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Lessons from collective housing projects co-designed with Indigenous communities in Aotearoa New Zealand and Chile

Priscila Besen,[1,*] Iván Ivelic Yanes,[2] Sibyl Bloomfield,[1] Claudio Aguayo,[1] Oliver Brockie,[1] Cristobal Jorquera,[2] Caleb Mokomoko,[1] Carolina Varela,[2] Madeleine Grimshaw,[1] Carol Hernandez[2]

[1] Te Wānanga Aronui o Tāmaki Makau Rau–Auckland University of Technology, New Zealand
[2] Pontificia Universidad Católica de Valparaíso, Chile
* Correspondence: priscila.besen@aut.ac.nz

Guest editors: Robert Amato Lastman, City St George's, University of London/Kingston University London, and Jonas E. Andersson, Malmö University, Malmö, Sweden

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Abstract

Cohousing and shared living environments have been gaining increasing attention worldwide, as they offer significant social, ecological and economic benefits. Many Indigenous communities across the world had historically lived in collective housing with deep connections to nature, multigenerational relationships and the sharing of resources. However, many of these populations have been displaced from land and currently live in homes that are not aligned with their values and traditions. In recent

decades, there have been growing efforts to recover these original values and translate them into contemporary housing through participatory design processes. This article presents findings from interviews with designers working on collective housing projects in two countries across the Pacific where Indigenous values have been integrated into architecture through co-design. This study, conducted in Aotearoa New Zealand and Chile, discusses differences and similarities in approaches, and provides insights into the future of housing. The findings reveal the residents' unique contributions to the design of these housing projects to create a sense of community. The methods and participatory practices shared can be valuable in helping to design socially connected and regenerative collective housing in other contexts and countries.

Keywords collective housing; Indigenous values; co-design; Māori housing; Mapuche housing; cohousing

Introduction

Access to adequate, sustainable, safe and affordable housing is part of the Sustainable Development Goals[1] and is critical to ensure an equitable transition to a liveable future for all. International human rights law recognises everyone's right to adequate housing, which is the basis of stability, security and dignity for individuals or families.[2] Despite this right, approximately 2.8 billion people are estimated to be affected by various forms of housing inadequacy globally.[3] It is widely recognised that the quality of housing has major implications for people's well-being[4] and that housing affects the health of the planet through its environmental impacts, including building-related and urban-scale issues.[5] Cohousing and shared living environments have gained increasingly larger attention worldwide, as they offer significant social, ecological and economic benefits.[6] While cohousing is sometimes perceived as a new solution for housing, this was the way that many communities used to live in the past, especially prior to colonisation in the Southern Hemisphere.

Historically, many Indigenous communities across the world lived in collective housing with intergenerational connections, sharing resources and forming deep connections to land and nature – this communal living structure supported holistic well-being, integrating physical, mental and spiritual health.[7] However, many of these populations have been displaced from ancestral lands; they currently live in homes and neighbourhoods that are not aligned with their values and traditions. While acknowledging that every country and Indigenous community is unique, there are shared issues in the lack of culturally appropriate housing for Indigenous people across the world. In the last few decades, there have been growing efforts to recover the original values and translate them into contemporary collective housing through participatory design processes. There is increasing recognition that Indigenous values and knowledge systems can be key components of sustainability and climate resilience;[8] thus, there is value in embedding these knowledges and ways of living into our built environment, especially through the architectural and urban design of new collective housing. Design processes and the built environment can be factors that enhance the well-being of inhabitants, considering the unique factors of their original cultural values and cosmovision.

There is limited literature reviewing contemporary housing co-designed with Indigenous communities from an international perspective. This article presents the results of research conducted on two sides of the Pacific – Aotearoa New Zealand and Chile – about participatory practices in co-designing collective housing with Indigenous communities. This article presents preliminary findings from a literature review and interviews with designers and project leaders working on collective housing projects where Indigenous values have been integrated into architecture through co-design processes. The interviewees were project leaders, including architects, urban designers and community leaders. While acknowledging the different cultures and their needs, this study highlights some important questions and reflections for designers who work with Indigenous communities, and provides insights into the future of collective housing.

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The research team acknowledges its positionality as a diverse group from South America and Aotearoa New Zealand, including people with European and Indigenous ancestries. This article represents the reflections from collective discussions among the team, where all the members were able to share their knowledge and opinions. The authors of this article acknowledge the differences between Indigenous cultures worldwide and this study aims to highlight some common questions and methods in co-designing housing considering diverse cultural values. A glossary of terminology in the Te Reo Māori and Mapudungun languages is provided at the end of the article, as key terms have been written in their original languages within the text to support the efforts of language revitalisation. The name Aotearoa is the common Te Reo Māori name for New Zealand and it is used to refer to the country in this article.

Contextualisation: culturally appropriate collective housing for urban Indigenous communities

According to the United Nations, Indigenous peoples live in some of the most appalling housing conditions across the planet, often far worse than those of non-Indigenous populations.[9] Indigenous populations are also at greater risk of homelessness in many countries[10] and they face significant challenges owing to displacement from their ancestral lands and the resulting loss of culture. Forced relocations, often driven by economic development, resource extraction and urbanisation, disrupt their traditional ways of life. This displacement leads to the erosion of cultural practices, languages and community structures.[11] Tuck and Yang, prominent researchers in Indigenous studies, point out that 'disruption of Indigenous relationships to land represents a profound epistemic, ontological, cosmological violence'.[12] Urban Indigenous communities face particular challenges in giving effect to self-determining autonomy in comparison with their rural, remote and reserve counterpart communities.[13]

