Inter-American Development Bank

Do it HERE,Not THERE

Guide for the selection of land to build social infrastructure

Wilhelm Dalaison

Infrastructure and Energy Sector
Social Sector

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Social Infrastructure

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to build social infrastructure

Wilhelm Dalaison

IDB

Contents

1. Background

In 2017, the management of the Infrastructure and Energy Sector (INE/INE) and the management of the Social Sector (SCL/SCL), agreed on the creation of the Social Infrastructure Unit to provide specialized technical support for programs and projects financed by the Bank's Social Sector containing infrastructure components.

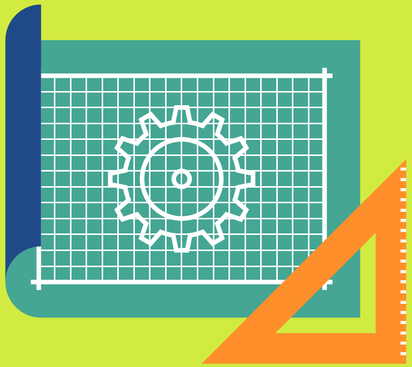
The Social Infrastructure Unit has the following objectives: (i) Strengthen the Social Sector teams, and through them, the executing units, offering technical expertise for the preparation, execution, and supervision of the infrastructure components included in the portfolio of operations; and (ii) Generate knowledge aimed at promoting good practices in planning, procurement, design, construction, and supervision of social infrastructure.

This document is the result of this experience and is aimed at guiding social specialists and executing agencies to improve the land selection for the construction of social infrastructure.

This Guide had the invaluable collaboration of all the members of the Social Infrastructure Unit: José Luis Irigoyen, Marcos Camacho, Livia Minoja, Iciar Hidalgo Roca and Juliana de Moraes (INE/INE), who collaborated in the revision and complementation of the document.

Also, the following people collaborated with their valuable technical contributions according to their areas of competence: Elizabeth Brito and David Maier (VPS/ESG); María Eugenia Roca and Freddy Andara (VPC/FMP); Carlos Rojas (CAN/CCO); Viviana Maya (LEG/SGO); Nidia Hidalgo (SCL/GDI); Ginés Suarez (CSD/RND); and Graham Watkins and Luz Fernández (CSD/CSS).

This Guide was originally written in Spanish. Translated by Fabiana Santos and edited by Juliana de Moraes.



2. Introduction

The selection of the appropriate area for the location is one of the critical aspects that arise at the start of an infrastructure project and has implications throughout its life cycle. This selection has two successive and complementary approaches: a “macro” approach, where the general location is defined, that is, the area in which the building must be built to offer a specific social service and, a “micro” approach, which refers to the specific land selected within that selected area.

The selection of the appropriate location is an essential activity of sectoral planning, particularly in the social sectors (education, health and human development). It is related, in principle, to the analysis of the needs or demands of the infrastructure in a determined area with a general level of accessibility and risks for infrastructure and people before natural hazards. The analysis of the demand for services (education, health, etc.) and urban planning play a predominant role at this stage.

The land selection, on the other hand, provided that is within the selected location, can be one or the other, and its selection will lead to the need for concrete actions that must be taken before or during the development of the design. If these actions are not viable from a technical, legal or economic point of view,[1] the land must be discarded. In that case, another land must be chosen in better conditions, but always within the previously defined location.

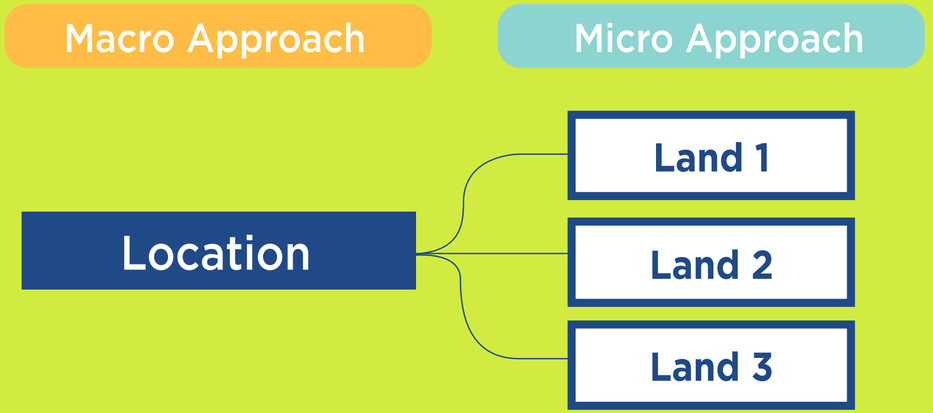
1 Among the technical aspects, the environmental elements, soil type, topography, accessibility, public services, etc., are considered. Within the legal issues, the regulatory aspects and ownership of the land. And, within the economic issues, aspects related to the price of the land and the investment to be made. All of these aspects are identified and developed in this Guide.

Generally, the supply of land in a specific location is not very broad, which makes the choice difficult and, in many cases, conditions the final solution of the project. Therefore, it is necessary to analyze and evaluate the different alternatives before making the selection. The actions required to technically or legally make land viable in some cases may involve high costs or times that exceed the possibilities of the project, and factors that may determine the convenience of finding another land.

Many of the unforeseen events in the design and construction stages, which result in higher costs, delays and claims made by companies, come from aspects related to the chosen land. More upper fillings than expected, lack of public services, lack of access roads in safe conditions, legal problems of the land that require the suspension of works, etc. These problems can reach such a magnitude that they cause the replacement of the land with the construction already started, for not having foreseen situations that had to be analyzed beforehand.

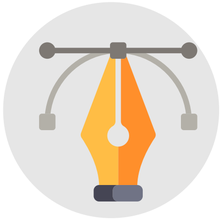
This Guide provides elements of analysis of relevant aspects for selecting the best lands for the construction of social infrastructure. This way, this Guide avoid inconveniences that generate higher costs and delays, conditioning spatial solutions to the detriment of the quality of the infrastructure and of the results expected to be obtained.

The characteristics of the selected land will determine, directly or indirectly, the characteristics of the new infrastructure and, therefore, its operation during the entire life cycle of the project. The land selection in suitable conditions is the first step to guarantee a sustainable infrastructure over time.



3. Objectives

Advise the executing units to improve land selection mechanisms from the technical, environmental, legal and economic point of view before beginning the design stage.



Assist design teams in the identification of all actions or works necessary and verify that they are included in the design in order to avoid unforeseen events that cause higher costs and delays during the construction phase.

Help executing agencies and project team leaders to consider the implications regarding cost and time that the land selection process may have.

Contribute so that the lands selected by the executing units can be better evaluated and in shorter terms by the IDB project teams during the preparation and execution of operations.

4. Program planning: Aspects to consider

Due to its complexity, the land selection process has a direct impact on the programming of the projects and their execution plan. For this reason, the executing agency and the project team leader should have caution and prudence, especially during the preparation stage of the operation.

The **IDB's specific loan programs** must have fully identified which projects will be included and financed by the Bank, which must comply with the requirements established in the sectoral policies and the loan contract,[2] as well as with the Country Financing Parameters (CFP).[3] These projects must be sufficiently analyzed beforehand to guarantee their eligibility. This guide represents a useful tool to ensure that the selected projects are on lands considered under acceptable conditions to the executing agency and the Bank.

In the **IDB's multi-works loan programs**, only a sample of the projects that will be included must have sufficient studies to be considered eligible. These studies, as in the case of specific programs, allow verifying in advance the conditions of the selected land.

However, it is essential to guarantee that the rest of the projects to be included in a multi-works program meet the same conditions by which the corresponding loan was granted.

For these cases, it is recommended that the requirements of the lands of the projects, to be included after the approval of the loan, are established in some way. In that sense, it is suggested to include these characteristics in the Operating Regulations of the Environmental and Social Management Plans (ESMP)[4] and in the Operating Regulations of the Program (ROP). This guide can be a useful tool to establish these characteristics in this instance.

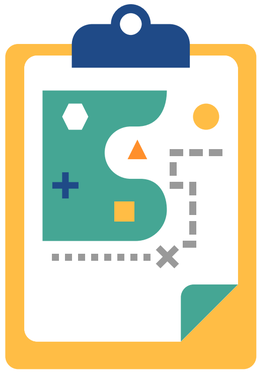
In both types of loan programs, it is necessary to carry out a careful analysis of the land selection process and to include it in the **Program Execution Plan (PEP)**,[5] since carrying out the necessary actions to achieve the viability of the land usually involves different actors. For this reason, the activities must be included in the PEP, and they must be assigned an appropriate term and the corresponding precedence links, allowing control of the project and anticipate possible deviations that may occur.

2 The general mention of the Bank's Policies in this Guide does not include the Acquisition Policies GN-2349-9 for the acquisition of Works and Goods since the land has particular characteristics. See Section 5 - Acquisition of Land.

3 Country Financing Parameters (CFP), provide the general framework for financing by the Bank of all projects in each borrowing country.

4 The description of the content of the ESMP is indicated in the Technical Studies Chapter.

5 Usually recognized as a Multi-annual Execution Plan, MEP.



Also, the **Procurement Plan** must include all studies or specific designs that may be required to determine the viability of the land if funds from the loan program will be used to finance them.

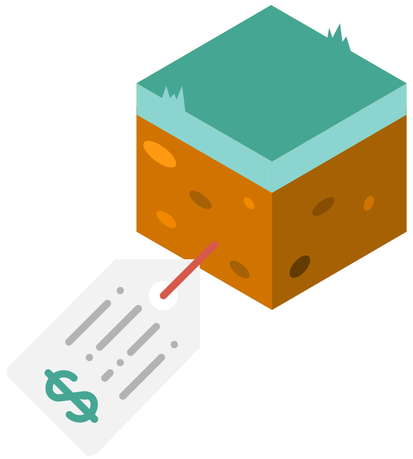
Although the selection of lands is the responsibility of the executing agency, the Bank must ensure the correct application of its policies and should warn if there is any deviation in the programming that puts at risk the realization of the objectives of the program.

