in Korea, India, Uganda, Nepal, Nicaragua, Guatemala, and Honduras. We examine the role of CTCs, focusing on the following three functions according to the finding in the literature review: (1) organizing citizen empowerment programs and mobilizing related organizations for communal activities including housing, (2) providing adequate preconditions for housing cooperatives with mutual aid, and (3) facilitating sustainable housing and building materials. We then examine whether these functions were realized by checking the following four aspects: (1) the main facilities, (2) community activities, (3) building activities, and (4) external assistance.

4. Case Review of CTCs in Assisted Self-Help Housing

4.1. Korea: Self-Help Housing with a Community Center

The vision with respect to CTCs is related to experiences in Korea, a country that achieved dramatic development some decades ago. Robust economic development was accompanied by rapid urban growth, which had created informal settlements. In many cases, the dwellers in the informal settlements were forced to leave the area in the course of redevelopment or infrastructure provision. Since the late 1980s, the government provided public rental houses at scale and adopted more tenant-friendly redevelopment schemes. However, before such institutional support, the improvement of the living environment of most residents in informal settlements depended on the residents' own resources and ability to survive. The community center played an important role in facilitating successful self-help upgrades.

Bokumjari village is a small village that was built in a suburban area of Seoul by people who were evicted from a slum area. The name of the village originates from the name of a gathering in the slum. The gathering was led by a few activists, including priests who wanted to understand and help the urban poor in the 1970s in Korea, and operated without a formal space [47]. The gathering began to play an important role when the slum was about to be demolished to build a motorway along the riverside slum areas. At the time, the tenants could not get any compensation for the demolition of the slum [48]. The activists organized tenants who were willing to develop a new settlement together. In 1977, 170 families from the slum developed a vision using their own hands (see Figure 1). A loan of US\$100,000 from Misereor, a German Aid fund, was used for land acquisition, communal purposes, and housing construction [47]. The loan was repaid in two years. After that, Misereor decided to use the fund to build other community-based villages, Handok and Mokwha, for evicted people in succession [47].

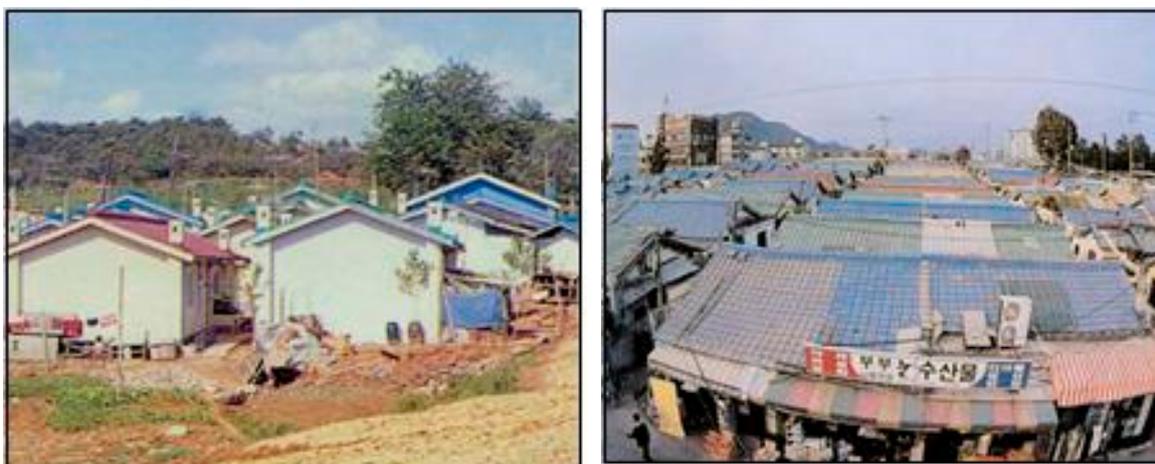


Figure 1. Houses built in Bokumjari village in 1980 (left) and houses in Bokumjari village after 20 years (right) [49].

The successful completion of basic infrastructure and construction of houses for 170 families with the initial loan was the result of self-help labor and the role played by the community center. Community members themselves developed the site by digging a well with the help of experts, making communal toilets and a sewage system, and building houses incrementally first with a core unit, then an indoor toilet, and additional units [50]. Producing bricks for themselves, for example, meant that the cost was a third of that in the market [47]. The community center, at that time without a formal space, played a critical role in managing the finances, mobilizing sweat equity, training the community in basic building skills, and guiding the entire process [48]. The sense of community was empowered by mutually building the residents' own houses, which were interwoven with the operation of the housing finance office (later, a credit cooperative for savings) and a production cooperative for generating more income [51].

In the beginning, the community center was not a physical space, but a mere gathering of a few slum dwellers. When they were evicted and went to build their own village, it became the center of all their community activities, thus determining the future of the evicted people. As their meetings became more frequent and larger, the evicted people built a temporary tent and later a temporary building in Bokumjari village [50]. Based on the experience accumulated, when a second village of Handok was built with another evicted group from another area, the community center became more formal with its own building and began to host regular training programs [51]. The formal community center also provided space for the credit cooperative and various community activities, including regular meetings, birthday parties, events for the elderly, and the operation of scholarship programs [50].

