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A review of public transport policies in remote communities in Chile

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A Review of Public Transport Policies in Remote Communities in Chile

Discussion Paper

179

Roundtable

Roberto Villalobos

Marcela Muñoz

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Ministry of Transportation and
Communications,
Santiago

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Geography and remote populations

Chile is located along the southwest coast of South America. It is 4 270 km long, with a maximum width of 445 km and a minimum of 90 km. The Andes mountain range forms the backbone of the country, with numerous peaks above 6000 m. Chile is divided into clearly identifiable northern, central and southern zones.

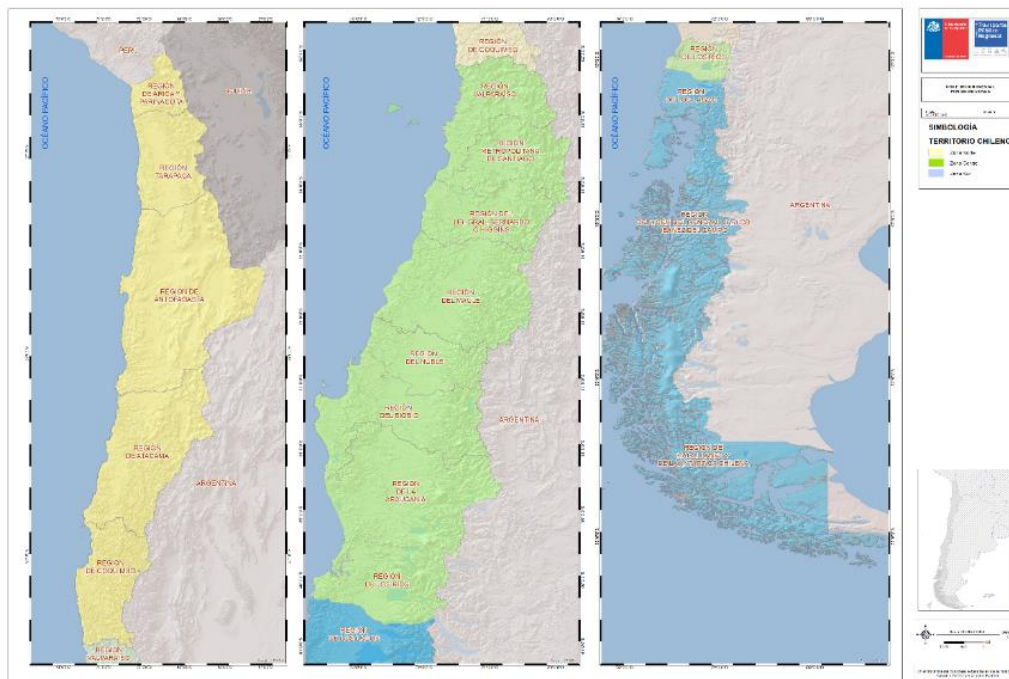
The northern zone lies between the northern border and the Aconcagua River, which flows into the Pacific near Valparaiso. It includes the Atacama desert, the driest on the planet. The volcanic activity of the Andes led to the formation of the Andean highlands and salt flats like the Salar de Atacama.

The central zone is the most populous. The wide Pacific coastal plains are where numerous cities and ports are located.

The southern zone, which includes Patagonia, begins at the 41st parallel south. It is characterised by an intermediate zone, with the Chiloé Archipelago, Chonos fjords and numerous islands and islets.

Chile has sovereignty over several volcanic islands in the Pacific, including the Juan Fernández Archipelago and Easter Island.

Figure 1. The northern, central and southern regions of Chile



Source: Ministry of Transport and Telecommunications, Chile.

A mere 12.2% of the total population of 17.6 million lives in rural areas, according to the 2017 census. They are concentrated in the central and southern regions of the country. Despite urbanisation rates close to 90 percent, many locations in Chile face isolation. Either for geographical reasons or because the

population is too small for private transport solutions to be viable, 2.0% of the population lacks stable and safe public transport to provide them with basic access to jobs, health care or consumer goods.