In general terms, for the IDB, when selecting a site where it is proposed to build an infrastructure, two norm groups must be considered:

a. Legal Norms, especially the conditions established in the Loan Contract.

b. Environmental and Social Safeguard Policies, through which the requirements that must be considered by projects in environment and social matters are defined. In particular, the project manager and the member of the project team of the Environmental and Social Safeguards Unit (VPS/ESG) must verify compliance with the Bank's policies, such as the Environment and Safeguards Compliance Policy **(OP-703)**, the Policy on Disaster Risk Management **(OP-704)**, Ithe Indigenous Peoples Policy **(OP-765)** and **the Principles and Guidelines for Involuntary Resettlement in IDB projects**.

This Guide incorporates aspects to be considered in the selection of the land such as: land title, accessibility work's needs, the provision of public services and their respective costs, which, complemented by environmental and social aspects, and risk management, contribute to the selection of lands in good and acceptable condition in accordance with Bank policies.



5. Land Acquisition

The acquisition of land is determined according to the specific needs of the project and the multiple factors inherent to the objectives of the project.

Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank **(GN-2349-9)** ndo not contemplate the concept of "land"[6] under the definition of goods. However, the Bank's policy on Expenditure Eligibility **(GN-2331-5** y **CC-6004-2)** allows funds from Bank financing to be used for land acquisition, to the extent that such acquisition is consistent with requirements of the Bank's policy.

In this regard, it should be noted that, in accordance with the Expenditure Eligibility Policy, land acquisition may be an eligible expense insofar as: (i) the cost is part of the project; (ii) it is necessary to obtain the development objectives of the project; (iii) the use of the land is productive in the context of the particular project; and (iv) it is possible to establish input values at market prices that are reasonable and satisfactory for the Bank.[7]

In turn, the Expenditure Eligibility Guidelines contain elements related to the information and procedures that project teams must consider in order to include land acquisition as part of the Bank's financing.

In this sense, the Loan Proposal must explain the arrangements to be used for land acquisition and its use, including: (i) the mechanisms of price definition; (ii) land title and transfer of rights; and (iii) permits and authorizations required for the usage of the land, purchase and usage evaluation.[8]

6 The word "goods" includes commodities, raw materials, machinery, equipment and industrial plants (GN-2349-9, paragraph 1.1, note 3).

7 Expenditure Eligibility Policy (GN-2331-5), paragraph 3.28.

8 Expenditure Eligibility Guidelines (CC-6004-2) paragraphs 4.6 - 4.11.

6. Inter-institutional coordination

In most cases, the infrastructure programs are structured in a centralized manner, with a central executing agency that deals with the overall planning, the preparation of the designs, the procurement processes and the financial management of the project. The local communities are generally, as final users, those who finally receive the work, accept it, make use of it and manage its operation and maintenance.

However, when structuring the program, collaborations with local institutions may arise with the intention of optimizing the processes. In some cases, local executing agencies supervise the work during the construction period. In other cases, the municipalities oversee the complementary actions for the infrastructure, provide land options and/or perform land selection for the construction.[9]

9 The purpose of this Guide is not to establish an assessment of the most appropriate way to plan this inter-institutional collaboration, but to highlight the importance of coordination in any of the selected modalities.

In order to "decentralize" project execution, a coordination between different actors, establishing commitments, defining roles and responsibilities and determining the leadership of the process is required. If the decentralization is poorly designed or managed, it will impact its whole implementation methods, affecting costs and deadlines, and putting at risk the fulfillment of the program's objectives.

In the specific case of land selection, if delegated to a local authority, it is recommended to assign the corresponding functions as soon as possible, and clearly define:

a. What are the minimum characteristics that must be met by the proposed land, especially concerning legality and provision of public services?

b. Request three alternatives of lands to be presented with a prior analysis of the advantages and disadvantages of each one. It will not only guarantee that there will be alternatives to choose from, but it will also minimize the risk that there is no alternative solution if the first land is not viable..

c. Establish a written commitment that guarantees that local authorities will provide the land under acceptable conditions, establishing the respective deadlines with clarity.

In many cases, the local authorities take accountability for certain costs when proposing complementary or necessary works for the operation in order for the project to remain in the program. For example, they suggest options of land lacking the supply of a public service committing to provide such service, or they offer to carry out demolitions including the removal of debris and cleaning of the land.

It is important to consider that, although this can be an advantage for the program by reducing the cost of the investment (since the municipality takes over some of the works), it can also represent a risk. Since it incorporates a new actor

that manages works to be carried out previously, having the municipality pushing for a specific land may affect the critical path to achieve the objective of the program. In these cases, it is preferable that these necessary works are incorporated within the same project plan.

Additionally, it is essential to consider that infrastructure programs are generally developed for periods of 4 or more years, in which local representatives can be changed once or several times, putting at risk the commitments and set deadlines committed by the predecessors.

PRACTICAL CASE 1

The designs of a health center were advanced and had already been approved by some organizations when the mayor reported that the land proposed by his municipality had difficulties and intended to change it. The reality was that the private owner, knowing that the city wanted to buy it for his health center, tripled the price, making it impossible to reach an economic agreement. Upon finding a new land option, two months later, the designer had to be paid for the work done on the discarded land and extended its contract term, generating additional costs.

Lesson learned: Having the land well defined before beginning the design, including its ownership.

The selection and verification of sites must be done before the design contract. In most of the projects, and particularly when trying to implement structures with standardized models, the particularities of the land can imply important costs, mainly due to more earth movements, more accesses and green areas, mitigation measures that may be necessary, etc.

PRACTICAL CASE 2

A consulting firm was hired to carry out a design without having made the corresponding verification of the land, a task that had been delegated to the municipality. When the consultant responsible for the plan went to the site, it was verified that the land was not suitable and communicated to the contractor and the latter to the corresponding municipality, requesting another land. When the municipality reported that it would have another area, the time for the consultancy was already over. Although the period could be extended, the consultant requested payment for fixed costs and the "dead" time while defining another land option.

Lesson learned: Always have more than one option.

It is recommended to pre-select two or three possible lands within the defined location and do the full analysis, including cost analysis. In this way, it is possible to perform a comparative study that will facilitate decision-making based on the advantages and disadvantages of each one. If only one were chosen and then discarded, it would be necessary to look for a new land again. By analyzing several options in advance, the times and costs are reduced.

If inter-institutional work is done and another body provides the land, it must be informed what are the eligibility conditions for the proposed land.

7. Definition of location

The location of an infrastructure within an urbanized or rural area depends on a series of factors that will determine the need for it in one area and not in another. This “macro” analysis covers different perspectives, from which it can be concluded that a particular location is the most appropriate.

The definition of a location is a planning activity in which, with a multidisciplinary approach, different aspects and data are analyzed in the search of the best solution. Disciplines such as sociology, economics, urban planning and - depending on the case - education, public health or social development among others, are those that should analyze the different aspects altogether.

This analysis and the corresponding decision are usually made by the sectoral Ministry or Secretariat, together with the local authorities, and not the executing agency. The executing agency will be responsible for obtaining the best land within the location defined in the planning stage.

If the land is not available in the required location meeting the established technical, environmental, legal and/or economic standards, it must be informed and proposed to the planning team other options before proceeding. The planning team must validate the decision to perform the infrastructure in an area different from the initially defined location.

To define the location of a particular infrastructure, it is recommended to analyze the following aspects:

1. Demand and/or need
2. Accessibility
3. Threats and risks

1. Demand and/or need for an infrastructure: This is the main factor to consider while selecting the location and should include a sectoral (education, health, others) and socio-economic analysis, for defining areas that lack coverage or have insufficient coverage. It should also estimate future projections of demand. The conclusion of this analysis should state: “in this area, this type of infrastructure is needed”.[10]

The definition of the infrastructure construction in a specific location responds to a thorough analysis based on which one should be selected. In order to obtain the pre-defined results, this analysis must be carried out with technical criteria, based on an identified need or demand, which must be resolved through the construction of an infrastructure.

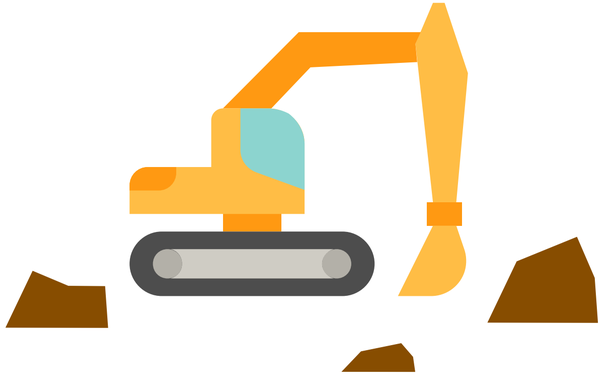
For example, if it is a program to expand secondary school coverage, the percentage of young people who do not attend secondary education should be analyzed due to the lack of educational provisions (institutions in which to participate) as well as the existence of buildings in poor condition and/or overpopulated, and what will be the future demand of this educational level. It will give information on whether it is necessary to increase and/or improve the conditions of existing places.

If it is a primary health care program, it will be necessary to know the epidemiological profile of the population and the existing providers in the area before defining the need for new infrastructure.

Therefore, the analysis and decision on where a specific infrastructure is necessary must be done in a technical manner, based on sectoral planning. This analysis and decision must not count on the criteria drawn from the executing agency analysis, where other aspects might stand out, such as the availability of land, the lowest investment cost, or other facilities of any kind.

2. Accessibility: Social infrastructure, as a “social facility”, involves a large flow of people, for which the analysis of accessibility, including proximity to beneficiaries, public transport coverage, vehicular and pedestrian access, must be considered according to the corresponding urban or rural aspects. The accessibility of the population to social facilities is essential, and for that selected locations must have good connectivity, at least in its coverage or surrounding area.[11]

In rural and remote areas, accessibility is also an essential matter since distances may be long, means of transportation may not be adequate, and roads may not be in good condition. Additionally, during the rainy season rivers may overflow impacting nearby roads and causing the social infrastructure to be unreachable for long periods.



10 The purpose of this Guide is not to develop a methodology for the analysis of supply and demand of infrastructure in a given area. An analysis of this type refers to other aspects and disciplines and must be done prior to the selection of sites for the construction.

11 For example, a health center or a school in an urban area generally has a neighborhood scope, where public and pedestrian transport should be prioritized, but buildings such as universities or hospitals of greater complexity generate another impact in the urban environment and require another type of connectivity, being its area of influence more considerable.