Apart from the joint efforts of community members, the success of the self-help developments in Korea cannot be understood without understanding the role of the committed leaders and the initial support of funds from a religious institute. However, the commitment of leaders and support from religious institutions cannot be expected in all informal settlements. This is why a more systematic and institutional approach, such as “assisted self-help” [5,23] or “organized self-help” [33], is necessary. A comprehensive community center with the help of an NGO, or another actor from the public sector, can empower communities in various activities, such as savings and regular meetings, to operate training programs for building houses and to provide a temporary shelter for the evicted or relocated residents in the process of house construction. The function of training skills is particularly important as it helps dwellers feel a sense of accomplishment in the process of building houses for themselves. Myung-ja Shin, one of the leaders in Bokumjari village emphasized the importance of the process of communal building and communal production under cooperative finance. “The most important point is the support for eventual self-reliance of residents. The experience of working and building their own houses incrementally increases the sense of accomplishment” [51].

These experiences were not limited to the cases of Bokumjari, Handok, and Mokhwa village. Ddukbang village in Seoul in the 1970s [52], Cheoltap village in Busan in the 1990s [53], and other communities, developed their villages through their own efforts. The experience did not just remain confined to each community. Residents, activists, researchers, journalists, and various observers tried to improve the living environment for the urban poor in many ways. For example, the Research Institute for Urban Poor was established with funds built out of repayments from Bokumjari, Handok and Mokhwa village development initiatives. Many activists and researchers who contributed to the institute influenced government policies on redevelopment, public rental housing, and the protection of the urban poor in Korea. For instance, Paul Jeong-gu Jei, one of the leaders in the Bokumjari community was later elected as a lawmaker in the area, and tried to enact various legislations to facilitate the improvement of the living environment of the urban poor. The joint redevelopment projects, which acknowledge the right of tenants on site, the introduction of a circulative redevelopment scheme, and the beginning of public rental housing with scale since the late 1980s, are directly or indirectly influenced by the activists, researchers, and observers who are related to the self-help community development in Korea [54].

4.2. India: Community Center for Citizen Empowerment

SPARC [55] is a large NGO working with the most vulnerable urban poor in India. In 1984, SPARC began to work with women from the streets of Mumbai, but finding a space to hold meetings was a major challenge. Then, the first Area Resource Center (ARC), a CTC, was installed where members could hold meetings, exchange ideas, receive visitors, and store records and savings. SPARC’s core activities comprise setting up ARCs as CTCs, encouraging households to join savings and credit programs, completing community-led enumerations, surveys, and maps to create databases, facilitating peer exchange among groups, and organizing housing exhibitions that showcase affordable solutions (see Figure 2). SPARC, Mahila Milan (MM), and the National Slum Dwellers Federation (NSDF) formed the Alliance and began to work together. Initially, the founders of SPARC and MM negotiated with the government at different levels, and gradually introduced the leaders of their local groups in their official meetings with institutional stakeholders. The Alliance also works on improving sanitation for their members and has built, operated, and maintained a huge number of individual and community toilets in slum communities. The Alliance is now working with hundreds of thousands of households across India and has either built or is building housing for over 8,500 families. It has set up a non-profit company called SPARC Samudhaya Nirman Sahayak (NIRMAN), which helps communities bid for construction contracts for slum dwellers and extend both livelihood and project outcomes to slum dwellers. The projects range from housing and sanitation to surveys for relocation and managing relocation. Communities can work as community contractors within this space with technical and financial support from the Alliance [56].



Figure 2. Meeting accommodations and incremental housing construction in Pune. Source: Society for the Promotion of Area Resource Centers (SPARC).

For slum dwellers who are able to secure tenure for the land they are living on, in-situ upgrading and redevelopment projects are commonly undertaken. An example of such projects is the in-situ upgrading project in Yerawada, Pune [57]. This project was part of the Jawaharlal Nehru National Urban Renewal Mission—Basic Services for the Urban Poor project. Slums on municipal land were eligible to be part of the project. Where government land for housing provision was available, communities were able to begin securing land tenure and constructing ground-floor houses. Costs are kept low by the sweat equity of communities in projects and by using low-cost construction technologies and blending government subsidies with housing loans. The NSDF and local groups co-operate in the design, supervision, and execution of the work. For pavement dwellers and slum dwellers who are not able to get secure land tenure where they are, the Alliance also works to support Resettlement and Rehabilitation projects, such as SPARC’s work in Oshiwara, Mumbai [58]. Medium- and high-rise apartment building blocks were constructed, which seem to be the only solution for the lack of urban housing; some other informal solutions are no longer permitted because of fire and other risks [59]. Although practical issues hinder the in-situ upgrading of slums, SPARC and its alliances prefer working on in-situ upgrading and redevelopment over resettlement housing projects delivering multi-story apartment buildings [60].