The southern Araucanía and Biobío regions are home to almost 50.0% of the country's isolated population. No less than 5.3% of the former's population lives in isolated areas, equivalent to 51 103 people. Other regions with a high percentage of isolated populations are Los Ríos (4.4%), Aysén (3.5%), Antofagasta (3.1%), Los Lagos (2.8%) and Ñuble (2.5%).

Chile has implemented policies to provide connectivity to the inhabitants of remote areas suffering from low access to services. The main measure is the 2009 National Public Transport Subsidy Law 20.378, which ensures the provision of public transport subsidies for isolated areas. Today, more than 350 000 Chileans benefit from 724 transport services in isolated areas, covering land, water and air modes. Transport services falling under the national subsidy law for public transportation were funded with about USD 87 million in 2018.

The role of the government in developing remote and isolated territories

The constitution of the Republic of Chile lays out the right of people to benefit from equal opportunities to participate in national life (Art. 1), the principle of the government not discriminating between sectors, activities and geographical areas (Art. 19) and the objective of harmonious and equitable territorial development (Art. 115).

The government of Chile has been working with the private sector over the past several decades to foster initiatives to develop remote and isolated areas, which provide the least economic opportunities. Though sovereignty, demographics, defence and integration all play a part in this, state intervention today goes beyond considerations of national sovereignty and territorial cohesion. Instead, transport policy seeks to achieve greater integration of remote and isolated regions, providing opportunities and economic development. A series of studies have attempted to quantify the effects of these policies. To date there are positive qualitative evaluations, however, progress is needed in the quantitative estimation of the impacts achieved.

Territorial and administrative planning

Chile has adjusted its territorial and political administrative organisation to promote more balanced regional growth and development, allow interconnections between remote localities and administrative centres and provide conditions allowing equal opportunities.

Chile today is composed of 16 regions, 56 provinces and 346 communes. In order to curb centralisation, the administrative and political divisions of the country were modified in 2007 for study, planning and development purposes.

Chile has been undergoing a regionalisation process that was conceived as a form of structural change, ensuring the needs of the territory were resolved at the local level and facilitating social participation, unity and national balance in socioeconomic development (CONARA, 1979). However, in some areas regionalisation has not occurred according to expectations. The process has required constant modifications and adjustments. In this context, incentives and support for certain regions, provinces, and communes has been provided in a complementary manner.

As part of its regionalisation process, the Chilean government has implemented a series of incentives for the economic and social development of remote regions. One of the main actions promoted during the regionalisation process was the support for remote areas (the Tarapacá, Los Lagos, Aysén and Magallanes regions and the Chilean Antarctic). The government granted tax-type customs franchises and direct bonuses to productive sectors to assist regions with economic difficulties due to remoteness and natural conditions (ODEPLAN, 1985).

The government has been encouraging private investment and directing part of it plus public expenditure towards these regions through both sectoral and regional programmes.

Franchises for remote areas

Government policy aimed at promoting the development of remote and isolated areas with specific geographic features and population densities has justified the application of exceptional measures for several decades.

The government of Chile has introduced a series of tax regulations, customs benefits and special economic zones, often including free tariffs or tax breaks, to encourage population and employment growth. It has provided support to develop the northernmost and southernmost extremities of the country. Specifically, the government has passed laws to stimulate the economic development and full economic integration of Arica, Austral, Navarino and Tierra del Fuego. These have established free economic zones to support firms engaged in activities such as manufacturing, mining, exploitation of sea resources, transport and tourism. In addition to the taxation advantages of these zones, there are also incentives such as wage bonuses for residents and extra vacation days.

Public policies, plans and programmes for isolated territories

The Company of Supply of Isolated Areas (EMAZA) was one of the first policy measures specifically aimed at isolated territories. It existed from 1960 until 2013 and was in charge of supplying daily goods and products to remote areas where the density of stores was too low to cover citizens' basic needs at affordable prices. It provided additional services of interest to the community at no cost, such as cashing checks, selling merchandise on credit and contributing to the settlement of isolated and unpopulated areas, which was considered strategic to maintain sovereignty.

