

TERMS OF REFERENCE**Design and implementation of a Cadaster for the Precarious Settlements Program***CHILE**CH-T1263**Support to the Ministry of Housing and Urbanism of Chile in the Anticipation, Measurement, and Inclusion of Precarious Settlements through a Cadaster***1. Background and Justification**

- 1.1.** The Ministry of Housing and Urbanism of Chile (MINVU), through the “Campamentos” Program, is implementing a modernization program to respond to the increase in informal settlements, known in Chile as “campamentos”. In 2011, according to MINVU data, there were 657 informal settlements and 27,000 households residing in them. The 2019 National Campamentos Cadastral found a total of 802 informal settlements with 47,050 households. Although there is still no updated cadaster, it is estimated that since 2019 the formation of informal settlements has accelerated, because of the social crisis, the intraregional migration phenomenon, and the effects of the pandemic on the economy. The most recent estimates show a total of around 1,000 informal settlements and 66,000 households, concentrated mainly in the north and south-central areas of the country. This significant increase in national and migrant households residing in informal settlements is due to three identified causes: (i) increased flow of households to informal settlements; (ii) difficulties in reducing the existing stock of homes in informal settlements; and (iii) barriers to socio-urban inclusion.
- 1.2.** The proportion of the immigrant population in Chile with respect to the total of all Latin American countries is the one that increased the most between 2016 and 2019, going from 2.15% to 8%. A large part of immigrants, unable to access the formal housing market, have sought housing solutions in the informal market. Between the 2011 and 2019 cadaster, the percentage of foreign heads of household residing in informal settlements increased from 1.2% to 30% and it is estimated that 27% of households residing in informal settlements today have foreign nationality, highlighting the Antofagasta region, which has 72% of foreign heads of household. The regions with the highest percentage of foreign heads of household by informal settlements are Antofagasta (72%), Tarapacá (65%), Arica and Parinacota (56%), Atacama (45%), Magallanes (29%) and the Metropolitan (21%).
- 1.3.** One of the challenges that the Camp Program has presented since its inception in 2011 is to improve its ability to quantify and monitor the growth of informal settlements. Given the urgent need to improve the cadaster process to obtain more accurate, up-to-date diagnoses and a more detailed characterization of the homes that inhabit these settlements, this consultancy proposes to contribute to both the design and the execution of the National Camp Cadaster to update the registries. of households residing in informal settlements throughout the country.

- 1.4. The HUD Division in collaboration with the Migration Unit seeks to hire a Consulting Firm (FC) with more than 10 years of experience in the development and application of surveys with multidimensional parameters (migration, gender, climate change, among others) through of the use of new technologies.

2. **Objectives**

- 2.1. The objectives are to: i) Develop an information gathering methodology that incorporates digital tools that are capable of installing capacities in the ministry to update the cadaster on a regular basis, ensuring that the survey data model is consistent with the data model of the MINVU Camp System; and ii) Introduce multidimensional parameters in the survey to be carried out, such as migratory situation, climatic risks, environmental, social, cultural, economic and health aspects that allow obtaining detailed information on the composition and characteristics of the households and their dynamics that make up these new settlements, their particular needs and with it the possible mechanisms and routes to improve their housing condition.

Specific objectives:

- Strengthen the MINVU methodology with respect to the collection of information according to the urgency and dynamism of the current context that considers the use of technology in all its stages so that it is reproducible.
- Develop a work plan that includes a work team, training program, and quality protocols for data collection.
- Use digital tools for the implementation of surveys in the field with the use of cell phones.
- Train supervisors and interviewers in accordance with the guidelines provided by the Bank.
- Compile detailed information on the composition of all the precarious settlements identified by the Ministry in open formats.
- Digitize maps through Open Street Map, a platform that allows to edit, use or develop information under a universal geospatial language of public property in order to publish and convert the maps into open data.
- Obtain complete, disaggregated, and detailed census information on each of the household members within the precarious settlements, ensuring that the survey data model is consistent with the MINVU Camp System data model.
- Incorporate in the surveys the level of digital inclusion of people and households in precarious settlements.
- Identify the identity cards of all the heads of household in the camp.
- Locate each household in the polygon of the camp.

- Prepare an analysis with the characteristics of the precarious settlements to identify trends, natural and climatic risks, and priorities of each camp with a multidisciplinary perspective.
- Determine what are the specific deficiencies at the housing level that are experienced in the precarious settlements through questions included in the questionnaire
- Identify what are the needs for access to urban services and equipment.
- Streamline the reading of cadaster results through innovation in the use of data processing platforms, such as GitHub, PowerBI, etc.