4.3. Uganda: Community Center for the Production of Sustainable Building Materials

In 2013, the Jinja Training Material Center [61] started as a social enterprise and a resource center for upgrading incremental housing in Jinja. It was initiated by the National Slum Dwellers Federation of Uganda (NSDFU), which is a network of community savings groups present in six major municipalities in Uganda. NSDFU works in cooperation with ACTogether, an NGO that works nationally. The project has a materials production center, a community space, and a hostel (see Figure 3). In the first instance, a group of leaders within the Jinja Federation were concerned about high unemployment among their youth, and they considered the possibility of producing building materials to create employment. The federation picked up the idea and built this comprehensive Training Material Center where young people can be trained in manufacturing innovative climate-friendly building materials. Over 200 young individuals from the Walukuba community were trained in the production and construction of low-cost materials for housing and in methods of construction. The training program included vocational skills on new technologies, such as stabilized earth bricks—called Stabilized Soil Blocks (SSB) or Compressed Earth Blocks (CEB). Low-cost building materials are produced at the center, such as the stabilized earth bricks, precast slabs, t-beams, precast mini slabs, and concrete blocks. The center generates regular income for several people from the sale of its products. These provide alternatives to burned bricks, which are more expensive and unsustainable because of the rampant deforestation and other cement-dependent materials. The facility was built in 2015 and has a community space

and various guest-rooms for people to attend building classes and multi-day training sessions and functions as a hostel. The three-story hostel for trainees, and the CTC for the Walukuba community were entirely constructed from materials produced on site. Demonstration projects such as sanitation units and a demo house are also available. The project is managed and partly funded by the NSDFU. The key stakeholders are ACTogether, the Jinja Municipality, and the Slum Dwellers International (SDI). The CTC is an example that can be replicated elsewhere in Uganda under the responsibility of the NSDFU.



Figure 3. Production of compressed earth blocks in the Jinja Training Center and Hostel for trainees. Source: ACTogether.

4.4. Nepal: Community Center for Reconstruction after the 2015 Earthquake

A combination of community activities and the use of sustainable building materials has been set up in Nepal, a disaster-prone country. The use of Compressed Stabilized Soil Blocks (CSEB) sped up in Nepal after the 2015 earthquake, which had destroyed many homes in poverty-struck regions and also killed thousands of people and hurt many more. Build-up-Nepal aimed to build affordable and high-quality houses using local materials. These materials and improved construction systems meant that the houses could withstand earthquakes. This organization was founded after the earthquake with the help of international aid organizations, such as Engineers without Borders, Sweden [62,63]. They execute a series of projects for low-cost housing, CTCs, and schools, all built using CSEB. An example of rebuilding houses with CSEB is found in Kalleri where a CTC was first built by the group, and then houses were rebuilt mutually. The CTC played a crucial role in organizing people for collective efforts and in disseminating construction skills and material production methods. Many other housing projects were realized with the help of households and communities. Another example is the community-driven reconstruction in Dandagaun (see Figure 4). Furthermore, with the aid of the Chaudhary Foundation, a “CSEB model village” comprising 70 earthquake-resilient sustainable homes in an internally displaced community was set up in Giranchaur, Sindhupalchowk. Besides community-driven reconstruction, the entrepreneurial rebuilding of homes is also emerging. The number of CSEB enterprises grew by about a hundred. Such enterprises were established to replace fired bricks and to reduce the emission of greenhouse gases. The related earth technology (CSEB) is earthquake resistant, safe for residents, and has been accepted by the government as an effective building method according to the Nepal Design Catalogue for Building Materials [64].



Figure 4. Reconstruction of houses in Dandagaun. Source: Build-up-Nepal.

4.5. Central America: CTCs for Housing Cooperatives

In Central America, CTCs contribute to the upgrading of housing and habitats in association with housing cooperatives. In an investigation of 22 housing cooperatives in Central America, it was found that the cooperatives were founded on the housing model with mutual aid, a proven model of the Uruguayan Federation of Housing Cooperatives with Mutual Aid (FUCVAM), for solving a substantial part of the housing deficit in Uruguay [6]. The key features of such a model are affordability and quality housing, the use of group savings, joint actions and efforts, and common property in the form of land and homes. Cooperative housing models require the active participation of the members in the construction and maintenance of buildings, as well as in the management of the housing cooperative itself. It was also found that most housing cooperatives accompany a CTC ('casa comunal' in Spanish) in their activities [22].

4.5.1. Nicaragua

The housing cooperative, Manos Amigas, has 20 members and is located in the Southeast district of León. Manos Amigas officially became a housing cooperative in 2008. The houses were built in 2016. The cooperative faced various difficulties in obtaining public finance for housing, but they eventually obtained a loan from a private fund. A CTC was built adjacent to the houses and used a central place for housing construction (see Figure 5). This CTC was used by other housing cooperatives in the district as well. The CTC also provided a space for activities by other groups in the neighborhood as a center for the wider community. In the southeast district of León, two other housing cooperatives had constructed homes with the help of the CTC, and six other cooperatives were established prepared to build homes. Following this CTC model, another was built in the nearby housing cooperative Juntando Manos. We Effect, a Swedish NGO, and Foundation Juan XXIII, a Spanish NGO, provided loan aid to these housing cooperatives [22].