In 1994, the Interministerial Committee for the Development of Remote and Special Areas of the Sub-secretariat for Regional Development (SUBDERE) was created under the Ministry of the Interior. The regions covered are Arica and Parinacota, Tarapaca, Aysén, Easter Island and the Juan Fernández Archipelago. The committee was set up to advise the president of the republic on studying, formulating and co-ordinating policies, plans and sectoral programmes aimed at the development of remote, isolated and special areas. Another aim of the committee was to deepen the decentralisation process, propose instruments for regional development and institutionalise the government's action in these territories. The

committee also ensures consistency in the execution of the various policies agreed upon by the ministries and public services and co-ordinates their implementation (SUBDERE, 2005).

In 2010, the government instituted the National Policy for the Development of Isolated Locations by Supreme Decree No. 608. Based on “social equity, it gives all Chilean citizens the same opportunities for access to basic services so they can develop their potential”. It does so by implementing actions and allocating resources to improve living conditions. Although it reinforces sovereignty by ensuring the government’s presence throughout the territory, it also bolsters decentralisation by putting the regional governments in charge of procuring co-ordinated action from all administrative bodies that operate in the region, harmonising actions and avoiding duplication. SUBDERE is the body mandated to submit to the Chilean president the legal initiatives necessary to implement this policy

Since 1999, SUBDERE has had a methodology to classify communes according to their isolation in relation to physical, demographic and economic factors, plus access to services and political-administrative criteria. The communes that fulfil these criteria are eligible for government support.

An isolated territory according to SUBDERE is an area with a low level of accessibility, low population density and limited basic public services.

SUBDERE began updating the variables for the methodology to identify isolated communities in 2018. In April 2019, preliminary data were delivered for the definition of isolated locations. According to this methodology, 12.5% of the country's locations are isolated.

SUBDERE and the Ministry of Transport and Telecommunications calculate the degree of isolation of a locality differently (the method used by the Ministry of Transport and Telecommunications is described in the next section). These are with regard to travel time, the structure of trips and distances. As opposed to the ministry, SUBDERE does not consider public transport variables. In methodological terms, however, both calculation methods are very similar: an origin-destination matrix is generated through a modal interconnection network from each location to the basic services. The differences are due to SUBDERE’s policy being more general and establishing guidelines for public institutions, addressing problems of isolated areas in the scope of each one. Given the above, the ministry specifies the policy according to its attributions and objectives.

In addition, the 2014 National Rural Development Policy has been updated. It includes new and improved standards for the evaluation and design of public policies in rural areas and challenges the actors involved to “strengthen and expand the coverage of public transport management systems and instruments, to ensure a frequency and cost of travel appropriate to the population's travel needs in rural territory.”

On a sectoral level, several programmes aim to develop isolated areas. These were adopted several decades before the National Policy for the Development of Isolated Locations. They include the following:

- the Telecommunications Development Fund, which aims to boost access to information and communication technologies, ensuring beneficiary communities can access the Internet
- the Television Antennas Fund in Extreme, Remote or Border Areas, which finances or subsidises the production, transmission and dissemination of television programmes
- the Rural School Transportation Support Programme and the Territorial Integration Scholarship for low-income students with good academic performance residing in Easter Island, the Juan Fernández Archipelago, Palena Province (Los Lagos Region), Aysén and Magallanes
- the Port Infrastructure Programme to Connect Geographically Isolated Areas, subsidising transportation services for isolated areas.

Likewise, the Chilean Navy and the Chilean Air Force serve the inhabitants of isolated and insular areas. They contribute to the improvement of their quality of life either through medical evacuations, transfers to and from isolated sectors, disaster relief, and medical and dental operations as part of the public health system, particularly on Easter Island, the Juan Fernández Archipelago, Chiloé Island, Palena and other areas of southern Chile.

In most cases, these policies have defined alternative evaluation systems to the typical social evaluation of projects based on the number of beneficiaries, which allow smaller communes to benefit from projects with a high cost. Usually, in addition to a negative private evaluation, projects are given a negative social rating and consequently do not qualify in the Chilean investment appraisal system. This is because social evaluation considers, among other elements, the number of beneficiaries. All programmes for isolated areas mentioned in this document operate outside the traditional social evaluation, applying their own methodology.