In attempts to house urban Indigenous populations, communities are often provided with basic and standardised dwellings built according to assumed ideals of good housing, which may conflict with their cultural needs.[14] Many of these architectures are based on cost-effective designs and functionalistic ideals, providing standardised buildings that can be built in multiple locations. There are shared challenges in the lack of culturally appropriate housing for Indigenous people across the world. For instance, Loosemore et al. found that in Australia public housing policies have often been imposed on Aboriginal communities based on non-Aboriginal ideals of good housing and that it is critical to consult the communities about what culturally appropriate housing looks like.[15] Although there is a rich cultural diversity among Indigenous cultures worldwide, shared values and ways of living can be identified. Indigenous conceptualisations of 'home' are relational and often extend beyond the physical environments where people live. Bowra and Mashford-Pringle argued that home can be conceived as the 'relationships that connect a person to all that surrounds them including people, plants, animals, insects, and land as well as ancestors, stories, languages, songs, and traditions. These relationships, and the homemaking practices that facilitate them, have direct and significant implications on the health and wellbeing of Indigenous peoples.'[16]

Globally, there has been a recent surge of contemporary architecture 'by, with and for Indigenous peoples, who wish to claim, reclaim and revitalise the built environment, and to create places and spaces that are congruent with and reflective of Indigenous lifestyles, histories, cultures and communities, and that celebrate Indigenous identity/s'.[17] Initiatives in various countries aim to create culturally appropriate new housing through authentic participatory and co-design processes, celebrating traditional knowledge and values. Co-design refers to the 'active involvement and empowerment of people in decision-making processes through creating a mutual learning environment democratically', engaging people with lived experience and other stakeholders.[18] According to Örnekoğlu-Selçuk et al., the role of designers is now less about 'designing for' and more about 'designing with' users and other stakeholders. For Mark and Hagen, 'co-design offers an opportunity for people to impact, lead, and shape the things that influence their lives'.[19] When implemented well and used to refer to culturally grounded participatory and developmental design practices shaped by and with people in place, co-design can lead to improved community well-being.[20]

Co-design offers new ways of working with communities in line with Indigenous peoples' right to be 'actively involved in developing and determining housing and other economic and social programmes affecting them'.[21] Co-design can be a tool to empower communities. As written by Mapuche architect

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Eliseo Huencho, 'the process of designing intercultural architecture is as important as the final result'.[22] Co-design with Indigenous communities should be developed in a very sensitive way and designers need to consider their own backgrounds and how this influences the process. Akama, Hagen and Whaanga-Schollum state that 'Designers are not culturally or politically neutral. Our backgrounds matter because they have shaped the kinds of designers we have become, and our sociocultural values inevitably manifest through our designing.'[23] Local histories and cultures should be always taken into consideration in-co-design processes. The next sections provide a brief contextualisation of Indigenous cultures and housing issues in Aotearoa and Chile.

Context of Indigenous culture and housing: Aotearoa New Zealand

In Aotearoa New Zealand, Māori are the Indigenous people, making up 17.3 per cent of the population.[24] Māori society is traditionally organised into iwi, hapū and whānau. The treaty between the British Crown and Rangatira Māori founded Aotearoa New Zealand as a bicultural nation in 1840.[25] Discrepancies exist between the English version and the Te Reo Māori translation of the treaty, which was signed by the significant majority of signatories, including the Crown representative.[26] The Te Reo Māori version is widely accepted as the true treaty, signed by both parties and defines key relationships and responsibilities. These include the recognition and upholding of Māori Tino Rangatiratanga, the Crown's freedom to govern and their responsibility to actively protect Māori interests.[27] These responsibilities have been articulated in legal precedent as the treaty principles and are known as the three Ps: partnership, underpinned by reciprocity and mutual benefit; the right to participation; and the protection of Rangatiratanga, 'just rights', 'of property', and property interests.[28] Over the decades after colonisation, the Māori lost most of their lands through Crown purchases, land confiscation and the individualisation of land titles, resulting in Māori freehold land today comprising only about 5 per cent of Aotearoa New Zealand's land area.[29]

Typical housing and development after colonisation tended to promote values of individualisation, private property rights and nuclear family units with few communal spaces, opposing relational Māori world views.[30] Māori needs regarding 'home' have often been limited to discussions about home ownership and affordability, with policies focusing on the physical element of 'shelter', without deep understanding of how to create dwellings that allow social connection and the expression of culture and identity.[31] A study by Boulton et al. discusses Māori perceptions of home, which 'tended to be more about connection to people and communities rather than a physical location or a physical dwelling'.[32] Māori conceptions of 'home' often extend beyond the physical dwelling, drawing on connections and relationships within (and between) whānau, whenua and whakapapa.[33] An important concept for Māori housing is papakāinga, a term broadly describing housing on ancestral Māori land that can include other activities such as marae, shared gardens, or commercial activities to support the community.[34] There are multiple definitions for papakāinga: it could be considered a village or settlement deriving from the earth, or a village or settlement formed from the layering of successive generations over time. According to Berghan, approaches to kaupapa Māori development such as papakāinga housing bear similarities with collective housing models such as cohousing.[35]

In Aotearoa, the Te Aranga principles can support co-design processes with Māori communities. In 2005, the Ministry for Environment recognised in the NZ Urban Design Protocol (UDP) that a clear Māori voice and meaningful involvement in the UDP development was lacking. This led to the development of the Te Aranga Māori Cultural Landscape Strategy.[36] It is recognised that 'as Māori we have a unique sense of our cultural landscapes. It includes past, present and future. It includes both physical and spiritual dimensions … It is not just where we live it is who we are.'[37] It is from this strategy and later projects that seven outcome-focused design principles – The Te Aranga Design Principles – emerged as part of the Auckland Design Manual. The principles provide a valuable starting point for conversations between design professionals and Māori as a foundation for the Te Tiriti-based partnership-led design practice to enhance built environment outcomes through Māori cultural values. The principles are underpinned by the core Māori values of Rangatiratanga, Kaitiakitanga, Manaakitanga, Wairuatanga, Kotahitanga, Whanaungatanga and Mātauranga. Te Aranga seeks to foster culturally appropriate responses to the built environments of Aotearoa that are strongly grounded in the concepts of place and belonging intrinsic to Te Ao Māori.[38]