Figure 5. Community center and houses built by Manos Amigas, a housing cooperative, in León, Nicaragua.

4.5.2. Guatemala

The cooperative Fe y Esperanza is located in San Pedro, near Guatemala City, in a rural area engaging in horticulture. The first group of families formed the pre-cooperative in 2004. That same year, land was acquired through a loan provided by three aid agencies, namely Institute of Socio-Economic Development in Central America (IDESAC) from Guatemala, and two international ones. The CTC was built in 2008. They then worked on the site to construct the access road before the first houses were built in 2010. In 2016, nine houses were available and three were being built. The members of the cooperative and an architect from the IDESAC designed an urban subdivision plan. Later, a standard dwelling was designed (see Figure 6).



Figure 6. Community center, family houses, and production of blocks in Fe y Esperanza, a housing cooperative, Guatemala.

The cooperative Domus Magistri in Santiago, outside Guatemala City, began working together in 2006. The founding members were mainly teachers. In 2016, only one of the founders was still in the cooperative. In 2008, the cooperative received the status of a legal person. All members of the cooperative worked in Guatemala City and in 2016, they had to continue living there because they had not yet built their houses. However, the cooperative already had ownership over the land, and built its CTC to host workshops and to store building materials (see Figure 7). It also has made an urban design and designs for the individual houses. The situation in Guatemala in 2016 revealed difficulties in obtaining state subsidies for the housing project.



Figure 7. Community center and members of Domus Magistri, a housing cooperative, Guatemala.

4.5.3. Honduras

The cooperative Covisenacal is located in Nacaome city. This housing complex has 90 houses, all with amenities such as drinking water, electricity connection, and connection to the municipal sewer system. The members of the cooperative formed a first basic group in 2006 with 195 families, and the cooperative acquired official status in 2007. The members paid for the land through their own efforts. Initially, they built a joint community center and designed a subdivision plan for the first dwellings for individual houses and built them in 2013. Next to the community hall of the CTC, a community kitchen was built later (see Figure 8). Funding for houses was achieved by grants, and an additional loan was arranged by the government.



Figure 8. Community hall, community kitchen, and houses in Covisenacal, a housing cooperative, Honduras.

4.6. Implications from the Cases: Working Together in Groups, Group Size, and Heterogeneity

In some cases, residents and groups of households are aided by NGOs or government institutions in their common struggle for better living and housing conditions. In all the cases, the CTC was a safe space where residents could form groups with common interests, where actions could be initiated and projects formulated and possibly executed. The cases demonstrate issues of great importance, including the need for group formation, the development of residents' organizations, the joint choices for actions and projects, and a joint presentation to other actors and organizations. Having a CTC as a safe space for meetings and trainings is the beginning of the community development. In the following, implications from the cases will be discussed in terms of working in groups, group size, and the existence of heterogeneity.

Working in groups for a common task often arises out of necessity. The revised theory of collective action [65] contains three elements: individual decision making, micro-situational conditions, and characteristics of a broader socio-environmental context. Individual decision making depends on the perspective that a participant obtains on the improvement of living conditions by working in a group. The micro-social conditions are also determined by the motivation of the group, including the homogeneity, internal leadership, good organizational structure, and the size of the group, which should neither be too small nor too big. Examined from the cases, it is common-sense that the broader social contexts differ greatly. For example, overpopulation and poverty in India are massive and the lack of financial resources is huge. Therefore, the focus of highly-density urban districts in India is to create toilet facilities first, and then build and improve houses. Saving is a means for communities to create a common fund to be used for the improvement of living conditions. This can be for house construction, but the saving groups always define their own priorities. The MM savings group leaders can build a close relationship with households as they visited 10–15 households regularly to collect savings and spent time talking with the families on daily family matters, such as their needs, children, health, and income.

The housing cooperatives in Central America are well organized, and the basic dwellings are of good quality, located within a safe gated community where members help each other. All examples were suburban housing solutions with small pieces of land. In Nicaragua and Guatemala, housing production by cooperatives with mutual aid is still limited and the groups are relatively small. Housing production by cooperatives in Honduras is significant and the group size roughly ranges from 40 to 400 families. Overall, there has been a strong involvement of the residents in the joint construction of a community house and family homes. From the cases, the formation of the group or community has been decisive while professional guidance was given by NGOs in terms of organizational, financial, and technical issues. A study [24] has revealed that there are many changes in membership in the initial stages when it is still not clear whether house construction will start. Sometimes, it takes years and participants can drop out, especially if home financing is not covered by the national government and its legislation. This has happened with some housing cooperatives in Guatemala and Nicaragua, where housing finance has so far been provided by aid organizations. The absence of adequate financial help of the government, however, was the cause. The broader social context affects the

conditions. The political context and legal and financing systems can be very different and can also change. Community participation is not so unequivocal, but there is research to be done, starting with the socio-environmental conditions.

The situation in Nepal was not similar because the need for housing emerged after the earthquakes. Direct action was necessary and many international aid organizations temporarily ensured the financing of new home constructions and the introduction of adequate earthen construction technologies (CSEB) that can withstand earthquakes. Locals can always be involved herewith under technical supervision. That technology can also be used under other circumstances.