In recent decades, the government of Chile has promoted a series of initiatives to address development problems that cannot be resolved with general provisions at the country level. This is because certain areas cannot have the same pace of economic development as localities that are closest to the centre of the country. The opportunities for inhabitants of remote and isolated areas are lower and therefore necessarily require government assistance.

Public transportation in isolated areas

For more than four decades, the Chilean Ministry of Transport and Telecommunications has implemented public transport services for passengers, vehicles and cargo in transit by sea, lake and river based on Decree-Law No. 3.059 of 1979 on the promotion of the merchant marine. It stipulates in article No. 14: “When the government demands special transport that is not covered by national shipping companies be provided, a subsidy must be tendered out and awarded to the Chilean shipping companies offering to supply the required transport. The subsidy referred to in the preceding paragraph must be financed from the corresponding ministry budget.”

The government extended the law to include the implementation of services using land, air and rail modes in line with the transportation needs that had emerged over time. Based on this legal system, a programme was created to finance initiatives. Its main objective is “generating and improving accessibility for inhabitants of isolated localities to centres with greater development and more services, contributing to better territorial, economic and social integration and improving living and development conditions.”

Due to their location, small population and socio-economic characteristics, these communities do not generate sufficient demand for transport services to encourage private operators to offer them. In other cases, despite the presence of a private transport service, the population does not have adequate access to this service due to their low level of income. Both situations require subsidies on the supply or demand side to ensure minimum levels of access.

In 2009, as a reaction to the financing needs of the Santiago public transport system (called Transantiago at that time), the National Public Transport Subsidy Law was promulgated to promote the use of public

passenger transport. The amount of subsidy for Transantiago and the rest of the country was defined as equivalent. As part of the same law, the Regional Transportation Support Programme includes subsidies for services in isolated areas, expanding the scope and impact of the programmes that had been developed up to that date. This programme is of an indefinite nature – it has no expiry date – and its geographical scope is limited by the existence of isolated locations in the country. Its financing also becomes permanent, as provided in the abovementioned transport subsidy law.

In modal terms, there are maritime, lake, river, air, land and rail services, as well as bimodal services, which include two or more modes of transport for connectivity. There are exclusive services for passengers, cargo and vehicles, or mixed. Transport service subsidies vary between USD 13 000 and more than USD 6 million a year. The highest amounts are spent on maritime, lake and river transport services.

A range of contract types and business models exist: transport with private and/or public vessels; with or without public port infrastructure (ramps and/or passenger terminals); contracts lasting three to eight years; contracts with immediate start of service, with or without commitment to renew ships or with a delayed start up to 24 months for the purchase or construction of a ship; uniform monthly payments per trip or per nautical mile.

Methodology for targeting, selecting and prioritising transport services in isolated areas

In 1998, the Ministry of Transport and Telecommunications developed a methodology to select projects based on technical and objective criteria. This methodology has been updated over the years and allows the identification, categorisation, characterisation and prioritisation of isolated communities with regard to their access to a series of basic services such as health and education. Transport modes taken into account include maritime, lake, river, land, air or rail.

According to the methodology of the Ministry of Transport and Telecommunications of Chile, there are 37 546 rural locations. Their degree of isolation is estimated depending on travel times to a range of services. With this method it was possible to identify that 296 199 people live in localities with some degree of territorial isolation, corresponding to 2% of the national population.

The Methodology of Identification of Isolated Areas for the Granting of Transportation Subsidies operates on a geographic information system and allows determining which locations are isolated with respect to basic services. It consists of two major stages: calculating the travel times from each location to the destination that has the basic services being considered and prioritising the degree of isolation according to the estimated travel times to the different services.

To estimate the thresholds of degrees of isolation, the distribution of access times from the macro-zone of each locality to each of the services is used. These include public transport, education, healthcare, the supply and sale of products, and financial and administrative services. The macro-zones considered are included in Table 1.