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Context of Indigenous culture and housing: Chile

In Chile, there are 10 recognised Indigenous groups: Mapuche, Aymara, Rapa Nui (Easter Island), Quechua, Atacameño (Likan Antai), Diaguita, Colla, Kawésqar, Yagán (Yámana) and Chango, representing 12.8 per cent of the population.[39] In particular, the Mapuche are an Indigenous group primarily residing in southern Chile and Argentina. The term *Mapuche* means 'people of the land' (*mapu*: land; *che*: people), reflecting their deep connection to nature. Historically, they resisted Spanish colonisation for over 300 years, maintaining a strong cultural identity despite external pressures.[40] The Mapuche social structure is traditionally organised around extended families, with governance provided by a Lonko and spiritual guidance by a Machi, who connect the physical and spiritual realms.[41] Many urban and rural Mapuche communities still keep this social structure. The Mapuche world view evolves from the concept of Az Mapu, representing the natural order and balance among all elements of the universe, including humans, animals and spirits. The supreme deity, Ngünechen, oversees this order, embodying fertility, wisdom and protection.[42] This world view underpins their collective land ownership and cultural practices.

The most well-known surviving Indigenous architecture in Chile is the Mapuche ruka, which has been an important part of the cultural identity of Mapuche people for centuries. However, there are limited relationships between the ruka and contemporary architecture.[43] During much of the twentieth century, the intention to 'Chileanise' Indigenous communities prevailed, to the point that some traditions and architectural expressions became extinct.[44] It is reported that Mapuche families, particularly women, recreate ancestral cultural practices in urban homes to enable the articulation of place identity in culturally modified post-migration urban spaces. Many of the rituals enacted in urban surroundings such as appreciation of nature, cultivation of medicinal plants, traditional food and family ngütram have been transferred from communities of origin to their new urban homes.[45]

The massive production of social housing in Chile has led to dissatisfaction among its beneficiaries with respect to the materiality and design of the housing and its surroundings, and particularly regarding the conditions of family and social coexistence and their marginalisation from the city. The building stock built today is not only a housing problem but is also a social problem.[46] The situation of Indigenous social housing in Chile in general, and urban housing in particular, has a very short history: only in 1999 was the need to implement a culturally relevant housing programme for the Indigenous population mentioned in the so-called 'Pact for Citizen Respect'.[47]

In the last few decades in Chile, there have been the development and implementation of the Indigenous Architectural Design Guides by the Department of Architecture, Ministry of Public Works, with the first Aymara and Mapuche editions published in 2004 and revised in 2016.[48] This initiative was part of a broader effort to recognise and include Indigenous matters in various spheres of state control, promoting social cohesion and cultural preservation. Since the return to democracy, efforts have been made to safeguard their identity, recognise their rights and integrate them in a respectful manner into the development of the country.[49] By integrating Indigenous perspectives into architectural design, the guides can help to create spaces that are more inclusive and reflective of the diverse cultural heritage of Chile.[50] The Mapuche architectural design guide for buildings and public spaces states that architecture translates meanings that are encoded in morphological, spatial and functional configurations; cultural pertinence refers to the ability to translate and respond through formal elements belonging to each community, which have their own cultural expressions.[51] The 2016 design guide includes four principles for culturally pertinent architecture:

(1) Interculturality, recognising Indigenous communities as integral parts of a plural society where all expressions receive equal respect, recognition and representation;
(2) Participation, promoting local development and the free exercise of rights within each community;
(3) Flexibility, adapting the requirements of each case to the vast material and symbolic repertoire of Indigenous references for design;
(4) Complementarity, ensuring the criteria of intercultural development in processes of public investment.[52]

However, according to Mapuche architect Eliseo Huencho, applying the guides to public buildings can be challenging:

> On the one hand, state resources are predominantly focused on the phase of execution, not in design development, while on the other, initial design phases rarely prioritize the long-term

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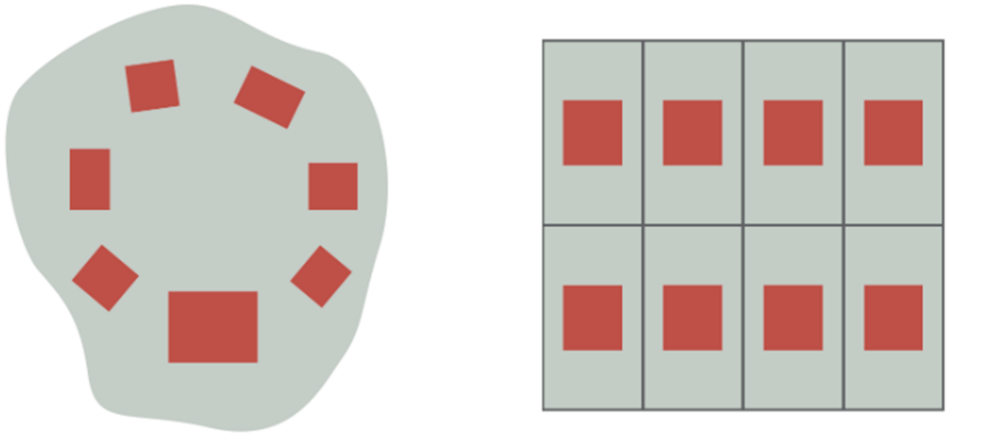
benefits and values needed to broaden the conventional scope of development. Based on the freedom of self-determination for each First Nation, space needs to be given to an Indigenous understanding of development.[53]

Comparisons, shared values and challenges

Like other countries in the Southern Hemisphere, historical events such as colonisation in Chile and Aotearoa have significantly influenced the ways of living for many communities. Traditionally, spaces in villages were organised with many shared areas and resources. However, over the years, land use has shifted towards more private approaches, focusing on nuclear family units consisting of parents and their children. Figure 1 provides a simplified visualisation of the changes in land use patterns, housing and ways of living before and after colonisation. These changes have impacted the ability to preserve cultural traditions and maintain the social connections that are valued by many residents for their holistic well-being.