In the cases described, the CTCs proved to be important for residential housing and neighborhood upgrading with assistance from NGOs or governments. A CTC is often multifunctional, and its functions can change over time. Training the residents in self-construction seems to be a good investment in designated cases and a community training facility plays a crucial role in various ways. Below Table 1, a comparison is given of CTCs and four main aspects for seven countries respectively.

Table 1. Comparison of seven community systems working with community centers.

Countries	CTC	Main Facilities	Community Activities	Building Activities	Involved NGOs/Local Authority for Assistance
South Korea:	Bokumjari village community center in Siheung	Meeting room	Meeting, savings group, scholarship committee, birthday parties, business association,	Subdivision plan, infrastructure construction, mortar block production, building skills training	Misereor: Loan aid
India:	Area Resource Centers in Mumbai and Pune	Meeting room, training center, production and training facility	Meeting, reception, savings group, training, enumeration, mapping	Building skills training, community construction subcontracting	SPARC India, NSDF, Mahila Milan: Plan, construction guide/supervision State: Subsidy and loan
Uganda:	Community and Materials Training Center in Jinja	Local community hall, meeting room, training center, production and training facility, accommodation hostel for trainees	Meeting, training, Dissemination workshop for building skills and material production	Building skills training, soil block production, precast slabs production, concrete block production	SDI: loan aid NSDF of Uganda, ACTogether: plan Jinja Municipal Council: building plan State: subsidy on land
Nepal:	Community center for rebuilding of houses in Kalleri and Dandagaun	Community hall, meeting room, training center	Meeting, workshop for building skills and material production, schooling	Building skills training, compressed soil block production, house rebuilding	Build up Nepal: Building skills Engineers without borders Sweden: Building skills
Nicaragua:	Community center for housing cooperatives of Manos Amigas and Juntando Manos in León	Community hall, meeting room, training center	Always, it is owned by the cooperatives, which operate as independent organizations	Building skills training, mortar block production	We Effect: Loan aid Foundation Juan XXIII: Loan aid
Guatemala:	Community center for housing cooperatives of Fe y Esperanza in San Pedro and Domus Magistri in Santiago	Community hall, meeting room, training center	meeting, workshop, storing building materials	Subdivision plan, infrastructure construction, mortar block production, building skill	IDESAC: Building skills, subdivision plan
Honduras:	Community center for housing cooperatives of Covisenacal in Nacaome	Community hall, meeting room, training center, community kitchen	Meeting, collective land purchase, subdivision plan, dining	Subdivision plan, building skills training	Nacaome city: Sewer system, State: Approving legal status to cooperative, loan provision

5. Vision of Community Development with CTCs

In the context of habitat and housing, participatory development is a significant and promising philosophy that eventually became a strong vision. 'Enabling communities and households to help themselves' is the leading motto of the majority of development and aid organizations. In this vision, local communities are prime participants, besides public and private stakeholders, and cooperation among all co-workers is crucial. In the overview of projects delivered by the Urban Poor Fund International (UPFI), where many development projects are listed, one can find that donor-partners, implementing-partners, and other organizations are mostly involved [61]. These partners work jointly in projects for the benefit of the families on ground. Generally, community participation comprises: (i) the involvement of residents in the (re)development of an urban area, a settlement, a neighborhood or project area, and (ii) the encouragement of self-help-driven home building and renovation activities by groups of households in settlements that must be built or upgraded.

5.1. Participatory Development

At the district/neighborhood level, participatory planning and development can go far beyond 'consulting the residents and communities' on planning issues. Conventional municipal tools include spatial development, land use, and social development plans. Here, the emphasis is on increasing the involvement of residents in upgrading their settlements. At the housing projects level, participation may even go further and handle areas such as decision making and active participation in execution and management. Communities are seen as major stakeholders who are able to take the initiative and partake in contributing with their own activities and investments. The vital role that local communities can claim is not free of any obligations. They need to be well organized in small or large groups, and there should be enough expertise available for everyone to play their role in a responsible manner. Nurturing residents' involvement and participation is vital for the successful practice of housing and settlement development. Training is the first phase in enhancing resident capacities to contribute toward community subjects in housing and planning. Concrete activities can be executed with professional help, such as the stakeholder mapping of a district, the identification of targets and prioritization, service planning, land pooling, community contracting, etc. Training social aspects is of utmost importance here, particularly for community interest and belonging, the socio-economic development of a settlement, the typology of future housing, and its affordability, social facilities, and technical services. The level of participation can differ according to the spatial scale. For example, residents may find a stronger sense of belonging at the street level than at the district or town level, as the ambience or the infrastructure directly influences their daily lives.