Specific climate change objectives:

- Collect information (and apply existing) to develop risk profiles of the precarious settlements, strengthening the analyzes already carried out by MINVU, including information related to vulnerabilities and exposure with respect to various threats, such as: forest fires, floods, flooding in areas coastal areas, mass removal, among others, considering both current scenarios and those caused by climate change. These risk profiles should be able to lead to a prioritization scheme for action regarding climate actions.
- Through surveys, prepare a household energy and water consumption profile. Develop a projection of energy saving and efficiency of the prototypes of sustainable social housing compared with the baseline of energy consumption of the current precarious settlements.
- Collect information to identify the needs and uses in transportation of the inhabitants of the precarious settlements with respect to the formal city, considering the trends in the use of transportation and fuels.
- Identify in georeferenced cartography based on climate risk studies the most suitable areas to develop green spaces that fulfill ecosystem functions and mitigate certain climatic impacts such as heat waves and floods.
- Include multidimensional variables that include climate vulnerability to the set of questions already established.
- Include questions about the perception of risks and disasters in the surveys (e.g., how often the house gets rained, the entrances to the camp flood, if there have been landslides, etc.).
- Achieve a geo-referenced and digitized cartographic order of all the cadastral information of the precarious settlements regarding environmental risks and climate change.

Specific migration objectives:

- Include in the questionnaire questions that identify the migratory status of members of households in precarious settlements.

Specific gender and diversity objectives:

- Include questions in the questionnaire that identify priorities and trends of the most vulnerable groups, such as women, children, and adolescents, the LGBTQ population, indigenous people, and those with disabilities.
- Include in the questionnaire questions that identify the detail of the social fabric of these neighborhoods, from the leaderships within the precarious settlements, community organizations, sports, schools, churches, and groups of women and young people.

3. Scope of Services

3.1. The Consulting Firm team will work closely with the IDB and must have specialists with at least the following profiles and roles (requirement):

- Study Coordinator: Professional with at least 5 years of experience in consulting and demographic research, management and coordination of work teams and application of large-scale surveys with multi-dimensional parameters, including migration, socio-economic, multidimensional poverty, gender, etc.
- Expert in migration, climate change, gender issues: Professional with a degree in sociology or anthropology with at least 5 years of experience in qualitative analysis, research, and development of surveys that include multidimensional parameters of gender, migration, multidimensional poverty, childhood, diversity, for application in scenarios of vulnerability and precariousness.
- Technical Assistance Managers: Technician with at least 5 years of experience in human resources administration, coordination of work teams in the field, with specialized technical knowledge in conducting and applying surveys in precarious and large-scale scenarios, in various regions of the country with multidimensional parameters.
- Web programmers and data analysts: Computer technician with at least 5 years of experience in the development of instruments for the application of the survey, data collection, validation, and processing, data compatibility in various systems.
- Field Team Managers: Personnel with at least 5 years of experience in managing and coordinating teams in the field in complex precarious scenarios; experience in applying large-scale surveys.
- Training Manager: Personnel with at least 5 years in management control, training of field teams, and conducting surveys, knowledge of gender and diversity approaches.
- Planimetry Manager: Experience in surveying geographic / cartographic material.
- Pollsters.

3.2. The expenses derived from work materials and any other stipend related to the development of the activities described in these Terms of Reference will be borne by and ordered by the Consulting Firm.