3. Threats and Risks: In all cases, but particularly in certain regions vulnerable to external threats and potential risks, it is necessary to analyze carefully the best location of the infrastructure. This analysis should involve a series of scenarios at the territorial planning level, including the management of risks, should they occur, and the role of the infrastructure in these situations in order to find a safe location.[12]

At the macro level, the threats to be considered may be of natural origin: earthquakes, tsunamis, hurricanes, volcanoes, avalanches, large-scale floods, forest fires; or technological: nuclear plants or dams that may fail.

Given these scenarios, the definition of the location must be accompanied by risk management at the urban and territorial level, and the evacuation measures defined by the local authority.

Signs indicating a tsunami threat zone.
Achao-Chile. Source: IDB.

Signs indicating an evacuation route in case of a tsunami.
Valparaíso-Chile. Source: IDB.

12 Hospitals, for example, must be located in safe areas because they must continue to function in the event of a disaster. Other types of infrastructure can fulfill similar roles in this type of situation, which must be defined by a risk management strategy at the local level.

The incidence of the location in the costs of construction, operation, and maintenance

The location will also have an impact on construction costs and the operation and maintenance of the infrastructure, covering the entire project cycle. For example:

Accessibility. Constructions in remote areas or with access roads in poor condition will define the availability of certain materials and equipment and may raise transportation costs, and consequently construction costs. Also, the operation and maintenance may require certain specialized labor and opportunity for replacement services or supply of inputs that may be conditioned by the remoteness or difficult access to the infrastructure.

Violence and/or criminality. Land located in areas with a high degree of violence can generate situations of insecurity during construction or the operation of the infrastructure. It can raise construction costs considerably. Although these situations are difficult to mitigate, during the design stage special conditions must be foreseen to provide greater security to the infrastructure. These special conditions include perimeter walls, surveillance systems or the use of window protection.

Availability of labor. Building in an area that does not have enough local employment can have an impact on construction costs, since it may be necessary to bring workers from other regions, for which it will be necessary to build a camp or pay housing subsidies. If it is decided to create a field, it will be required to have a land of sufficient size or additional land nerby. Also, it must be considered that mobilizing workers from other areas can generate conflicts with local communities, potentially resulting in significant social impacts.

8. Land selection

The land is the specific lot[13] located within the previously identified location, destined to the construction for certain infrastructure. Their selection depends on a “micro” analysis, where technical, environmental, legal and economic criteria must be considered. The land must comply with characteristics that allow guaranteeing the development of an infrastructure of quality and safety for the users.

Also, considering the time frame for the development of the program, the selection of a particular land may depend on the time required for its viability and when the land is available to begin the construction.

Once the location of the new social infrastructure has been defined, specific plots of land should be identified. It is recommended to determine more than one land and perform an analysis of the alternatives including the advantages and disadvantages of each.

For each land, the different criteria that will determine its viability and its comparative advantage to others must be analyzed in an orderly manner.

It is suggested to consider the following criteria:

1. **Place and surrounding area**
2. **Regulatory analysis**
3. **Legal analysis**
4. **Socio-environmental aspects**
5. **Susceptibility to threats**
6. **Pre-existing buildings**
7. **Shape and dimensions**
8. **Topography**
9. **Accessibility**
10. **Public services**
11. **Costs**
12. **Deadlines**

13 Depending on the country, the term can be land, lot, terrain, plot. The term “land” is used in this Guide.

1. Place and surrounding area: The school or the health center has, for the neighborhood and the community, an emotional and social importance that must be matched with the new construction. In this sense, it is recommended to select a visible and easily recognizable place that allow the building to stand out in its surrounding area.

Existence of noise, dust, smoke, and odors, as well as landfills, septic tanks or any other possible source of contamination should be verified. A land that is near fuel depots or stations, power or phone lines, antennas or minefields should also be carefully examined. Visiting the site, along with the information derived from interviews with the local community, is the best way to verify these conditions.

If a selected land is not located in a fully developed location, regulations for land use determining future developments and compatibility infrastructures should be reviewed. If the land is in an industrial zone, which is not fully developed, it may present a future risk since its surroundings could potentially change.

2. Regulatory analysis: The country and the municipality, where the land is located, must have regulations, requirements and conditioning factors regarding the property and its surrounding area in respect to the project verified. This verification should be done regarding planning, sectoral (e.g., education or health) and environmental standards, and design and construction codes. Also, national, subnational and local regulations must be considered.

In some cases, there are no specific rules for the land and the municipality should be consulted about applicable regulations. Since there are no rules of general application, but decisions from the municipality, the project can be considered of risk. In order to avoid foreseen risks, it is necessary to have written backup documents.

Through this regulatory analysis, it will be possible to establish what are the conditions for the land such as land use, removals, easements, height, need of a parking lot, etc. It may result for the land not to be viable. Failure to take these regulatory aspects into account can lead to delays in construction and even delays in formalizing the construction once it is completed.

Planning standards

The planning standards are generally municipal or local norms, which establish requirements such as land uses, land occupation factor, withdrawals, and available construction height. Included in this category are the Plans of Territorial Ordering at an urban and territorial scale.

Sectoral standards

Sectoral standards are specific to sectors such as education or health, which establish specific conditions for the selection of sites and the design of this type of infrastructure. Annex 2 includes the list of standards for the design of educational infrastructure in some countries of Latin America and the Caribbean.

Environmental standards

Environmental standards are generally established by the national authority that establishes ecological policies. Typically, these norms define procedures and studies to be carried out in the matter and establish sanctions in function of environmental breaches.

Design and construction codes

Design and construction codes refer to specific technical requirements about construction methods, acceptable materials, origin and testing of materials and equipment. These codes are presented according to the specialty, such as, for example, earthquake-resistant codes for structural calculation, or electrical and sanitary systems, norms, measures against fire or air conditioning installations. These codes can be country-specific or internationally recognized standards that are applied by different groups of professionals, such as NFPA or ASHRAE standards.

3. Legal analysis: Property title is very important, especially in some countries where land ownership is a significant problem. The land must be owned by the executing agency and must be legally regularized have titles and records, be free of debts and any legal requirements established by local legislation. In some cases, it is proposed to use donated or fragmented land of which processes must be carried out by the new owner.

Another relevant aspect is that the land must be able to be occupied by the construction company at the time of starting the work without this generating delays or additional costs.[14] The executing agency may own the land but that it is still being occupied wholly or in part by its former owners or other occupants. For this reason, it must be guaranteed that beyond the formalization of documents, the land is unoccupied.

The analysis of this point can lead to the need to carry out administrative or legal procedures that involve costs and deadlines not foreseen by the project, even to having to refrain from using the land.

14 Sometimes, the land is transferred from one agency to another, but they are not vacated by them in time and form, prior to the beginning of construction. Therefore, the contractor must have real possession of the land at the time of the start of works, and it must be correctly delimited.

PRACTICAL CASE 3

During the design phase of a hospital, it was found that the land did not allow the number of parking spaces required by the regulations to be included. The contracting authorities asked the mayor for an exception to the regulations, which was given orally. When the work finished, the mayor of the town was another and did not take over the verbal exception made by his predecessor, demanding the construction of more parking.

Lesson learned: Do not accept verbal commitments, only commitments duly documented.

It is not advisable to analyze the viability of the land based on assumptions that cannot be demonstrated or verbal commitments without technical-legal support.

PRACTICAL CASE 4

Land located in a central and well-consolidated area was chosen for the realization of a tertiary educational center. The land allowed the development of the project, including the realization of the parking lots at a level in the subsoil. Once the design was completed, it was found that the area was declared of patrimonial interest because of its historic value, and particular design parameters that had not been considered, including the height limit of the building. The design was exceeding on a floor the maximum allowed height, and it had to be redone for another land.

Lesson learned: Review all applicable regulations before selecting the land and performing the design.

A meticulous compilation of the regulations that apply for the type of construction and for the area and land to be evaluated must be made. Ignoring the regulations can cause later complications that can even lead to the failure to enable the infrastructure once it is completed.

Land for sale.
Santiago de los Caballeros,
Dominican Republic.

In many cases, during the planning phase of a project, the land is not yet owned by the executing agency. However, it is recommended that the executor owns the land at the time of approval of the operation. If this is not possible, it is recommended to move forward with the project, but never make the call for bids for the construction before the executing agency owns the land.

The executing agency must carefully plan the necessary steps for the legal regulation of the land, including it in its programming, and consider the risks involved in moving forward with the design process without owning the land.

The corresponding measures must be taken, assign responsibilities and strictly monitor the progress of the legal regulation process until there is assurance that the corresponding call for bids is feasible

4. Socio-environmental aspects:
In addition to complying with the requirements established by the Bank's and the country's regulations, the environmental aspects should also be analyzed. There should not be an impact on the biodiversity of the land due to the construction or subsequent use (for example, with the excessive cutting of trees). Also, it should be avoided to build in areas of cultural heritage or archaeological importance.[15]

Another relevant aspect for the investigation is the previous usage of the land to evaluate possible deferred environmental risks. If factories or deposits were installed that may contain lags of polluting residues, the land should be further investigated, and if the existence of waste is confirmed, it should be discarded. There may also be landfills, garbage dumps, abandoned or closed.

From a social point of view, under Bank regulations, it must be verified that there are no occupants who could be displaced, or rights of way that may condition the project. In the field, there may also be, for example, agricultural fields belonging to people who, although they do not permanently occupy the land, benefits

15 In some areas, the possible appearance of archaeological remains in the excavations is highly probable. Therefore, it must be foreseen how to act in those situations, as well as the implication that can have in the development of the construction.

from working in that field. In these cases, voluntary withdrawal and adequate compensation must be guaranteed, which must be financed by the project.[16]

This socio-environmental analysis can lead to mitigation or compensation measures that imply additional costs for the project.

All of the measures indicated, in addition to having an impact on costs, will affect the program's schedules which should be included in the programming, particularly in the PEP, and managed carefully by the executing agency.

In particular, the IDB, through the Environmental and Social Safeguards Unit (VPS/ESG), defines the guidelines that projects must comply with based on the impact and risks of the operation, as well as the different categories of actions with the technical studies required.[17] Although the VPS/ESG analysis includes the entire project, a fundamental part of it focuses on the particularities of the selected site and its environment, including environmental and social aspects, which must be addressed by the Bank's policies.