Figure 1. Diagram illustrating key changes in land use and ways of living before and after colonisation (homes/buildings/structures are illustrated in orange).



Globally, the growth of cohousing demonstrates a shared interest in having more socially connected communities, which is shared by many cultures in different countries. For many Indigenous communities, the development of collective housing can enable the freedom to live in a way that is more aligned with their values. In Aotearoa and Chile, there are still many challenges to delivering culturally appropriate housing for all, but there have been improvements through the design guidelines mentioned in the sections above and other local initiatives. There are examples of projects in both countries that attempt to bring back elements from the original cultures and to create contemporary architecture informed by the values of future residents. Therefore, we explore examples of collective housing built in both countries, where there are multi-unit typologies with shared spaces, bringing back some ideas from traditional villages to urban settings.

Methodology

This study used a qualitative approach with mixed methods, including a literature review, semi-structured interviews, site visits and collective discussions within the research team. The literature search was conducted as a narrative review and sources were identified through searches on Google Scholar and Scopus. The review mainly included resources from the two countries studied, as well as insights from

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other countries on both sides of the Pacific facing similar challenges and opportunities, such as Australia and Canada.

Five semi-structured interviews were conducted in person by the researchers in Chile and Aotearoa in 2023. Regarding ethical considerations, this study was approved by the Auckland University of Technology Ethics Committee on 11 July 2023, AUTEC reference number 23/131. Interviews were not anonymous, as many of the designers included in the study are well-known in their field; therefore, interviewees agreed to be named in research outputs. Interviews were conducted in Spanish in Chile and in English in Aotearoa, incorporating terminology from the local languages of Mapudungun and Te Reo Māori as necessary. The five interviews were audio-recorded and transcribed by professional transcribers. The Spanish interviews were then translated into English by the researchers, striving to maintain the original content; however, some nuances and meanings might have been lost in translation. As discussed by other scholars, translators need to be particularly sensitive to the influence of social context in their expressions;[54] the fact that the same researchers conducted the interviews and translated them helped to keep the original meanings according to the context.

The two countries were chosen because they shared some common characteristics and because of the lack of studies making correlations between them. Both nations are located in the Southern Hemisphere, surrounded by the Pacific Ocean, with strong local cultures and facing geographical isolation in relation to their neighbouring nations. Both have similar Indigenous population proportions: 12.8 per cent in Chile and 16.5 per cent in Aotearoa.[55] There are high numbers of urban Indigenous populations in both countries: over 84 per cent of Māori in Aotearoa live in cities[56] and over 87 per cent of Chile's Indigenous population is urban.[57] No previous studies were found on comparisons between Indigenous housing in these two countries; most comparisons focus on countries that speak the same language.

The interviewees were specifically chosen based on their roles as designers and project leaders of social or collective housing for Indigenous peoples, which involved varying degrees of participation and co-design. This selection was informed by an initial literature review and an analysis of housing projects in Chile and Aotearoa. The ethics approval process facilitated the identification of respectful approaches for engaging with interviewees, many of whom had pre-existing social relationships with at least one team member.

Two interviews were conducted in Chile:

- Raúl Araya: Architect from Borde Urbano Arquitectura,[58] who designed the Cuno Kaweskar housing project in Valparaíso.
- María Godoy: Mapuche community leader and Machi, who led the residents in the development of the Cuno Kaweskar project.

Three interviews were conducted in Aotearoa New Zealand:

- Rau Hoskins (Ngāti Hau, Ngāpuhi, Pae Matua Ngā Aho): Director of Design Tribe Architects[59], lecturer and a leading voice in Māori architecture and the design of papakāinga in Aotearoa.
- Jade Kake (Ngāpuhi [Ngāti Hau me Te Parawhau], Te Whakatōhea, Te Arawa): Architect, Director of Matakohe Architecture + Urbanism,[60] Senior Lecturer in architecture, involved in the design of several papakāinga projects.
- Gary Lawson: Architect and Director of Stevens Lawson Architects,[61] an architectural practice that designed the Kāinga Tuatahi papakāinga in Tāmaki Makaurau.

The interviews included open-ended questions followed by informal conversations to explore topics in depth. The main themes were: (1) participatory practices and co-design processes; (2) integration of Indigenous values in the design; (3) shared spaces, design for social interactions and intergenerational connections, layout flexibility; and (4) project limitations and regulatory challenges. This article discusses preliminary findings from interviews, summarising the main insights learned from designers. Interviewees also provided feedback on the research, contributing to the process and next steps. The site visits were carried out in one project in each country by the two lead authors. Data from interviews was coded to identify key themes and all team members participated in discussions about the findings, considering all ideas and reflections. The team included academic staff and students who worked as research assistants; all members participated in discussions and were included as authors of this article.

Figure 2 illustrates some of the collective housing projects discussed in the interviews, which include government-subsidised social housing in Chile and community-funded papakāinga projects in Aotearoa.

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The projects presented various levels of participation, from authentic co-design with all residents to participatory processes with few community representatives.