5.2. Social Production of Housing and Habitat

The experiences of the social movement in Latin America reveal that housing cannot be the result of the demand and the supply alone. They see housing not as a finished product, but as a process. The Social Production of Housing and Habitat is seen as a necessary vision to be implemented in public housing policies. Public housing production is seen as an alternative to private market production, but social production is seen as a hybrid form, also serving families, groups, and cooperatives. Better organized self-managed house construction is seen as an alternative to market-oriented housing production. This vision of social housing production has become a social movement with local residents as prime actors [66]. The participation of residents can be categorized into two levels: housing and habitat. These are two different spatial levels and each have different issues to deal with, but both serve the interests of local residents. At the housing level, residents can participate individually or collectively, but the focus is mainly on issues related to individual housing, although Latin American experiences with housing cooperatives focus on the collective ownership of housing complexes. The habitat level deals with improvements to the settlement through collective efforts, and focuses on infrastructure and service shortages. At this level, the roles of public authorities, such

as the local government, focus more on the different interests of larger and heterogeneous groups. In this study, the function of CTCs should place greater emphasis on the housing level, but should also include collective efforts at some other levels.

5.3. Building a Community Facility and then Houses

When local communities are involved in housing and neighborhood upgrades, there is always a need for a community facility, for meetings, the administration of savings, mapping and surveying, housing design, hands-on training, participatory planning, education, and workshops. After homes are built, a community house can be used for other tasks and functions in the settlement. During the reconstruction of residential buildings after the earthquake in Nepal in 2015, first a community organization was arranged before the construction of houses [62]. Local residents were involved in the construction of community facilities, the production of building materials, and the self-help reconstruction of houses. Housing cooperatives formed with mutual aid in Central America showed that most of the cooperatives that had acquired land for housing first began with the construction of a community center. After the construction of common facilities, in which each member had to participate, they began to build houses jointly. This contributed to the sense of common interest and mutual trust. Such common arrangements and facilities must be pre-financed and in many projects that was done by aid organizations that provided loans. A community house built prior to the houses can be very useful in the preparation and construction stages.

Table 2 displays which features of and affairs prevailing at the habitat level for a neighborhood or settlement upgrading process, and at the housing level for low-cost housing projects and programs. The functions to be addressed at this level may relate to support for project-based housing, individually or collectively, and for home improvements. At both levels, the presence of a community center is particularly functional but the interests of various neighborhood groups are not always the same. All operations described can take place in or are connected to a CTC in which future residents can work mutually. Thus, residents can experience the CTC as an asset.

Table 2. Main issues on habitat and housing in CTCs.

Habitat and Housing	Issues to be Addressed by the Community in a CTC
Habitat: Concerning improvement of the settlement	<ul style="list-style-type: none"> ○ Land mapping ○ Participatory planning ○ Planning Infrastructures and services ○ Stakeholder approach ○ Community contracting
Housing: Concerning the support for house construction and home renovations.	<ul style="list-style-type: none"> ○ Land titling issues ○ Housing finance ○ Core housing design ○ Group's formation and training ○ Group's contracting ○ Housing cooperatives ○ Technical assistance on site ○ Building materials; availability and production

6. Sustainable Housing Provision with CTCs

The link between the role of the CTC in low-cost housing construction and the production of sustainable housing and sustainable local building materials is as follows. In countries where a large proportion of the population lives below the poverty line, different strategies are relied on to enhance socio-economic development. With institutional support for low-income families, the latter can obtain skills to improve their housing and living conditions. An individualized approach that handles each family can obviously help, but it is generally assumed that a common approach is

more efficient in that cooperation between families is considered desirable. Theoretically, there are several possible solutions for sustainable housing and their corresponding applications that are particularly affordable for low-income households, including new designs and techniques, building materials, and sustainable energy solutions [67]. The principles of sustainability are often addressed in development plans. Residents themselves ask for this. Aid organizations frequently offer knowledge on and options for sustainability. Sustainability measures exist in other things, too, including protect local culture, stimulate social interaction, assist the formation of local communities, and complete ecological functions of the environment. Other aspects of sustainability found in literature are: (i) involving local communities with planning and housing; (ii) providing building materials to self-builders; (iii) developing building standards, (iv) implementing financing mechanisms, and (v) providing available land [68,69].

6.1. Training Communities for Housing and Building Materials

As the case studies show, the use of local labor and the offering of (vocational) training has great advantages, such as: (1) home construction being carried out as far as possible with local resources and people so that jobs are created and construction costs are reduced, and (2) the supply of materials over larger distances is minimized (sand, cement, wood, steel, bricks) so environmental advantages can be achieved and the emission of greenhouse gases lowered. In both cases, construction cost can be reduced. Through the participation of households, savings groups, building groups, and cooperatives, conditions can be optimized, while local self-sufficiency and economic growth may increase. Social enterprises, cooperatives, as well as small- and medium-sized enterprises (SMEs) may be involved. The application of earth-architecture and earth-techniques, such as Adobe, Compressed Earth Block (CEB), and Compressed Stabilized Earth Block (CSEB), for low-cost housing is appealing because its inclusion enables (future) residents to get involved both in the production of building blocks and in the construction of houses. In many cases, aid organizations assist low-income households and encourage residential groups to participate in the production and use of sustainable building materials and techniques for housing.