4. Key Activities

4.1. The Consulting Firm must carry out the following activities:

- 4.2. Prepare a work plan:** Develop a work plan that includes a project schedule, organizational scheme, work team, training program, and information gathering quality protocols.
- 4.3. Develop an information gathering methodology:** Develop a methodology for efficient information gathering throughout the national territory.
- 4.4. Train supervisors and surveyors:** Develop training for supervisors and surveyors in accordance with the guidelines provided by the Bank for the application of the survey through the application of mobile surveys.
- 4.5. Aerial photographic processing:** prior to conducting the survey, images taken with drone must be processed in orthophotos beforehand by the MINVU team from each camp to intervene. This processing should include rectified orthophotos, surface models, cross sections, and vector maps that read building, infrastructure, utility, and community data. The images must be delivered in .tif format and the planimetries in .shp format with the indicated settings.
- 4.6. Survey in the field:** At the same time, each neighborhood must be visited with a cell phone application with GPS accompanied by geographers to corroborate the information from the aerial photographic survey.
- 4.7. Prepare digital planimetries:** The maps must be digitized in an open format through platforms that allow the editing, use, or development of information under a universal geospatial language of public property such as the Open Street Map of each camp based on the images collected previously. The digital planimetries should identify the Sites that make up each settlement. Likewise, the planimetry should be able to be crossed with other georeferenced data existing in the different government agencies in Chile regarding different environmental and climatic risks. The use of Mapbox software is also recommended to visualize areas that present urban and demographic problems.
- 4.8. Apply survey:** It will be applied through a mobile application that ensures the geo-referencing of the survey by means of a trained interviewer to a household member, through technological devices that have an internet connection and allow the capture of photographs, which must be provided and administered by the FC. The following must be obtained: i) complete, disaggregated, and detailed census information for each of the household members. A maximum of 3 visits should be considered by the interviewers to households that did not answer in the first instance. In case of not answering on the 3rd visit, the households are classified as having absent or unoccupied residents. ii) location of each household in the polygon of the camp to identify access to services and urban facilities, proximity to risk areas, and specific deficiencies at the housing level. It should be ensured that the mobile application available to capture census information connects with the Camp System developed by MINVU.
 - Pollsters must maintain sufficient sanitary measures to reduce the risks of contagion by COVID-19.
 - The FC must plan the development of the cadaster and consider the scenarios in the field work for the different communes in accordance with the quarantine restrictions and in the face of changes in the "step-by-step" phases imposed by the Government of Chile.

- The number of surveys to be carried out corresponds to the following numbers:

Regions	Informal settlement	Number of households
Antofagasta	17	737
Araucania	50	1147
Arica y Parinacota	10	495
Atacama	31	1766
Aysen	0	0
Biobio	80	5158
Coquimbo	9	378
Los Lagos	29	1460
Los Rios	11	291
Magallanes	0	0
Maule	0	0
Metropolitana	52	8397
Ñuble	0	0
O'Higgins	17	333
Tarapaca	19	3611
Valparaiso	82	9851
Total	407	33624

- 4.9. Build camp risk profiles:** Strengthen analyzes already carried out by MINVU and the Ministry of the Environment, including information related to vulnerabilities and exposure with respect to various threats, such as: forest fires, floods, floods in coastal areas, removal in mass, among others.
- 4.10. Systematize cadaster results:** The use of data processing platforms such as GitHub, PowerBI, R Studio, Python, etc. is estimated. The ability to leave certain capacities installed in the Ministry is evaluated. Ensure that the data model used is consistent with the MINVU Camp System data model.
- 4.11. Prepare final report:** This report must contain a descriptive and multidisciplinary analysis of the information collected, together with the identification of trends, risks, and priorities in the previously defined areas. Specifically, it must contain: i) priorities of the most vulnerable groups, such as migrants, women, children and adolescents, the LGTBQI + population, the indigenous population and those with disabilities; ii) diagnosis of prejudices and stereotypes regarding the migrant population and migrant women; iii) details of the social fabric of these neighborhoods, from the leaderships within the precarious settlements, community organizations, sports, schools, churches, and women's and youth groups; iv) precarious settlements and homes in risk areas for subsequent prioritization of interventions; v) geo-referenced and digitized cartographic maps of all cadastral information of the precarious settlements; vi) energy consumption of the precarious settlements; vii) georeferenced

cartography with the most suitable areas to develop future green spaces.

4.12. Publish data: The report must be accompanied by the presentation of the information in a web application integrated into the IT division of the Ministry of Housing and Urbanism.

5. Expected Outcome and Deliverables

5.1. Deliverable I: Work Plan and Methodology. The first deliverable includes the following products:

- Work plan, information gathering methodology, project schedule, details of activities, organization scheme, quality protocol for data collection.
- Project team, supervisors and surveyors who meet the requirements.
- Information gathering strategy in the field with details of the digital tools to be used.
- Training program for the field team, with a description of the activities, duration of the activity, materials to be used, place and term in which it will be carried out.
- Survey to be carried out that includes multidimensional questions advised by a multidisciplinary team.
- Pilot qualitative and quantitative questionnaire.
- Description of the information to be used or collected to identify the climatic risk profiles of the precarious settlements.