Figure 2. Collective housing projects discussed in the interviews: Cuno Kaweskar Social Housing Complex, Villa Alemana, Valparaíso region, Chile (A, B: image credit Raúl Araya/Borde Urbano); Kāinga Tuatahi in Ōrākei, Tāmaki Makaurau, Aotearoa (C: image credit Priscila Besen; D: image credit Stevens Lawson Architects, https://www.stevenslawson.co.nz/); Render of Te Rewarewa papakāinga project, Whangārei, Aotearoa (E: image credit Jade Kake and https://www.matakohe.co.nz/)

Interview findings

The interviewees discussed experiences from collective housing projects where they were involved as designers and/or project leaders, covering the following topics: participation and co-design methods, integration of Indigenous values into the design, provision of shared spaces, design for social interaction and intergenerational connection, flexibility in layouts, current limitations and challenges. The following sections summarise the main interview findings from each country.

Interview findings from Chile

At the Cuno Kaweskar project, there were several workshops and meetings with the community to discuss important aspects of the project through dialogue. The community included Indigenous and non-Indigenous residents and the majority of the Indigenous residents were of Mapuche ancestry. Architects held workshops to teach residents how to read architectural drawings so that they could have a common language for the understanding, discussion and proposal of changes in the project to reach

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an authentic co-design process. According to the architect Raúl Araya, 'These measures made them feel equal to the professionals and they could contribute significantly to the project.' Araya also discussed possibilities for future co-designed projects to use augmented reality technologies for visualisation: 'These are inevitable advances to be introduced in projects, but we have not explored them together with other technologies, basically due to a lack of resources, which is why we have always remained in the analogue.'

The project leader, María Godoy, discussed that design according to the Mapuche world view and the concept of kumel kalen should consider all aspects of well-being – physical, psychological, spiritual and social – consolidating the whole as a space where they can be calm and that welcomes the free development of their culture and customs. Aspects of the Mapuche cosmovision on collective housing included the creation of meeting places, such as social centres, agoras, courts or parks, where people can meet and where the social organisations present in the complex can develop and strengthen themselves. Community and shared facilities such as sports courts were beneficial to enhance social connection among all age groups. The sports court at the heart of the housing complex in Chile allows the community to connect and watch the children playing from the apartments.

The families of Mapuche and other Indigenous ethnicities expressed their wishes to live closer to the land, in homes located on the ground floor. According to the project leader María Godoy:

> Our objective was to create homes with Indigenous relevance. What we wanted were houses. Contact with the land and nature was very important, because we come from territories, our ancestors had their territories, they were related to the spiritual forces of nature, our 'ñukemapu' … Understanding our worldview is difficult in apartments, so we tried to have as few divisions as possible.

Owing to the need for higher densities, the solution found was to design apartments with external staircases and prioritise ground-floor units for the Indigenous residents. According to Raúl Araya, 'the Mapuche defended being on the ground floor, and things were clearly tied to the meaning of the land, to be linked to the ground as part of the culture, as a recovery of ancestral values and a series of things that have to do with the cosmovision.' Regarding embedding Indigenous values in the design of internal layouts, María Godoy stated that:

> The table for us is like the kutralwe, it is the hearth where we meet with my family every Sunday, and we talk about everything here in this place … We have bathrooms upstairs, with the bedrooms. The bathroom is always outside the ruka, it could not be near the kitchen.

The location of bathrooms and kitchens, with a clear distance between them, was thoroughly discussed with the community to reach this solution.

One of the challenges discussed was the need for follow-ups and assistance after buildings had been completed: 'There is a lack of follow-up afterwards because they leave you alone … After we have the house, everyone disappears' (María Godoy). Funding challenges limited what could be designed and built. According to the architect Raúl Araya, 'the Cuno Kaweskar project had monetary limitations and in the same way the merit of having been built with around 700 UF' – a very small amount of the inflation-indexed unit of account, calculated and published by the Central Bank of Chile (BCCh), the *unidad de fomento* (UF). Residents and designers wished to introduce more mixed-use typologies in the project, with shops to cater for both residents and the wider community. However, this was not possible owing to the funding limitations. Araya also mentioned considerations about the expansion of the dwellings (progressiveness), since it is common for expansions to occur due to new demands in families over time, considering the large size of the families.

Interview findings from Aotearoa New Zealand

When asked about co-design processes, interviewees in Aotearoa discussed the importance of forming meaningful relationships and gaining a deep understanding of the land where projects will be based. According to Rau Hoskins:

> You've got to develop that cultural connection and rapport … There's no lines on any paper until you've walked the whenua … You walk the whenua; you build up the rapport first and you

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> listen before any commissioned topo survey, and you listen before any lines go on your paper … Then, the design moves that you make should be in the room with the people.

Jade Kake stated about the design process:

> I think it works the best when people know the site really well and know each other really well … Once you've got a viable project and people are engaged in the processes, I think just utilising these co-design tools and active listening and just facilitating that process really well, making sure you're always looping back, making sure governance is really functional, so you've got a space here with the wider group and that's where you do all your co-design, but it's the governance group that actually has to ratify those decisions and hold responsibility for them.

Regarding techniques for the co-design workshops, Hoskins discussed the use of white boards with plans or aerial images projected on them as a quick and interactive design tool to work with communities. Jade Kake's workshops involved using 'big maps and markers and 3D elements, some of the uncles would start telling stories and then drawing in the maps; we also go on walks together'. Jade Kake and Rau Hoskins discussed the important role of kaumātua in the design process, as older residents usually share their knowledge of the whenua and the culture with the younger generations. An important design strategy for papakāinga discussed by interviewees was to create shared areas between homes where children could freely move around and where residents could connect with each other. Rau Hoskins mentioned 'keeping vehicles to the perimeter, making sure that there are whole communal zones, which are tamariki free-range zones and that you should not expect any vehicles to appear in that part of the site'. Gary Lawson discussed the integration of communal green spaces and vegetable gardens at Kāinga Tuatahi and how shared low-speed laneways were utilised as play spaces by the children in this project.