In some cases, the national or local environmental authority requires environmental impact studies and specific approvals and defines the need for compensation measures, which may or may not be carried out within the premises. The realization of this compensation can include from the replacement of removed trees in another part of the country. The completion of these works and the necessary approvals must be included in the project.

Land with a soccer field for community use.
Although it is not a formal field, using the land for the construction of new infrastructure may imply the need for compensatory measures, including the construction of a new field in another site. Manaus-Brazil.

Land with abundant vegetation.
The need to cut down this vegetation will require compensatory measures, probably reforestation of some surrounding areas of the land or elsewhere. Manaus-Brazil.

16 For cases of projects financed by the IDB, the Environmental and Social Safeguards Unit (VPS/ESG) will verify whether the people who lived or worked (including agricultural and subsistence activities) on the land were removed or left voluntarily if they were relocated and compensated. It is important that all evidence obtained be maintained to demonstrate compliance with OP-710.

17 See "Environmental Policy and Compliance with Safeguards - OP-703". Generally, social infrastructure projects, because they are of little impact and contain mitigation measures included in it, are defined as Category B, provided that the mitigation measures have been identified and included in the project..

Environmental and social impact of construction

Infrastructure projects generate environmental and social impacts both in the construction and in the operation stage. These impacts, which may be high or low, positive or negative, must be identified by carrying out an analysis during the planning stage and the mitigation measures implemented after the execution of the project.

This analysis, which must be carried out by the executing agency, must include all the works necessary for the viability of the land and the future operation of the building, such as access works, provision of public services, or mitigation works against threats, and even demolitions and the final disposal of waste.

The IDB, through the Environmental and Social Safeguards Unit (VPS/ESG), carries out the verification of these aspects and validates the proposed mitigation measures.

When selecting the land, it is essential that all the necessary works and their implications are identified before making the final decision. If the selection of the land implies the realization of works, these must be included in the design and scope of the construction, including the necessary safeguard measures.

5. Susceptibility to threats:[18]

It is necessary to identify the possible dangers that may arise and their risk of affecting the land and the future infrastructure, through a susceptibility analysis of the land.

This analysis must include at least the verification of the susceptibility[19] of the land to floods, landslides, avalanches, waterlogging, or scouring of rivers, etc., as well as any other type of possible threat of natural or human origin. The presence of volcanoes or frequency of earthquakes can be the source of risky situations in the future, as well as the presence of industrial plants, high voltage lines or gas pipelines. It is important for this analysis to know the antecedents of the land, to know if the area or its surroundings have ever suffered similar situations, or if there is evidence of a progressive deterioration of situations that represent a future risk. For this point, it is essential to know the history of the area and talk with the residents.

Generally, this analysis is carried out with a visit to the site by a professional, who determines the susceptibility of the land based on observation of the land itself, its surrounding area (distance to water courses, slopes of land, age of vegetation, type of rock surface, presence of waterlogging, etc.) and on secondary information (for example, through the Geographic Information System (GIS), geological data, frequency and amount of rainfall or a rate of earthquakes or windstorms and tropical storms).

In some cases, this susceptibility analysis may define the non-viability of the land. If a high or medium susceptibility is identified and the possibility of mitigation measures considered, compensatory measures or a more in-depth analysis of the risk is required. For that, detailed studies by specialized professionals will be necessary, for which it is recommended to apply the guidelines defined by VPS/ESG for specific risk studies.

The IDB, through VPS/ESG, defines the guidelines to be used in the operations, qualifying them as a high, moderate or low-risk. If the operation contains projects, they are also classified. This classification arises from the analysis of the characteristics of the threats, the vulnerability of the sector and the project area and is measured according to the frequency and intensity of the threat and the magnitude and extent of the consequences (impact). Depending on the risk, the IDB may require a specific study of disaster risk.[20]

Sinking or lateral erosion of river.
Conde-Haití.

18 In some cases, it is possible to carry out a broader Risk Study, which includes the susceptibility to threats, the socio-environmental aspects, the existing environment, and the topography.

19 The susceptibility analysis aims to establish in a field the greater or lesser propensity to natural threats based on the analysis of the different factors that condition these threats. The first geomorphological and qualitative approach is based on expert criteria, obviating the difficulty and cost of carrying out a disaster risk study, something that is beyond the scope of the feasibility analysis carried out in some investment projects.

20 Generally, in low risk projects, no specific studies are necessary, and in moderate risk projects, studies are defined based on the criteria of the project team. For projects considered high risk, the Bank requests specific studies of disaster risks. See “Guidelines for the Application of the Disaster Risk Management Policy” of OP-704.

Additionally, and about the risk of natural disasters,[21] the IDB establishes in its sectoral policy that it will not finance projects that, according to its analysis, increase the threat of loss of human lives, significant injuries, major economic disorders or serious material damage attributable to natural threats.[22] This implies that a careful analysis of the place must be made to verify that the location does not contribute to exposing goods and populations to natural disasters.

Annex 3 includes references to some publications with methodologies for assessing and analyzing the susceptibility to different types of threats in the field.

6. Pre-existing constructions: It must be verified whether there are constructions in the land,[23] and the new infrastructure can make use of them or if they must be demolished, in which case it is probable that the project would be responsible for the costs.

Generally, when the project intends to use new repetitive models, the possible use of existing buildings is discarded, because it would imply a specific or partial design of the new building incorporating the existing structure. However, in other cases, depending on the architectural value of the pre-existing building and its versatility, it can be chosen to keep it for non-complex use.[24]

If it is decided to reuse existing structures, a technical evaluation of the state of the structure and the possibility of reusing it must be made. This study will depend on the state of the existing structure and what it is intended to do with it, including potential tests. Moreover, if the existing infrastructure was built in compliance with previous regulations, the current construction requirements may include specific structural reinforcements or even its total demolition.

Should an evaluation study of the existing structure be necessary, the corresponding costs must be included in the project. It is also required to consider the selection of a professional and their time preparing of the study itself.

Existing construction.
Depending on the state of an existing construction and the flexibility of the project to be built, the designer could choose to maintain the existing construction by reusing it or demolishing it completely and replacing it with a new building. Santiago de los Caballeros, Dominican Republic.

21 The risk of disasters is the "Probability of harmful consequences or anticipated losses (deaths, injuries, property, means of subsistence, interruption of economic activity or environmental deterioration) due to the interactions between natural or anthropogenic threats and conditions of vulnerability." See "Guidelines for the Application of the Disaster Risk Management Policy" of OP-704.

22 Policy on Disaster Risk Management (OP-704).

23 It should also be considered that there may be old buried facilities or garbage dumps that are not easily visible. It happens with foundations or underground facilities that may have been left over from previous uses.

24 For example, in some cases you can choose to use an existing building as offices, classrooms, consulting rooms or exhibition spaces, and build a new building for more complex areas such as laboratories or hospitals.

Social infrastructure in the face of climate change

There are two types of strategies to be addressed regarding climate change: mitigation measures and adaptation measures.

Mitigation measures to climate change are aimed to reducing greenhouse gas emissions and, in the case of infrastructure, focus on strategies aimed to energy saving, the use of renewable energy and the reduction of the carbon footprint.

Adaptation measures focus on ensuring that the infrastructure adapts to the effects of climate change, so that it is more resistant to disasters that occur more frequently and intensely.

During at the Land Selection phase, mitigation and adaptation measures should be considered using the approaches below:

Mitigation

- Land in an area where local raw materials are available, which would reduce the commute of transporting them from further regions.
- Lands that do not require the cutting of native trees, or that have enough area to replace or even increase the number of trees or green spaces.

Adaptation

- Safe lands, without threats due to climate-related effects, such as floods, mudslides or scouring of rivers.
- Accessible land that allows refuge in case of natural disasters or that can continue to be enabled in adverse weather conditions.

7. Shape and dimensions: The land must be large enough to house the desired building and to provide for an area of future growth. Generally, there is local regulation in that sense, but at least one sector of the land should be free for future growth, without considering the areas of recreation, agriculture, services, etc., that the project may require.

In exceptional cases, where the regulations enable it, or in densely populated and urbanized areas, it may be possible to resolve future growth during the design stage, through the possibility of a structural design that allows vertical growth of the building. In urban areas, sufficient parking should be provided, especially for projects such as hospitals or universities.

The shape of the land should be as regular as possible and allowing for a functional design. Very narrow or elongated lands are not suitable because they condition the project, which generates higher construction costs.[25] Also, the shape of the land should allow the correct location and orientation of the building.

It is important to bear in mind that in cases where there are no public services such as electricity, drinking water, sanitation or waste disposal, which must be resolved *in situ*, the land must have enough surface area to be able to implement solutions.

Regularity and similarity between lands are key in the programs where a building prototype is to be repeated. If the land has particularities, the designs must be specific, with increases in costs and time for its construction.

PRACTICAL CASE 5

The selection of large areas for the construction of schools allowed that, when the educational model was updated by extending primary education from 6 to 9 years, modules of 3 classrooms could easily be added in the existing grounds years after having finished the first phase of building.

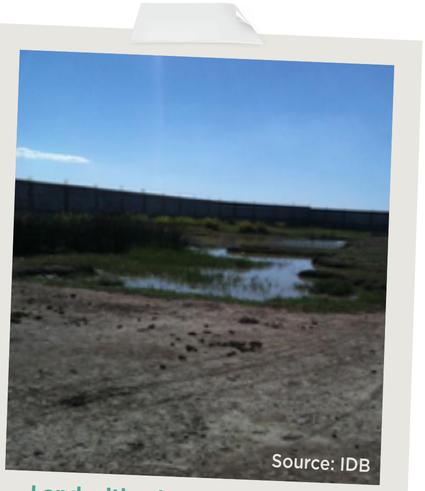
Lesson learned: Select lands with enough area for future expansions.

Even if no extensions are planned, it is necessary to identify land with enough space for future growth. Obtaining land under technical, environmental, legal and economic conditions for the construction of social infrastructure is very difficult and foreseeing large areas with space for future growth is one of the best ways to mitigate/avoid subsequent problems.

25 A design that has been studied to maximize its functionality and reduce the number of square meters, when trying to implant in an irregular land, will require adjustments that will imply greater lengths and with higher costs.

8. Topography: Very irregular or steep land can generate many problems in the design and construction stage. It is advisable to choose land as levelled as possible, avoiding the need for considerable excavations and landfills.