6.2. The Role of Community Architects

Community-based work is increasingly being done by academic professionals, mainly young architects and engineers, to give technical assistance to groups and help rebuild better houses, particularly after disasters. There are some examples worthy of mention. An early one is from Cuba, where the Community Architect Program was created in 1994 to support self-help housing. More than a thousand community architects used participatory techniques to provide technical advice to residents who build, expand, or renovate their homes [70]. Another example is the Technical Training Resource Centre (TTRC) in Karachi, Pakistan, which was set up to support better quality housing in informal settlements of Karachi, with the help of architects and engineers [71]. Both examples were directed mainly by government agencies. Contemporary examples are a direct result of collaboration between local communities and academic advisory teams. An extended practice can be found in the Philippines, where the Community Architects Network (CAN) and other organizations supported local communities in strengthening traditional home-building systems among other things. Therefore, local families can build, manage, and maintain their housing improvements better. CAN works with four development phases: (1) the mobilization of groups, (2) savings, (3) planning, and (4) implementation. The latter comprises financial mobilization, site development, house construction by core housing and incremental design, re-blocking, and the use of alternative materials, such as Interlocking Compressed Soil Blocks (ICEB), comparable to CSEB [72].

6.3. The Role of Small and Medium-Sized Enterprises

The active involvement of SMEs may also be of significance for the local economy. For example, in Nepal, a growing number of CSEB enterprises were involved in the production and dissemination of

earthen building blocks. This is also the case in Thailand, where the production of CSEB was outsourced to micro-, small-, and medium-sized enterprises (MSMEs). There are already 661 of them in the country, which are not only concerned with the production of building materials, but also with the sales of it and technical assistance for families and groups [73]. Small enterprises can also act as contractors on a housing project. It is desirable that knowledge concerning the use of eco-friendly materials and earth-techniques has transferred from the Research & Development institutes and universities to the local communities, and has been able to reach remote areas. This development vision can also involve regional and local vocational education, and the role of CTCs for local residents appears to be vital.

6.4. Examples of CTCs on Reconstruction Projects after Disasters

The value of the community center was proven during the reconstruction projects after disasters. As the example of Nepal reveals, the community center played an important role in planning, consulting, and training, as well as providing space for urgent needs such as schools. In reconstruction housing projects after natural disasters, the households are usually involved in cleaning the district, renovating homes, or helping construct new houses [74] under the guidance of CTCs. After the 2004 tsunami that struck Aceh, a relocation plan was set up by the Indonesian government. A temporary community center was built in Cot Lam Kue village simultaneously with the construction of temporary homes for affected families. Initial planning meetings were held in this temporary facility. Soon after, a new community center began to be built in Acehnese style with pylons and a sloping roof. The open space also served as a center of operations for planning and consultation with the CTCs. The communities here were assisted by aid organizations—one of which was Uplink—and the final outcome was a ‘network of living together,’ with 26 communities. This network, Jaringan Udeep Beusaree (JUB), was functional to restore the social infrastructure and the following activities were carried out in the CTCs: (i) community survey and mapping, (ii) settlement planning and mitigation, (iii) house design delivering five housing types, (iv) building materials with stabilized soil-cement blocks, for example, and (v) contract management, including technical assistance [75]. In other studies on housing recovery after natural disasters, one can find descriptions of CTCs built during the implementation of reconstruction plans. The preservation of social structures is deemed vital for cohesion and development in the communities. While rebuilding a settlement in Shyamnagar, Satkhira District, Bangladesh, the residents mentioned that their first interest was having a school to meet the community’s needs. This was the case in the reconstruction of 43 new houses that were built after the Aila cyclone. Here, the homes were first rebuilt and then the CTC; later, this was considered an error [76]. In a reconstruction project after the 2004 tsunami in Sri Lanka in Seenigama village, Galle District, it was stated that the CTC should be located at the heart of the settlement [76]. This was done in many other housing projects. In Pakistan, the Earthquake Reconstruction and Rehabilitation Authority (ERRA) decided to open Housing Reconstruction Centers after the 2005 earthquake. These centers provided large-scale training and technical assistance to partner organizations that had mobile teams that directly assisted people in the reconstruction of their homes. In September 2012, 436,000 housing units had been completed [77].

6.5. Functions as a Community Center, Training Center, and Transition Home

While producing building materials and applying them to house buildings, vocational training is usually necessary, and the residents themselves ask for it. The functions of CTCs can vary, but technical training is always important. Thus, it may double up as a technical center and as a social training center, a community house, and the like. When local building materials are made in the form of CEB, production can be carried out in or in the vicinity of a CTC, so that (future) residents can be easily involved in the production of building materials and the construction of homes. In new construction and urban renewal projects, there is often the need for transit homes or exchange dwellings for the group of residents that are there “first.” These dwellings can be located near the community house, so working together on the production area is possible but not always necessary. Ideally, a community

space is located at the heart of a settlement, but again, that cannot always be so, especially in existing slum areas. Good spatial planning, where temporary and final community facilities are displayed, is desirable. In the Figure 9 below, a schematic program of an area in which a CTC can be built is displayed.