Internal layouts in the projects were designed with consideration for the concepts of tapu and noa. Certain functions in homes were kept separate from others in order to preserve their tapu (sacred/prohibited) or noa (common/profane) nature. For example, kitchens were kept far away from bathrooms and laundries. Another point discussed and expanded upon by Rau Hoskins was about making the culture more visible in the projects:

> I think it's important for our houses to be identifiable and recognisable, and I think that sometimes we need to look at more motif and cultural treatments, more personalising of our whare. That can be through kowhaiwhai, it could be through carved elements. It could be through brick, the use of different coloured bricks.

Flexible spaces were built at Kāinga Tuatahi in Auckland to provide opportunities for families to adapt them according to their needs. Garages were designed to allow conversion into spaces serving multiple purposes; after completion, they noticed that these spaces started being used for small businesses such as tattoo studios and small apartments for grandparents or visitors.

Rau Hoskins and Gary Lawson discussed some of the conflicts found between medium- and high-density living with Māori world views, highlighting the preferences of many residents to be more directly connected to the land. Townhouse typologies, with vertical separations between units, were often preferred over apartments where there was a horizontal separation between homes. Rau Hoskins stated:

> It's as much about the whenua (land) as it is about the houses … The anecdotal stories I'm hearing are not good in terms of people's mental health, their lack of access to green space, to mahinga kai, issues of accessibility and two-/three-storey terraces … Where we've landed on multi-level developments is vertical tenancies, vertical differentiation tenancies is better than horizontal because your whānau are living above you and coming down to the middle level, etc., as opposed to walk-ups where you've got so and so lives up there.

Residents were interested in implementing many sustainability initiatives in the projects, such as the use of solar energy in remote papakāinga mentioned by Rau Hoskins. Houses at Kāinga Tuatahi integrated solar panels and batteries, enhancing their resilience. Jade Kake stated about co-design discussions related to sustainability: 'Environmental stewardship always comes through really strongly. So, whether it's riparian planting and waterway restoration, not cutting down trees, biodiversity, those are always really key considerations.'

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All interviewees brought up the many challenges that can make these projects difficult, such as current regulations preventing the design of alternative ways of living beyond separate nuclear family units, lack of funding and other aspects. Jade Kake commented: 'There's just so many structural barriers still … there's just a lot of issues before you even get to the part where there's this fun, cool design project to do together.' Rau Hoskins said in his interview:

> I think Māori housing is so difficult. Anyone that gets into three dimensions is a success. So, just having a warm, safe, dry set of dwellings, setting aside everything else, that's actually quite important … I think our best papakāinga have not been built yet, this is my honest opinion. I think some are on the books now.

Discussion: comparisons between experiences in Aotearoa and Chile

The interviews revealed the importance of participatory practices in creating a sense of community from the very early stages. The findings showed that project initiation should be done in a culturally sensitive way and forming good relationships from the early stages leads to better outcomes for the projects. The importance of knowing the site, visiting the land in person and developing cultural mapping before any design moves was also discussed. Being part of the co-design process in the case of a social or collective housing complex allows people to begin to relate to each other before sharing a neighbourhood; therefore, this community is formed and strengthened from the beginning. This also allows the generation of links, which can later contribute to the location by affinity, in the blocks. Since the co-design, the space has belonged to the community and a sense of belonging and appropriation has been developed, which ensures its development and maintenance.

The tools utilised for co-designing with residents included analogue, digital solutions and a blend of both. There was a notable effort to teach residents how to read architectural drawings in the project in Chile to ensure a meaningful co-design process. Raúl Araya pointed to the possibility of using augmented reality in future to be able to blend analogue and digital tools.

The leading role of elders in the design process was highlighted in both contexts. In co-design processes, they shared their knowledge about the land and the culture, and projects have implemented strategies for intergenerational connection such as flexible spaces that can become studios for grandparents to stay or live with families. This helps to recover traditional family relations and create strong relationships between the oldest and youngest members of communities.

Important aspects of Indigenous values were considered when designing internal layouts. In both countries, residents expressed the desire to have toilets and kitchens separated by a clear distance in floor plans, or to have them placed on different levels. Other preferences for adjacencies and separation of rooms were also revealed, but this was the main one found in both countries. The separation of tapu and noa is a well-known consideration for Māori housing, which has been included in design guidelines:[62] 'certain household functions are kept separate from others in order to preserve their tapu (sacred/prohibited) or noa (common/profane) nature. For example, all food-related facilities must be separate from bathrooms, toilets and laundries.'[63] The design guidelines in Chile also state that Mapuche living is characterised by a clear spatial separation of the different degrees of privacy and their functions, even in independent volumes on some occasions (for example, kitchens or stoves), which is accompanied by interconnecting elements such as enclosures, pavement work or shapes that make these spatial relationships visible.[64]

Preferences regarding vertical relationships in buildings and connection to the land were also shared themes in both countries. Through discussions with designers, communities expressed their preferences for homes located on the ground floor for a more direct connection with the land. Having easy access to natural outdoor spaces and food gardens aligns with cultural values and the deep relationships with the earth. It can be challenging to implement some of these ideas in high-density environments and apartments and designers need creative solutions to create good connections between homes and the land. Another important aspect was the design of spaces for indoor/outdoor connection in both countries. According to a publication by Hoskins et al., 'verandahs, porches, patios and decks are key elements of Māori houses and provide essential transitional indoor/outdoor zones, connection to Papatuanuku and relieve pressure on internal spaces'.[65]

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Designers in both countries revealed there are still many challenges in developing these projects and it usually takes time to reach the design stage, as there are many barriers and bureaucratic issues that need to be resolved before this. Challenges with project funding were reported in both countries, with some valuable design elements being removed from the designs owing to budgetary considerations. Designers in Aotearoa reported they would like to see more unique facades and artworks that visually express the communities' identities. One key difference to note between the case studies explored in both countries was the funding approach – the project in Chile was developed through government subsidies, and the ones in Aotearoa were mainly funded by the communities themselves, which enabled more flexibility in the designs. Although there are still many challenges in developing these types of housing projects, issues with funding and regulatory frameworks, architects in Aotearoa were feeling positive about the number of new papakāinga being planned and the quality of the new projects being developed, with many new projects currently in the planning stages.