The presence of watercourses, tributaries, runoff signals, wells or trees that will need to be cut off, must be reviewed. It should be verified that the land allows natural drainage, does not have a very high-water table and that the type of soil allows a natural excavation. More specific studies should be considered if needed.



Land with a lagoon and natural drainage difficulties

Declos-Haití.

Land with slopes and showing signs of runoff from higher ground.

Noel Monereau-Haiti.

PRACTICAL CASE 6

A consultant designed a prototype for the construction of health centers, a single level and an area of 3,500 square meters, ideal for building on flat land. One of the properties on which that prototype would be built had a steep slope so that the building would be supported by columns of 6 meters in the lowest part of the land.

Lesson learned: Select lands with similar characteristics.

If you intend to build typologies of buildings in a repetitive way, the selected lands must meet similar characteristics, which allow the technical resolution of the project in an agile manner and at reasonable costs. Otherwise, the initial idea of a building based on prototypes to reduce time and expenses will fail, because the prototypes must be modified and adapted to the particularities of each land, generating higher costs and significant delays. As indicated above, it is suggested to define initial basic guidelines before selecting the land, especially if the land proposal is made by another agency.

9. Accessibility: The land must have guaranteed access roads both for vehicles and for pedestrians so that the infrastructure can be built and later used in safe conditions, regardless of weather conditions. If accessibility cannot be guaranteed, the design and construction of roads must be incorporated into the cost of the project, even if it is outside the boundaries of the land. Ideally, the design should be developed by the same designer or the same contractor. The existence of roads is essential to connect the new infrastructure with the existing road network, and its costs are generally high. If the land is in a remote rural area, it must provide good access for users and also connection for the people who will work on the construction of the project and in the operation of the infrastructure.

Ideally, if it is in an urban or suburban location, the land should have direct access to two streets[26] (either on the corner or opposite streets) not only for functional reasons, but also to guarantee evacuation in case of emergencies or access by firefighters.

Accesses should also be analyzed from a road safety standpoint, defining the need for pedestrian crossings, traffic lights, etc.

The public transportation system must be analyzed, including the identification of the nearest stops and those that will generate the greatest commute, and what are the implications of the use of public transportation on road safety.

If it is expected that the designs of the access works will be developed by the same project designer, their terms of reference should state such expectation in order to avoid contractual modifications. In this case, access works must also be included in the works schedule.

In case the local authority takes the responsibility of the works outside of the land, the activity must also be incorporated into the schedule with its deadlines and costs properly assigned. A delay in design and construction process may negatively affect the objectives of the program.

Land on a road that will require the construction of a pedestrian path in its perimeter.
Manaus-Brazil.

Public transport stop on the road in front of the selected land.
Surely, it will be necessary to make a safe pedestrian crossing to the other side of the road.
Santo Domingo, Dominican Republic.

26 In some cases, such as hospitals, several points of contact with public roads is necessary because there are different flows of people that should preferably be maintained independently: ambulances, patients, clinics, personnel, waste disposal, removal of corpses, supplies, etc.

10. Public Services: A crucial issue is the presence of public services in the land. If the land does not count with adequate public services, their provision must be included in the project, including costs and related designs. Regarding public services, such as accessibility, options can vary depending on urban, peri-urban or rural areas.

The existence of services such as electricity, drinking water, sanitation, final disposal of waste or internet is essential for the operation of the infrastructure.

As for accessibility works, if the designs necessary to equip the land with public services is performed by the same designer who does the infrastructure, their terms of reference should be adjusted accordingly.

If the local authority or the company providing the corresponding service takes responsibility of the public services works outside of the area, it should be included in the program schedule with deadlines and costs. A delay in the process can negatively affect the objectives of the program.

Generally, when there are public services, the companies providing them grant feasibility certificates or service availability. If this does not happen, or even in cases where the corresponding certificates are obtained, the project may need to undertake further studies in charge. These are hydrogeological studies and/or water quality studies that are required when there is no water supply network system.

When there are no public service providers, specific designs to provide them is necessary and must be included program schedule. These specific designs usually have high costs.

If that there are some services, either that have existed, but are currently in disuse, collapsed or the supply does not correspond to the demand, retrofitting works must be included in the project.

Also, the implementation of technical solutions to equip the project with public services may require a larger land area of necessary for the project. In rural areas, for example, it is not common for public entities to collect and properly dispose waste. In that sense, it is important to verify that there is space on the land to do on-site management. Something similar happens with the provision of electricity, the supply of drinking water and sanitation facilities.

The specific designs of public services provision may be included in the plan of the infrastructure itself or contracted separately, in which case the necessary terms of reference must be drafted accordingly.

Existing sewage installations out of service due to the presence of waste, and lack of coverage.
The project must include the adaptation works of the existing network. Santo Domingo, Dominican Republic.

The lack of public services as an opportunity

In some very remote areas, or even in some urban areas, the land does not have certain public services such as water supply, sanitation or energy. In some places, the service exists, but its supply is irregular or present only during certain hours of the day.

It is evident that buildings require public services under optimal conditions, and particularly in some cases, such as buildings for health care, the consistent and reliable provision of these services is essential.

The lack of these services must be resolved during the design stage. Technically complex and expensive solutions are usually needed, and it is necessary to study the possibility of using innovative ideas to find better answers.

In this sense, it is possible to incorporate the use of renewable energies, energy savings and even the use of rainwater, solving the problem of providing essential services and contributing as a mitigation measure to climate change.

Although these technical solutions correspond to the design stage, the fact that the land does not have public service supplies is not necessarily a problem. However, the cost of including such provisions must be included the cost of the project.

Based on public services provisions, why not think about renewable energies and sustainable projects?

11. Cost: Traditionally, the price of the land has been the only or one of the only factors considered on land selection, failing to consider other costs. In some cases, it is been prioritized to look for donated land, including portfolio of State lands or other organisms, assuming it would mean zero cost.

If the Bank finances the purchase of land, the corresponding policy, and the most appropriate mechanism should be applied. It will be necessary to maintain a certain level of discretion while negotiating, as the cost of the land is not the final cost. It may vary according to the location, accessibility and public services costs, as well as the surround area aspects that may affect the final cost.[27] In some cases, price speculations affect the final land cost. These speculations must be monitored closely before making the purchase decision.

In any of the cases, whether it is acquiring or using one already available and viable, the land must meet specific technical and legal characteristics. Thus, it is suggested waiting to purchase the land until its viability for the expected purpose is guaranteed.

In this sense, when carrying out cost analysis, in addition to its market price, other conditioning factors or investments necessary for its viability must be considered:

(i) Legal regulation of the land, including legal procedures, payment of previous debts, fractionation needs, etc.

(ii) Realization of improvements or compensatory works drawn from the corresponding environmental evaluation.

(iii) Elimination or mitigation works necessary to reduce the vulnerability of the future infrastructure including retaining walls, slopes, elevations of the land, etc.

(iv) Demolition of all existing construction not useful for the project, including the removal of all debris.

27 In some cases, properties have been occupied during the negotiation process, with the intention of obtaining benefits through the application of the policies for voluntary resettlement.

(v) Increase in design and construction surface derived from the land conditions, which may require an extension of the building and more square meters.

(vi) Vehicular or pedestrian access roads are necessary to connect the land with the existing road network or the population centers.

(vii) Provision of lacking public services in the area, including connection to existing systems or the specific solution for infrastructure on or off the land.

(viii) Any other additional cost that may require the viability of the land.

It is possible that, in some cases, technical studies are necessary to determine the viability of the technical solutions and/or the costs.

This analysis determines the total cost of the land and the rationality of the investment, compared to the other possible alternatives

It is important to define economic parameters for the analysis of the total cost of the land, depending on the total cost of the project, guaranteeing that it is reasonable and amortizable during the entire life cycle of the project.

PRACTICAL CASE 7

A school should be designed in an extremely remote rural area, and the area lacks sanitation service and cleaned septic tanks. After long technical discussions, it was concluded that latrines should be made, a prevalent system in rural areas. The solution could have been viable, except that the selected land had too high of a water table, and the installation of latrines would have caused the contamination of the groundwater. The system had to be modified, and chemical waste treatment systems were incorporated in place of latrines. The selected system included a higher operating cost than originally planned, which had to be absorbed by the school during the operation stage.

Lesson learned: The particularities of the site determine the technical solutions and operating costs.

The lack of public services is persistent in the land and not only in the rural area. There are urban sectors that do not have potable water, or sanitation network services. The projects must include adequate technical solutions while complying with standards, guaranteeing safety for people and the environment, presenting reasonable construction costs and future operations, and ensuring the sustainability.

12. Deadlines: As well as cost, in the process of land selection it is important to consider the factor of time. Setting deadlines determines the opportunity to have available land when needed and the viability to include it in the program.

The necessary actions that provide land viability and suitable conditions established in the objectives of the program must be included as activities within the program itself. These activities, with their corresponding times and costs, affect the development of the program.

In this sense, and as already mentioned, it is essential to consider deadlines involving the hiring of consulting services, where appropriate, for the development of specific actions such as:

(i) Legal regularization of the land, including legal procedures, payment of previous debts, fraction needs, etc.

(ii) Management to implement and specify the voluntary transfer of the occupants and/or the removal of existing facilities in the area.

(iii) Realization of procedures and studies related to the environmental management of the land.

(iv) Carrying out detailed studies of disaster risks.

(v) Realization of a verification report for the state of existing structures intended to be maintained in the new project.

(vi) Realization of specific land designs, a product regarding the land's shape, dimensions, and topography.

(vii) Realization of studies or road works essential for the land to be in suitable conditions.

(viii) Realization of studies or works for the provision of public services, necessary for the land to be under appropriate conditions.

(ix) Any other factor affecting the project's execution deadlines drawn from the selected land.

The following table describes each of the 12 identified aspects the land should fulfill, and which ones can be "solved" in the design stage.

The design stage aspects must be included in the cost analysis of the land as well as the time needed to make each of them viable, especially when analyzing all the alternatives.

Table 1: Aspects to consider during land selection. Essential and tolerable or solvable aspects during the design stage.