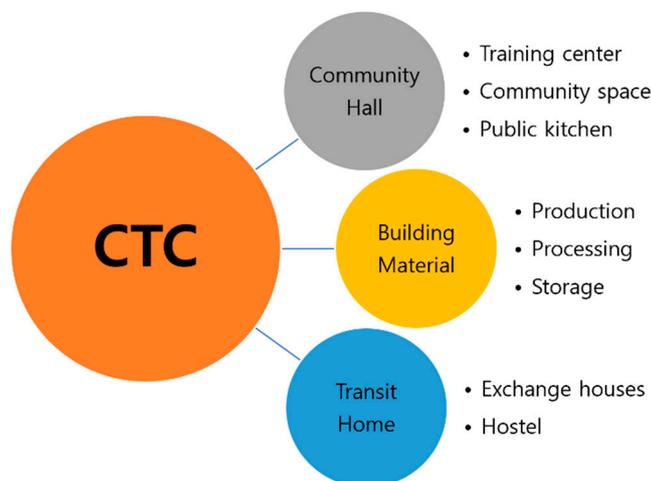


Figure 9. Schematic representation of functions of a community training center. Source: revised from Park et al. [5].

7. CTCs and Incremental Housing—Looking Further

This paper indicates that the interests of local residents, local groups, and even a whole community, can come together in a CTC. It was found that working together on the local or project level is crucial for the achievement of results, that is, to ensure sustainable housing for low-income earners, and the possibility for incremental house building. Thus, low-cost housing can become more accessible for low-income families if they are able to save in advance and can help in the construction of their own houses or incrementally upgrade their houses to minimize the construction costs or financial burden. A new development vision for low-cost housing includes a strong social aspect, such as working together in groups or cooperatives. This has been advantageous in many projects. Concerning such comprehensive housing projects, the participants mostly want to apply incremental principles. The examples of housing cooperatives in Latin America show that the realized basic homes are all expandable and that many residents start right from the beginning with improvements. Through the combination of self-help and social housing, a hybrid form emerges, whereby households with limited income can initially partake in a project with a core-house that will be expanded over time. Incremental housing may be enclosed in social housing programs.

Some houses are initially only core houses or half-houses. This new development vision was developed by Elemental with their housing projects in Chile and Mexico [78]. Some small-scale housing designs with incremental potential are housing cooperative Virgen del Rosario (COVIVIR) in Sipe-Sipe, and housing cooperative Señor Piñami (COVISEP) in Quillacollo, both near Cochabamba, Bolivia, providing progressive housing and a CTC [79] (see Figure 10). Vertical growth is the case here, while in the past, mostly horizontal incremental growth was experienced. Vertical growth is necessary to achieve economical land use in growing cities, which refers to an organized core-house construction such as in Ciudad Bachué, a district of Bogotá, Colombia, which was a large-scale pilot project with high density housing [40]. All housing types were designed for incremental vertical expansion, where the residents could play a crucial role in the growth and the completion of their homes [80]. More examples of vertical densification are described in other studies [81]. In an examination of the in-situ upgrading studies of SPARC with Architect Presanna Desai in Pune, India, one can see the small parcels on which vertical expansions of individual tiny homes are made possible. Studies on housing complexes to be expanded incrementally are ongoing [82].



Figure 10. Community center and incremental housing in Virgen del Rosario, a housing cooperative, Bolivia. Source: Azarug Justel.

8. Conclusions

In this paper, we paid attention to the functions of CTCs in the context of self-help housing and low-cost housing for low-income households. From the case studies, we conclude that the presence of a CTC strongly encourages cooperation between members of resident groups. This applies to kinds of common goals, but especially for the construction of homes and home renovations, both individually and collectively. These examples present contemporary themes, such as low-cost housing for social target groups, incrementally expandable houses, housing development, and housing rehabilitation, and applications of sustainability principles, such as earth technologies. We are aware that the examples do not reflect the current mainstream housing production and in-situ home renovations, but they are in tandem with the international quest for sustainable and affordable housing solutions. It is challenging that low-cost housing must be of good quality and, for example, earthquake resistant or storm resistant in areas that are at risk for such natural disasters.

The presence of CTCs may stimulate sustainable housing in two ways: (1) sustainability in a social sense, where cooperation between residents will serve common goals; and (2) sustainability in a technical sense, where homes are affordable and technically adequate with the possibility that owners and residents themselves are able—with knowledge and through mutual aid—to finish their homes or the renovation incrementally. In both cases, institutional assistance is necessary. Both social and technical assistance can be given to local residents in a neighborhood-oriented CTC, especially when it is experienced as a joint asset. Strengthening the feeling of “belonging” and “accomplishment” can be reached if groups of residents are, for example, trained to work with sustainable building materials for their own housing. We have provided some examples, and earth technology is one. It is clear that institutional aid is necessary to start mutual cooperation projects. This is usually facilitated by aid organizations, such as local NGOs and government institutions. Research on the social-environmental conditions for community participation is likely to be favorable for both the projects and the communities. The results can help establish well-functioning groups and determine both the definition of goals for the short and medium terms and the establishment of groups. Housing finance can almost never be achieved without the help of national governments. Aid agencies simply do not have sufficient resources to fund large-scale housing programs, and never cross the line and take over the powers and responsibilities of governments.

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