Conclusions

This article has discussed research findings on co-design approaches for building collective housing for urban Indigenous communities in Chile and Aotearoa. While there are many differences across both countries and their original cultures, some common strategies in co-design processes and some shared preferences in ways of living were identified. Forming a good relationship between designers and communities from the initial stages is crucial. Teaching the community to read architectural drawings enables authentic co-design processes and using simple analogue tools such as physical models, printed maps and whiteboards with projected images can enable all future residents to participate. The findings reveal the unique contributions from residents to the design of these housing projects to create a sense of community. The role of elders in the design process and the continuity of communities was highlighted in interviews, as they hold valuable knowledge about the land, original languages and traditions. Strategies for efficient decision-making were shared, highlighting their importance for communities that may need housing quickly, as a lengthy co-design process could be challenging.

Regarding preferred ways of living, there were shared preferences for implementing various types of communal space for social interaction, a preference for ground-floor units to enable direct connection to the land, the implementation of flexible spaces to enable multigenerational living and a clear distance between kitchens and bathrooms in the homes owing to cultural considerations in both countries. Having shared green spaces and direct contact with nature was desired by most communities. While these preferences might vary across other Indigenous cultures, these might be good initial points to query when planning new housing in other contexts as well. We hope that the findings of this study can benefit Indigenous communities by raising awareness among designers about different world views and ways of living, encouraging them to have more participatory processes and being open to different perspectives on housing.

It is acknowledged that there are still many challenges in implementing these projects and the number of authentically co-designed collective housing units is still small in these countries; in both nations, the case studies were exceptions, not the norm. Interviewees expressed that there are still many structural barriers to implementing these types of projects. Nonetheless, notable development has been observed through top-down and bottom-up initiatives. Government or institutional guidelines such as the Indigenous Architectural Design Guides in Chile and Te Aranga Design Principles in Aotearoa can provide valuable initial frameworks for culturally appropriate design processes. Local initiatives by community leaders and exemplar projects provide valuable lessons and inspiration for future collective housing co-designed with Indigenous communities.

The findings from this research are limited owing to the small number of interviewees involved; the correlations with findings from the literature aimed to validate the knowledge gained from participants and compare it with other contexts. It is hoped that authentic co-design processes are embedded not only in exceptional projects but that these considerations are integrated more often into new collective and social housing for Indigenous residents. While acknowledging that there are still many challenges in delivering these projects, throughout this study there was also noticeable hope for the future by sharing these successful examples. These collective housing projects enable more freedom for urban Indigenous communities to live according to their values and preferences. The benefits of co-design processes go way beyond the architectural propositions – they help to empower communities and create connections

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between the people who will be living together for years to come. As cohousing projects emerge in many countries,[66] valuable lessons can be learned from the cultures who for centuries lived communally on the lands where cities lie today.

Glossary

Te Reo Māori terms (used in Aotearoa New Zealand)

Aotearoa	Literally 'the land of the long white cloud'; the common Te Reo Māori name for New Zealand. Aotearoa New Zealand.
Hapū	Kinship group, clan, tribe, subtribe. A section of a larger kinship group (iwi) consisting of a number of whānau sharing descent from a common ancestor.
Kaitiakitanga	Defined as a value for the Te Aranga principles as: Managing and conserving the environment as part of a reciprocal relationship, based on the Māori world view that humans are part of the natural world.
Kaumātua	A respected elder, leader or person of status within the whānau. Also, old, elderly, aged.
Kotahitanga	Defined as a value for the Te Aranga principles as: unity, cohesion and collaboration.
Manaakitanga	Defined as a value for the Te Aranga principles as: the ethic of holistic hospitality whereby Mana whenua have inherited obligations/responsibilities to be the best hosts they can be.
Mana whenua	Māori who hold direct whakapapa ties to an area or territory.
Marae	Courtyard – the open area in front of the wharenui, where formal greetings and discussions take place. Also often used to include the complex of buildings around the marae.
Māori	Indigenous people of Aotearoa New Zealand; also māori – normal, ordinary, natural, usual, common.
Mātauranga	Defined as a value for the Te Aranga principles as: Māori/Mana whenua, knowledge and understanding.
Noa	Profane, common.
Pākehā	New Zealanders of non-Māori, usually European descent.
Papakāinga	A housing and community development for Māori on their ancestral land.
Rangatira	Chief, leader, esteemed and revered.
Rangatiratanga	Defined as a value for the Te Aranga principles as: the right to exercise authority and self-determination within one's own iwi/hapū realm.
Tāmaki Makaurau	Auckland, specifically the Auckland isthmus. Also, Tāmaki.
Tamariki	Children. To be young, youthful.
Tapu	Sacred, prohibited.
Te Ao Māori	The Māori world and world view.
Te Reo Māori	The Māori language.
Te Tiriti o Waitangi	The Treaty of Waitangi – importantly the Te Reo Māori version of the treaty – signed by the British Crown and Rangatira Māori (Māori chiefs, leaders), the founding document of Aotearoa New Zealand.
Tikanga	Appropriate Māori customary practices and behaviours.
Tino Rangatiratanga	Often translated as sovereignty, highest chieftainship, unqualified chieftainship, self-determination, self-government, domination, rule, control, power, independence, autonomy (there is no one translation that captures the true meaning(s) as the term is deeply rooted in Te Ao Māori).
Wairuatanga	Defined as a value for the Te Aranga principles as: the immutable spiritual connection between people and their environments.
Whakapapa	Genealogy, lineage. Also, the kinship of human and non-human encompassing the complex relations between people and the land.