	Essential (if not fulfilled, it will require another land)	Possible to solve during the design stage
1. Place and surrounding area	The land must be in the location defined in the MACRO analysis. If the environmental conditions are not considered safe or adequate for the function of the infrastructure or people, the land must be discarded.	n/a
2. Normative analysis	The regulations established for the design and construction of the infrastructure applicable to the selected land must be complied with.	In some cases, exceptions may be requested, which must be made quickly and effectively. It is recommended not to accept verbal commitments. All requests must be written.
3. Legal analysis	The land must be owned by the executing agency, the sectoral agency or another state agency. If owned by another state agency, it must be transferred for the executing agency or sector - whichever corresponds. In some cases, the land is given to the executing agency or the sectoral but not owned by any. The legal status of the land and the period of the assignment, before deciding if the land can be used, should be clearly stated. It is important to ensure that there can be no claims from former occupants or owners.	n/a
4. Socio-environmental aspects	The land must be discarded if the cost of mitigation measures or damage to the environment and biodiversity is such that it does not justify its selection. If the land has a history of having polluting residues, it must be analyzed and, if necessary, discarded.	Specific studies will determine the measures of elimination, mitigation or compensation. In some cases, the removal of possible sources of contamination must be included in the project, provided that the costs are reasonable. If the land has occupants, their resettlement must be done voluntarily and followed by IDB policies, which includes compensation costs within the cost of the project.
5. Susceptibility to threats	If the land presents high vulnerability to risks that cannot be resolved with reasonable technical and economic measures, it must be discarded. If the necessary technical solution exceeds the possibilities or scope of the project, it must also be discarded.	The elimination, mitigation and compensation measures must be included in the project.
6. Pre-existing constructions	It must be discarded if the demolition or retrofit of existing buildings presents an excessive cost.	In some cases, it is possible to adapt old constructions for new applications. However, these adaptations must comply with their intended use and current regulations.

	Essential (if not fulfilled, it will require another land)	Possible to solve during the design stage
7. Shape and dimensions	It must be discarded if there is a specific normative requirement that makes the land unviable due to its shape or dimensions.	During the design stage, it is possible to find an architectural solution that adapts shape and size of the land to the project objectives. However, such solution might have higher costs.
8. Topography	In addition to what has been verified regarding susceptibility to threats, if the natural drainage is complicated presenting the possibility of waterlogging, or there are surface water tributaries, its technical solution is costly, and the land must be discarded.	During the design stage, it is possible to find a technical solution that adapts to the conditions of the topography and the height of the water table. However, these solutions might have higher costs.
9. Accessibility	It should only be discarded if the value of carrying out roadworks or access (for example, bridges or pedestrian accesses) is such that the total cost is much higher than other alternatives.	During the design stage, it is possible to include roadworks or access works. Both must be included in the costs.
10. Public services	It should only be discarded if the cost of including the provision of public services is such that the total cost is much greater than other alternatives.	During the design stage, it is possible to include the provision of public service systems. There must be enough space to develop these adaptations and their costs must be included in the program.
11. Cost	A parameter must be defined to consider a reasonable cost regarding the total cost of the land in relation to the total cost of the project	n/a
12. Deadlines	If the time necessary for the viability of the land is exceeded or jeopardizes the development of the project within the terms of the program, the land must be discarded.	n/a

9. Analysis of alternatives

Once the different aspects of each land have been analyzed, it is necessary to carry out a comparative analysis between the various options available to choose the best land based on advantages and disadvantages.

Generally, the analysis is done with quantitative aspects, specifically with the cost of the land,[28] but it is advisable also to carry out a qualitative and weighted analysis considering the deadlines related to each of the options.

The analysis of the land must be carried out according to the geographical area of the project, along with local social conditions. For example, in mountainous regions, it will be challenging to obtain flat land, or in certain indigenous communities, the land ownership system may be collective, so there will never be an individual property title.

Something similar happens regarding accessibility and availability of public services in urban, peri-urban or rural areas.

In urban areas, if the land does not have a defined service, it can be discarded in favor of another nearby property. In rural areas, the lack of public services and the costs for their provision among the different alternatives tend to be similar, so it is not usually a decisive factor.

The comparative analysis seeks to evaluate the advantages and disadvantages of one option over another, to obtain the best land within the available options. The selection must be weighted and evaluated according to the results in the different points analyzed. For example, it may be better to have a well-located land that must be filled to avoid getting flooded, to a remote area that does not risk flooding.

There is also the possibility of using specific software that helps to assess and weigh certain aspects to be analyzed, systematizing the processes and incorporating technology that facilitates decision making. The use of these analytical methods or integrated information systems should never replace the site visit and the technical assessment but should be a tool to help and facilitate the selection and analysis of data.

28 However, this Guide has already explained that the cost of land is not only its market price.

It must be considered that the priority is always the infrastructure construction that has been determined as necessary in a defined location. At the end of the process, it is important to be sure that the best land available was selected and the aspects will be resolved during the design stage.

In Annex 1, an instrument is presented to qualify the different characteristics of land comparing different options. The instrument may be adjusted to the particularities of each country, its regulations, and the type of the project, and represents only one example of a possible way to perform a comparative analysis. Each executor will be able to design their multi-criteria system, where the land characteristics will be defined objectively, and compared, or a standard multi-criteria selection software can be used.

In the example in Annex 1, each of the characteristics of the land has been graded to help get an idea of which one is better. In this sense, the score of each land acquire relevance according to the 12 items evaluated. The final total value is included for reference purposes.

It is not considered appropriate to base the selection exclusively on the final total score of each land. There are particular characteristics, some of them considered essential, that must be taken into account.

The selected land will emerge from the qualitative analysis, in addition to the numerical results. These results must be analyzed and compared, and the property with the highest score will not necessarily be selected.

10. Land visits

All the lands that are evaluated must be visited during the evaluation and before making the final decision.

The feasibility analysis of the land cannot be valid without a visit. While most of the work can be done from a desk by reading standards, documents and aerial photos (secondary sources), it is essential to visit the area in order to collect additional information and to verify in situ that these papers reflect reality. This visit is not only crucial to verify the veracity of the documentation, but to check any updated information on the land.

The visit should allow a direct interaction of the land and its surroundings, the inhabitants and local authorities to know the antecedents of the land and to do a complete photographic survey.

PRACTICAL CASE 8

A design consultant had discarded a land intended for the construction of a school with the argument that a sewage line crossed it. Based on this argument, the consultant requested the completion of an additional detailed study and an extension of time and increase of costs to carry out the canalization of the canal. When the supervising technicians went to visit the land, they verified that the sewage line did not cross the area, but was 50 meters away, on the other side of the road.

Lesson learned: Visit all fields, even if they have been discarded.

The analysis of all legal, technical, environmental and economic aspects to determine the viability of the land cannot be complete if there is no visit made by a technician with the ability to verify and assess *in situ* what is stated in the documents.

11. Technical studies

After selecting the land, additional technical studies[29] are necessary complementing those carried out in the analysis stage. These studies are necessary to define specific characteristics of the new infrastructure, but they should not lead to major changes in the selection of the land.

However, in some exceptional cases, these studies may conclude that the characteristics of the prospective construction and its costs are such as to propose a change of land.

As mentioned above, the development and hiring of these studies affects the costs and times of the program. Thus, a strategy must be well designed so that these studies do not negatively affect the development of the program.

Among the technical studies, this Guide highlights the following:

1. Topographic Study: It is an essential study that yields detailed information on the characteristics of the land surface, specifically the relief represented by level curves. This study also locates other natural components such as rivers, reservoirs or rocky areas and built elements as fences, buildings, and records of public services. Topographic studies must provide the coordinates of the land in X, Y and Z.

In some cases, for the determination of the limits or legal boundaries of the land, it is necessary to carry out a topographical survey,[30] for which the topographic research is not only an instrument of exclusively professional use, but also of legal use.

2. Soil study: An essential analysis that yields information on the characteristics of the subsoil, including the types of materials, the load capacity at different depths and design recommendations for the architectural design and for the structural project proposals. Soil samples are collected and analyzed in certified laboratories in order to obtain conclusions.

In some cases, the geotechnical specialist also makes recommendations on the materials to be used for the completion of fillings or slopes.

There are different criteria on the time and scope at which the soil study should be carried out. It is recommended to perform the soil study once you have a basic layout of the building to ensure that the soil samples are collected from precise places where the construction is planned to take place.

29 It is not the purpose of this Guide to describe in detail the contents that these studies should have, for which the description made of each one is for explanatory purposes only. These descriptions should not be used as technical specifications of the contents that each study should have.

30 The geotechnical specialist is the professional responsible for carrying out soil studies

3. Environmental Evaluation: The projects financed by the IDB must comply with the policies and guidelines set forth in the Bank's regulations and verified by the project team leader with the support of VPS/ESG. Depending on the category of the operation and the level of risk it presents, it may be necessary to perform: An Environmental Impact Assessment (EIA), a Strategic Environmental Assessments (SEA) with its Environmental and Social Management Framework (ESMF) or an Environmental and Social Management Plan (ESMP) and also an environmental and/or socio-cultural analysis. The SEA and ESMF only apply to a set of projects (plan, program or policy). In the case of individual buildings, another environmental analysis and an ESMP or a sociocultural analysis will probably be required.

The operations identified as Category A and B, in addition to requiring specific studies, will also require consultations with the affected parties (at least two consultations for Category A and one consultation for Category B) and consider their viewpoints. Other related parties may also be consulted.[31]

In some countries, depending on the type of infrastructure, national regulations require environmental impact studies or other environmental studies, defining the standard specific requirements and the scope of the infrastructure.

4. Detailed study of disaster risks:[32]
A deep or detailed hazards and/or risks study of the land may be necessary should the susceptibility analysis fail to estimate the degree of threats, vulnerability, and risks that may occur in the area during or after the construction of the infrastructure. The development of these studies requests the use of technical equipment, recognition of models, simulations and the use of specific software. All these requirements may present higher costs and potential delays to the program. If the study is carried out, VPS/ESG guidelines should be followed.

If the social infrastructure involves small-scale projects on small-scale land[33] generally this kind of studies is not justified. Should there be evidence of the need to carry out these studies, it is recommended to select another land.