5.2. Deliverable II: Planimetry. The second deliverable includes the following products:

- Aerial photographic processing of the images of the precarious settlements throughout the national territory. It should include: orthophotos, surface models, cross sections, and vector maps that read data from buildings, infrastructures, public and community services.
- Digital planimetries in open and interoperable formats under a universal geospatial language of public property such as Open Street Map based on aerial images of the precarious settlements previously corroborated in the field by experts with the mobile phone application with GPS. The plans should identify the Sites and houses that make up each settlement.

5.3. Deliverable III: Cadaster Results. The third deliverable includes the following products:

- Information on the field work and supervision that contains the questionnaires carried out (number of questionnaires per camp, refusals, return visits, etc.).
- Digital database with complete and detailed information on each of the homes and dwellings that make up the camp. It should include: i) complete, disaggregated and detailed census information for each of the household members, ii) location of each household in the camp polygon, iii) cross-information that combines aerial photographic images with survey information and secondary information from public records; iv) Environmental risk and climate change profiles of the precarious settlements; v) energy and water consumption in housing, as well as transportation needs of the precarious settlements; vi) georeferenced cartography with the most suitable areas to develop future green spaces. Suggested format: geospatial data files (“shapefiles”), so that each record corresponds with some coordinates

that locate it (to your camp site, for example). Ensure that the survey data model is consistent with the MINVU Camp System data model, allowing, without prejudice to the application used, the information contained therein to be captured by said System.

5.4. Deliverable IV: Final report and data construction. The fourth deliverable includes the following products:

- Final report that includes the delivery of all the information collected and worked on during the duration of the cadaster.
- Georeferenced and digitized cartographic maps of all cadastral information.
- Descriptive and multidisciplinary analysis of registered information, together with identification of trends, risks, and priorities. It must clearly identify: i) priorities of migrant groups, women, children, and adolescents, LGTBQI + population, indigenous population, and people with disabilities; ii) diagnosis of prejudices and stereotypes regarding the migrant population and migrant women; iii) details of the social fabric of these neighborhoods; iv) precarious settlements and homes in risk areas (check point 1.15.); v) profile of energy and water consumption of housing and transport needs.
- Training guide.
- Validation and consistency of all (100%) of the data entered the storage cloud provided by the MINVU.
- Presentation of the information in a web application integrated into the IT division of the Ministry.
- Final schedule of the project according to real times.

6. Project Schedule and Milestones

6.1. The Consulting Firm must comply with the following Delivery Schedule:

DELIVERABLE	DELIVERY DATE
<i>Deliverable I</i>	<i>10 days after signing the contract</i>
<i>Deliverable II</i>	<i>30 days after signing the contract</i>
<i>Deliverable III</i>	<i>60 days after signing the contract</i>
<i>Deliverable IV</i>	<i>183 days after signing the contract</i>

7. Reporting Requirements

7.1. All deliverables must be written in Spanish and in the formats specified by the CSC / HUD.

7.2. The CSC / HUD must approve the reports, and if there are observations, the Consulting Firm must rework said document.

8. Acceptance Criteria

8.1. The FC will send the deliverable for final approval by the Bank. If there are observations by the IDB, they will be sent by email directly to the FC, who must respond to them within a maximum

period of five (5) days from the receipt of the IDB email.

- 8.2.** Deliverables should be sent by email in PDF format to Team Leader Luis Felipe Vera Benítez (lfvera@iadb.org). In the case of files that exceed the capacity of the e-mails, the FC may send them in compressed format (.zip) or through the free platform “We transfer”.

9. Other Requirements

- 9.1.** No other requirements are needed.

10. Supervision and Reporting

- 10.1.** Supervision of the activities of the Consulting Firm will be carried out by the IDB Project Manager, Luis Felipe Vera Benítez (CSC / HUD) and / or the alternate team leader, Jennifer Doherty Bigara (CSD / CCS) or Ana Maria Saiz (SCL / MIG).
- 10.2.** Final approval of all deliverables will oversee the IDB Project Manager, Luis Felipe Vera Benítez (CSC / HUD) and / or the team designated by him.

11. Schedule of Payments

- 11.1.** Payment terms will be based on project milestones or deliverables. The Bank does not expect to make advance payments under consulting contracts unless a significant amount of travel is required. The Bank wishes to receive the most competitive cost proposal for the services described herein.
- 11.2.** The IDB Official Exchange Rate indicated in the RFP will be applied for necessary conversions of local currency payments.

Payment Schedule	
<i>Deliverable</i>	%
1. <i>Deliverable I</i>	10%
2. <i>Deliverable II</i>	20%
3. <i>Deliverable III</i>	40%
4. <i>Deliverable IV</i>	30%
TOTAL	100%