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Whānau	Family, close kinship group.
Whanaungatanga	Defined as a value for the Te Aranga principles as: a relationship through shared experiences and working together which provides people with a sense of belonging.
Whenua	The earth, ground or land; also placenta.

Mapudungun terms (used in Chile)

Kumel kalen	To be well, to live well.
Kutralwe	A hearth, made of stones, that used to be in the centre of rukas for fire.
Lonko	Political chief who leads a group of families.
Machi	Traditional healer and spiritual leader, shaman.
Mapuche	Indigenous group primarily residing in southern Chile and Argentina. The term 'Mapuche' means 'people of the land' (*mapu*: land; *che*: people), reflecting their deep connection to nature.
Mapudungun	The native language of the Mapuche people of Chile and Argentina.
Ngütram	Conversation or story.
Ñukemapu	Mother Earth.
Ruka	Traditional Mapuche house type, typically built communally from tree trunks and branches with a round form and conical roof.

Notes

1 United Nations General Assembly, 'Transforming our world'.
2 United Nations, 'The right to adequate housing'.
3 UN-Habitat, 'Rescuing SDG 11'.
4 World Health Organization, 'WHO housing and health guidelines'.
5 Organisation for Economic Co-operation and Development, 'Reducing the environmental impact'.
6 Garciano, 'Affordable cohousing'; Lubik and Kosatsky, 'Public health'.
7 Viscogliosi et al., 'Association between intergenerational solidarity'; Rowe et al., 'Prioritizing Indigenous elders' knowledge'.
8 United Nations Climate Change, 'Values of Indigenous peoples'; Makondo and Thomas, 'Climate change adaptation'; Ford et al., 'Resilience of Indigenous peoples'; Dorji et al., 'Understanding how Indigenous knowledge contributes'.
9 United Nations, 'Report on the right to adequate housing'.
10 Anderson and Collins, 'Prevalence and causes of urban homelessness'.
11 Tapsell, *Kāinga: Tangata, Whenua, Taonga*.
12 Tuck and Yang, 'Decolonization is not a metaphor'.
13 Walker and Barcham, 'Indigenous-inclusive citizenship'.
14 Grant et al., 'Introduction'; Mercer et al., 'Eight examples'.
15 Loosemore et al., 'Aboriginal housing policies'.
16 Bowra and Mashford-Pringle, 'More than a structure'.
17 Grant et al., 'Introduction'.
18 Örnekoğlu-Selçuk et al., 'Systematic literature review'.
19 Mark and Hagen, *Co-design in Aotearoa New Zealand*.
20 Mark and Hagen, *Co-design in Aotearoa New Zealand*.
21 United Nations, 'United Nations declaration on the rights of Indigenous peoples'.
22 Huencho, 'Indigenous architectural design guides'.
23 Akama, Hagen and Whaanga-Schollum, 'Problematizing replicable design'.
24 Stats NZ Tatauranga Aotearoa, 'Māori population estimates'.
25 Te Tiriti o Waitangi.
26 Waitangi Tribunal, 'Signing of the treaty'.
27 Yates et al., 'Transformative architectural pedagogy'.

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28 Te Puni Kōkiri, 'He Tirohanga ō Kawa Ki Te Tiriti o Waitangi'.
29 Macgregor, Ropata and Grimes, 'Land loss'.
30 Berghan, 'Kaupapakāinga'; Brown, 'Contemporary Māori architecture'.
31 Boulton et al., 'Māori perceptions of "home"'.
32 Boulton et al., 'Māori perceptions of "home"'.
33 Berghan, 'Kaupapakāinga'.
34 Whangārei District Council, 'Papakāinga'.
35 Berghan, 'Kaupapakāinga'.
36 Auckland Council, 'Te Aranga principles'.
37 Auckland Council, 'Te Aranga principles'.
38 Auckland Council, 'Te Aranga principles'.
39 Ministerio de Desarrollo Social, 'Pueblos Indígenas'.
40 Bengoa, *Historia del Pueblo Mapuche*.
41 Bacigalupo, 'Shamans of the Foye tree'.
42 Melin et al., *AzMapu*.
43 Whitman, Armijo P. and Turnbull, 'The Ruka Mapuche'.
44 Ministerio de Obras Públicas - Dirección de Arquitectura, 'Guías de diseño arquitectónico'.
45 Becerra et al., 'Recreated practices by Mapuche women'.
46 Rodríguez and Sugranyes, *Los Con Techo*.
47 Valdés Castillo, 'Los Nuevos Hábitats Residenciales'.
48 Huencho, 'Indigenous Architectural Design Guides'.
49 Ministerio de Obras Públicas - Dirección de Arquitectura, 'Guías de diseño arquitectónico'.
50 Huencho, 'Indigenous architectural design guides'.
51 Ministerio de Obras Públicas - Dirección de Arquitectura, 'Guías de diseño arquitectónico'.
52 Ministerio de Obras Públicas - Dirección de Arquitectura, 'Guías de diseño arquitectónico'.
53 Huencho, 'Indigenous architectural design guides'.
54 Ho, Holloway and Stenhouse, 'Analytic methods'.
55 IWGIA, *Indigenous World*.
56 Meredith, 'Urban Māori'.
57 IWGIA, *Indigenous World*.
58 Borde Urbano, 'Borde Urbano'.
59 https://www.designtribe.co.nz/.
60 https://www.matakohe.co.nz/.
61 https://www.stevenslawson.co.nz/.
62 Hoskins et al., 'Ki Te Hau Kainga'.
63 Kāinga Ora Homes and Communities, 'Ngā Paerewa Hoahoa Whare requirements'.
64 Ministerio de Obras Públicas - Dirección de Arquitectura, 'Guías de diseño arquitectónico'.
65 Hoskins et al., 'Ki te hau kainga'.
66 Giorgi, *Co-Housing Phenomenon*.

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