In some cases, the threat is present in an entire region, and its analysis requires studies at the macro level determining mitigation actions at a regional level. In these cases, the scope of the social infrastructure project exceeds what can be mitigated in the specific area. The recommendations stated at the macro level must be acknowledged and considered.[34]

5. Hydrogeological Study: In some cases, when it is intended to use water supply through drilled wells, it is necessary to study the availability of water in the area, and the possible impact to the rest of the groundwater system. These studies determine the characteristics of the wells and the conditions and frequency at which the water can be extracted. This type of studies is generally regulated by local water regulatory authorities or environmental agencies.

31 For more details, check the "Environmental Policy and Compliance with Safeguards OP-703", Part B.

32 In the case of projects financed by the IDB, once the project has been classified as high risk, a report "Disaster Risk Assessment" should be prepared to determine in more detail the impacts of the threats and the selection of appropriate management and mitigation measures. See "Guidelines for the application of the Disaster Risk Management Policy".

33 Different would be in large-scale projects such as bridges, dams or large foundations.

34 In some cases, the threat is given by a situation that affects an entire town or a region, such as a flood zone at the macro level. This type of projects is managed by specific executing agencies or units, that can make the specific required recommendations.

Environmental and Social Management Plan (ESMP)

Social infrastructure projects are usually small projects with minor impacts. For this reason, in most cases operations that include construction of social infrastructure are categorized as B.

The IDB Policy defines Category B as “those operations that are likely to cause local short-term negative environmental and social impacts, for which effective mitigation measures are available.”

For these operations, the borrower must carry out an ESMP, describing the mitigation measures and monitoring requirements that are agreed upon to verify compliance, establishing the framework for the following stages.

The ESMP can be part of an Environmental Impact Assessment (EIA), in the case of Category A operations, or be prepared independently, in the case of Category B operations.

Environmental Impact Assessment (EIA)

According to Bank’s Policies, EIAs are generally required for Category A investment projects, defined as any operation that has the potential to cause significant negative environmental and social impacts, or that has profound implications that affect “natural” resources.

The EIA identifies potentially significant environmental and social consequences and proposes measures to avoid, mitigate or compensate for negative consequences and intensify positive ones.

This study should cover all the stages of the project: from design, construction, to operation. Including within its content an ESMP.

6. Water quality studies: Water quality analysis, including bacteriological and PH analysis, are required when using water from underground wells or water sources not yet exploited for human consumption.

In the case of hospitals or buildings where food is expected to be handled, it is advisable to carry out the studies even when there is a public supply network.

7. Structural study of existing buildings: In cases where pre-existing buildings are to be reused, modifying their functionalities or not, a technical structural survey must be carried out to ensure the condition of the structure and the possibility of reuse.

In many cases, this study will determine the development of structural reinforcements or foundations for the structure to be reused properly. Generally, this happens when the structure is not in optimal conditions, when the functionality of the new building is different from its the original (providing for new overloads)[35] or when the structure must be adapted to the current regulations.[36]

This report may conclude with recommendations of entirely or partially demolishing the existing structure or modifying its functionalities.

8. Other studies: Any other study that is necessary to define criteria for infrastructure design.

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35 For example, in cases where the old construction is expected to house a library or specific heavy equipment, some structural reinforcement may be necessary.

36 For example, when the current seismic-resistant norm establishes another type of requirements for the structure not currently presented.

12. Summary and conclusions

The selection of suitable land for the development of a social infrastructure project must be drawn from a comprehensive technical, environmental, legal and economic analysis. Also, the selection of a suitable land must be drawn from the comparison of different land alternatives in a previously determined macro location. These analyses must be rigorous and encompass all relevant aspects. It must also be flexible aiming to find solutions for the need to build an infrastructure.

Moreover, land selection process affects the schedule of the program and, thus should clearly define the moment in which it starts and its duration. Along with all the activities, a clear estimate of the process period and its potential deviations must be included in the program as they may affect the accomplishment of the objectives.

While performing the analysis of each land, it is expected to categorize the essential and tolerable or solvable aspects. As shown on la **Tabla 1** the essential aspects must comply otherwise the land is discarded, and the tolerable or solvable aspects can be adjustable during the project's design stage.

The decision of the land cannot be based exclusively on the evaluation of market prices, but on the cost of all the works and actions necessary for it to be viable. This analysis is necessary to define the total cost of the land.

The analysis of the different aspects must be carried out based on secondary information, such as reports, studies, maps, and aerial photos, but also with primary sources, which implies a visit including interaction with the local inhabitants and authorities, gathering information on the background of the land and the area.

Finally, it is fundamental to recognize that a perfect land does not exist. Rather project teams should identify the best possible land within existing options, and look into viable technical, legal and economic solutions meeting the needs for a community and the corresponding specific infrastructure.

13. Glossary

LAND: Lot or specific property selected for the construction of the infrastructure, which has limits, a property title and is located within the location defined in the planning stage.

LOCATION: Macro-level location within an urban or rural area where the infrastructure will be located. Respond to a specific sphere of influence on adequate security and accessibility conditions.

MULTI-WORKS PROGRAMS: Programs financed fully or partly by the IDB, including a series of similar and/or repetitive projects, located in different sites. These series of projects may have not been fully identified at the time of approval of the program. The operation is adopted based on the analysis of a representative sample previously defined, considered viable and eligible, determining the characteristics of all the projects included in the operation.

PUBLIC SERVICES: Installations systems in urban or rural networks, for collective or individual use, that guarantee supply of potable water, electricity, and internet, as well as the final disposal of solid and liquid waste. Further example: drinking water supply, sanitation or wastewater treatment plants, electricity, internet, final or transitory disposal of waste, phone lines, street lighting, etc.

RISK: Damages or potential losses that can occur due to natural or technological threats, in a specific period determined by the vulnerability of exposed elements. Risks are analyzed usually through the probability of occurrence and level of impact.

SOCIAL INFRASTRUCTURE: Buildings destined for the development of collective activities associated with human social development. These buildings include education and health sectors of different degree of complexity and technological level and in urban, peri-urban or rural areas. Example: schools, high schools, kindergartens, universities, educational institutions, health clinics, health centers, hospitals, etc.

SPECIFIC PROGRAMS: Programs financed fully or partly by the IDB, all projects to be included must be identified at the time of approval, have the necessary viability and eligibility conditions. Specific plans cannot be changed during the development of the program.

THREAT: A dangerous phenomenon or condition that can cause physical damage to people or infrastructure. Threats can arise from a variety of sources, independently or in combination: geological, meteorological, hydrological, oceanic, biological and technological. Example: hurricanes, tsunamis, earthquakes, landslides, floods, wild fires, land subsidence, etc.

VULNERABILITY: Land or infrastructure susceptibility or fragility of the threats.

Annex 1

Example - qualitative analysis of available land

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
CRITERION RATING	**ADDRESS AND SURFACE**	*1. Address option 1*	*m²*		
		2. Address option 2		*m²*	
		3. Address option 3			*m²*
7 = SATISFACTORY 4 = PARTIAL 1 = NOT SATISFACTORY	**LOCATION**	1.1. It is located within the defined location	*7*	*7*	*7*
		1.2. Easily communicated with the local road system	*7*	*4*	*1*
		1.3. The area does not present threats	*7*	*4*	*1*
			21	15	9
3 = SATISFACTORY 1,5 = PARTIAL 0,5 = NOT SATISFACTORY	**1. PLACE AND SURROUNDING AREA**	1.1. The land is located in an outstanding place	*3*	*3*	*1.5*
		1.2. It is removed from sources of noises or dust	*3*	*3*	*3*
		1.3. It is far from smoke sources or bad odors	*3*	*3*	*3*
		1.4. It is far from trash	*3*	*3*	*3*
		1.5. It is far from septic tanks in poor condition or lakes of oxidation	*3*	*3*	*3*
		1.6. It is far from insects and rodents	*3*	*3*	*3*
		1.7. It is far from deposits of fuel, gas pipelines and oil pipelines	*3*	*3*	*1.5*
		1.8. It is far from high voltage lines	*0.5*	*0.5*	*1.5*
		1.9. It is far from mine fields	*3*	*3*	*3*
		1.10. It is not in a zone with potential industries of risk	*3*	*3*	*3*
			27.5	27.5	25.5

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
5 = SATISFACTORY 2,5 = PARTIAL 1 = NOT SATISFACTORY	**2. NORMATIVE ANALYSIS**	2.1. Existing specific standards of the land	*1*	*1*	*5*
		2.2. The use of the land enables the construction of the infrastructure	*1*	*1*	*2,5*
		2.3. Servings, and heights determine an acceptable useful area	*1*	*5*	*1*
		2.4. It does not work in an urbanistic protection area that conditions the design	*1*	*1*	*1*
		2.5. Sufficient space for parking	*2.5*	*5*	*1*
			6.5	13	8
5 = SATISFACTORY 2,5 = PARTIAL 1 = NOT SATISFACTORY	**3. LEGAL ANALYSIS**	3.1. The property title is in the name of the Executing Agency	*1*	*1*	*5*
		3.2. It has records and legal documentation update	*1*	*2.5*	*2.5*
		3.3. It is without debts and up to date with the payment of taxes	*1*	*1*	*2,5*
		3.4. Does not require fraction	*5*	*5*	*1*
		3.5. It is available for the start of construction	*5*	*5*	*5*
			13	14.5	13.5
3 = SATISFACTORY 1,5 = PARTIAL 0,5 = NOT SATISFACTORY	**4. SOCIO-ENVIRONMENTAL ASPECTS**	4.1. Construction does not affect biodiversity	*1.5*	*3*	*3*
		4.2. No great taling of trees is required	*1*	*3*	*3*
		4.3. There are no value property assets that must be preserved	*3*	*1*	*1*
		4.4. It is not in an area of archaeological importance	*3*	*3*	*3*
		4.5. There are no occupants who should be displaced	*3*	*3*	*3*
		4.6. The previous use of the land does not represent risks (specify)	*3*	*3*	*3*
		4.7. There are no serving areas that can be affected	*1.5*	*3*	*1*
			16	19	17

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
3 = SATISFACTORY 1,5 = PARTIAL 0,5 = NOT SATISFACTORY	**5. SUSCEPTIBILITY TO THREATS**	5.1. Does not present susceptibility to flooding (pluviales, fluviales, coastal)	*3*	*3*	*1.5*
		5.2. Does not present susceptibility for mass removal or landslides	*3*	*3*	*3*
		5.3. Does not present susceptibility for excavation of rivers	*3*	*0.5*	*0.5*
		5.4. There are no records of antecedents of natural disasters	*3*	*3*	*3*
		5.5. Does not present susceptibility to another type of threats (specify)	*3*	*1.5*	*3*
		5.6. No mitigation work is needed	*3*	*1.5*	*1.5*
		5.7. No detailed studies of threats is needed	*3*	*3*	*3*
			21	15.5	15.5
3 = SATISFACTORY 1,5 = PARTIAL 0,5 = NOT SATISFACTORY	**6. CONSTRUCCIONES PREEXISTENTES**	6.1. Does not present constructions that must be demolished	*0.5*	*1.5*	*3*
		6.2. Existing constructions can be useful	*0.5*	*1.5*	*3*
			1	3	6
3 = SATISFACTORY 1,5 = PARTIAL 0,5 = NOT SATISFACTORY	**7. SHAPE AND DIMENSIONS**	7.1. Presents sufficient useful surface for the new building	*3*	*3*	*1,5*
		7.2. Allows future growth with no inconveniences	*3*	*0.5*	*1,5*
		7.3. Possesses regular proportions in its wide / long relationship	*3*	*3*	*1.5*
		7.4. Allows the correct installation and orientation of the building	*3*	*1.5*	*1.5*
			12	8	3

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
5 = SATISFACTORY 2,5 = PARTIAL 1 = NOT SATISFACTORY	**8. TOPOGRAPHY**	8.1. It is a majorly plot land	*5*	*2.5*	*5*
		8.2. Allows natural drainage of rainfalls	*5*	*5*	*2.5*
		8.3. Does not contain affluent or water courses	*5*	*1*	*2.5*
		8.4. Avoid the need for considerable excavations and fillings	*5*	*5*	*5*
		8.4. Excavations are considered to be relatively easy	*5*	*5*	*5*
			25	18.5	20
5 = SATISFACTORY 2,5 = PARTIAL 1 = NOT SATISFACTORY	**9. ACCESSIBILITY**	9.1. There are ways of access in the limits of the land	*5*	*2.5*	*5*
		9.2. There is easy and safe pedestrian access	*2.5*	*2.5*	*5*
		9.3. The roads allow the easy evacuation or access of firemen	*5*	*5*	*2.5*
		9.4. There is urban transportation service close to the ground	*2.5*	*2.5*	*5*
			15	12.5	17.5

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
3 = SATISFACTORY **1,5 = PARTIAL** **0,5 = NOT SATISFACTORY**	**10. PUBLIC SERVICES**	10.1. The village or district has potable water service	*3*	*3*	*3*
		10.2. The land has water supply by public network	*3*	*3*	*1.5*
		10.3 The existing water supply network has sufficient capacity	*3*	*0.5*	*1.5*
		10.4. The water receives treatment	*0.5*	*0.5*	*0.5*
		10.5. There are certificates of feasibility and/or availability of drinking water	*0.5*	*0.5*	*0.5*
		10.6. The village or district has sanitation service	*0.5*	*0.5*	*0.5*
		10.7. The land has a close sanitation network	*0.5*	*0.5*	*0.5*
		10.8. The existing sanitation network has sufficient capacity	*0.5*	*0.5*	*0.5*
		10.9. There are certificates of feasibility and / or availability of sanitation	*0.5*	*0.5*	*0.5*
		10.10. The village or district has electrical energy service	*3*	*3*	*3*
		10.11. The land has a electric energy network in reach	*3*	*1.5*	*3*
		10.12. The electrical energy service is permanent	*1.5*	*1.5*	*1.5*
		10.13. The electrical energy service has sufficient capacity	*1.5*	*1.5*	*1.5*
		10.14. There are certificates of feasibility and/or availability of electrical energy	*0.5*	*0.5*	*0.5*
		10.15. There is a waste collection service	*3*	*3*	*3*
		10.16. The collection of waste for the future building is guaranteed	*3*	*3*	*3*
		10.17. There are available telephone lines	*3*	*3*	*3*
		10.18. It could be guaranteed as a minimum three phone lines for future building	*3*	*3*	*3*
		10.19. There is availability of installing internet connection	*3*	*3*	*3*
			36.5	32.5	33.5

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
5 = SATISFACTORY **2,5 = PARTIAL** **1 = NOT SATISFACTORY**	**11. COST**	11.1. The price per square metro of the land is low	*1*	*2.5*	*5*
		11.2. It is not necessary to regularize the land legally	*2.5*	*5*	*2.5*
		11.3. It is not necessary to perform works of mitigation or environmental or social compensation	*1*	*5*	*1*
		11.4. It is not necessary to do mitigation works to reduce vulnerability	*5*	*2.5*	*2.5*
		11.5. No demolition of existing structures is required	*1*	*2.5*	*5*
		11.6. The dimensions or form of the land will not increase the cost of the project	*5*	*1*	*1*
		11.7. It is not necessary to build access routes	*2.5*	*2.5*	*5*
		11.8. It is not necessary to build potable water supply systems	*5*	*2.5*	*2.5*
		11.9. It is not necessary to build sanitation systems	*1*	*1*	*1*
		11.10. It is not necessary to build energy systems or extend electrical networks	*2.5*	*1*	*1*
		11.11. It is not necessary to extend telephone networks	*5*	*5*	*5*
		11.12. It is not necessary to build waste treatment systems	*5*	*5*	*5*
		11.13. It is not necessary to extend internet networks	*5*	*5*	*5*
		11.14. The total cost of the land is low	*5*	*5*	*5*
			46.5	45.5	46.5

LOCATION		INFRASTRUCTURE	OPTION No. 1	OPTION No. 2	OPTION No. 3
City / Department / Municipality		*Name of school or health center that is intended to be built*			
5 = SATISFACTORY **2,5 = PARTIAL** **1 = NOT SATISFACTORY**	**12. DEADLINES**	12.1. Does not require ownership procedes or legal registration	*2.5*	*1*	*5*
		12.2. Does not require fractions	*2.5*	*2.5*	*2.5*
		12.3. Does not require environmental authorizations	*1*	*1*	*1*
		12.4. Does not require specific environmental studies	*5*	*2.5*	*2.5*
		12.5. It is not necessary to empty the land	*1*	*5*	*2.5*
		12.6. Does not need to expect the conclusions of detailed risk studies	*5*	*5*	*5*
		12.7. It does not need to wait for studies on existing structure	*2.5*	*5*	*5*
		12.8. Does not require specific designs	*2.5*	*1*	*2.5*
		12.9. Does not require additional designs for accessibility	*1*	*1*	*1*
		12.10. Does not require special designs for public services	*2.5*	*1*	*1*
		12.11. It does not require the contracting of consultants	*5*	*5*	*5*
			30.5	30	33
		TOTAL	**281**	**269.5**	**272**

Annex 2

Standards for the design of educational infrastructure

ARGENTINA:

Criterios y normativa básica de arquitectura escolar. 1998. Ministerio de Educación.

Manual de Proyecto, Programa Nacional 700 escuelas. Ministerio de Educación, Ciencia y Tecnología de la Nación. 2003.

BRAZIL:

Parâmetros Básicos de Infraestrutura para Instituições de Educação Infantil. Ministério da Educação. 2006.

CHILE:

Guía de diseño de espacios educativos. Ministerio de Educación. 1999.

COLOMBIA:

Norma Técnica Colombiana NTC 4595-4596, Ingeniería Civil y Arquitectura, Planeamiento y Diseño de Instalaciones y Ambientes Escolares. Ministerio de Educación Nacional. 2006.

Lineamientos y recomendaciones para el diseño arquitectónico del colegio de jornada única. Ministerio de Educación Nacional. 2014.

COSTA RICA:

Compendio de normas, edificios para la educación. Ministerio de Educación Pública. 2010.

GUATEMALA:

Manual de Criterios Normativos para el Diseño Arquitectónico de Centros Educativos Oficiales. Ministerio de Educación. 2016.

HAITI:

Normes de Construction des Bâtiments Scolaires. Ministère de l'éducation Nationale et de la Formation Professionnelle. 2013.

HONDURAS:

Criterios y Normativa para la Planificación y Diseño de Centros Educativos. Secretaría de Educación. 2013.

MEXICO:

Normas y Especificaciones para Estudios, Proyectos, Construcción e Instalaciones. Secretaría de Educación Pública. 2014.

Norma Mexicana NMX-R-003-SCFI-2011 Escuelas – Selección de Terreno para Construcción-Requisitos. Secretaría de Economía. 2011.

Criterios Normativos de Diseño Arquitectónico. Secretaría de Educación Pública. 2007.

PERU:

Normas Técnicas para el Diseño de Locales Escolares de Primaria y Secundaria. Ministerio de Educación. 2006.

DOMINICAN REPUBLIC:

Reglamento para el diseño de plantas físicas escolares, Decreto No. 305-06. Secretaría de Estado de Obras Públicas y Comunicaciones. 2006.

VENEZUELA:

Normas y recomendaciones para el diseño de edificaciones educativas. Ministerio del Poder Popular Para la Educación. 2007.

Annex 3

Methodologies for assessing threat susceptibility

Manual para la Evaluación de Riesgo del Emplazamiento y del Medio construido. Comisión Permanente de contingencias COPECO. Agencia Suiza para el Desarrollo y la Cooperación COSUDE. Programa de las Naciones Unidas para el Desarrollo PNUD. 2011.

Recomendaciones Técnicas para la elaboración de mapas de amenazas por inundaciones. Comisión Permanente de contingencias COPECO. Agencia Suiza para el Desarrollo y la Cooperación COSUDE. 2008.

Recomendaciones Técnicas para la elaboración de mapas de amenazas por movimiento de laderas. Comisión Permanente de contingencias COPECO. Agencia Suiza para el Desarrollo y la Cooperación COSUDE. Programa de las Naciones Unidas para el Desarrollo PNUD. 2010.

Manual de derrumbes: una guía para entender todo sobre derrumbes. Highland, Lynn M; Bobrowsky, Peter. Sistema Geológico de los Estados Unidos; 2008.

Notas de orientación para la construcción de escuelas más seguras. Mecanismo Global para la Reducción y Recuperación de los Desastres. The World Bank. 2009.

Social Infrastructure

Do it HERE, Not THERE

Guide for the selection of land to build social infrastructure

Wilhelm Dalaison