Table 1. Classification of macro-zones

| Region | Macro-zone | |
|---|------------|---------|
| Arica Y Parinacota | 1 | North |
| Tarapacá | | |
| Antofagasta | | |
| Atacama | | |
| Coquimbo | | |
| Valparaíso | 2 | Central |
| Metropolitana de Santiago | | |
| Del Libertador General Bernardo O'Higgins | | |
| Del Maule | | |
| Del Ñuble | 3 | South |
| Del Biobío | | |
| De La Araucanía | | |
| De Los Ríos | | |
| De Los Lagos | | |
| Aisén Del Gral. Carlos Ibáñez Del Campo | 4 | Austral |
| Magallanes y de la Antártica Chilena | | |

Source: Ministry of Transport and Telecommunications, Chile.

If a locality is at a certain distance, and it takes a certain amount of time to access the public transport network and basic services, it means that it is in isolation from them. It is therefore necessary to establish a subsidised public transport service. This classification allows for prioritisation of projects according to urgency: the order in which these services are implemented will depend on the degree of isolation each one presents, which, according to the methodology, can be critical, high or regular.

Design of transport services

Once a service has been prioritised according to the location's degree of isolation, the service is designed based on the needs of potential users. The design of the programme is based on technical visits, construction of the routes and consultations with the inhabitants. The objective of these activities is to detail the service in terms of the number of daily, weekly or monthly trips, detention, embarkation and disembarkation points, departure and arrival times, passengers, cargo, vehicles, and so on.

In the case of maritime, lake and river transport services, it is also essential to identify the available port infrastructure (e.g. dock, ramp) to define the vessel type to be used for the transport service.

For terrestrial services, bridges, bends and other road conditions are verified to check restrictions for certain types of vehicles.

Demand is estimated based on population. Fares are established considering proportional rates per kilometre or nautical mile travelled with respect to average rates for the area. These are usually significantly lower than those that would have been offered if the service were provided without subsidies.

Based on demand and rates, the income of the business is estimated and a business model established. Fixed and administrative costs are calculated according to the type of vehicle or ship (crew, insurance, administrative personnel, infrastructure use, management of ticket sales, etc.). In addition, operating costs for things such as fuel and maintenance are estimated, as well as the expected profitability for the private operator.

The amount of subsidy necessary to incentivise transport operators to perform the defined service is calculated based on all of the above for a period of time varying between three and eight years, depending on the required investments.

In the case of maritime services, contractual models have been applied where it is required to improve the ship's standard after a certain period of time (e.g. two years). A more competitive contractual model that has been applied involves an anticipated award. The public tender is awarded two years prior to the start of the service so the operator has enough time to make the purchase or allow for construction of the ship in that period.

The government of Chile's Port Works Directorate of the Ministry of Public Works owns barges and ferries for the transport of vehicles. They are used mainly for lakes when private companies have no interest in bringing in or building a ship. Reasons for this are remoteness, difficulties in moving ships to lakes or building ships on site. The same applies to passenger ships, often provided by regional governments.

In these cases, the business model generated for maritime, lake and river services stipulates delivery of the ship by the government. In some cases, the port infrastructure (e.g. ramps, passenger waiting rooms and cafeterias) is included to be managed and maintained by the same operator. Maintaining ramps (i.e. cleaning and lighting) is often part of the contracts.

Allocation of the transport subsidy

In Chile, the allocation of subsidies is done through a call for public tender.

Once the service is designed, the bidding terms are generated, which contain the requirements related to the operation of the service, the characteristics of buses, ships and aircraft, the contract terms, as well as the maximum subsidy amount available. Fines are also established for possible breaches and other administrative aspects related to the contract.

To allow for a comparison of bids, evaluation criteria are established with associated scores, differentiating the bids and emphasising the most relevant aspects for the provision of the service. Criteria such as greater capacity of passengers and/or vehicles offered, as well as a lower age of ships, aircraft or buses and the requested amount of subsidies, are taken into account.

The contracted operator is required to provide statistics on passengers, cargo and vehicles transported to analyse demand and estimate occupancy rates and revenue for the next contract period.

In remote regions, there are a limited number of operators, and many routes have single operators.

Coverage, resources and the perspective from 2010-18

The coverage of transportation services in remote areas increased by 153% from 2010 to 2018 (Figure 2).

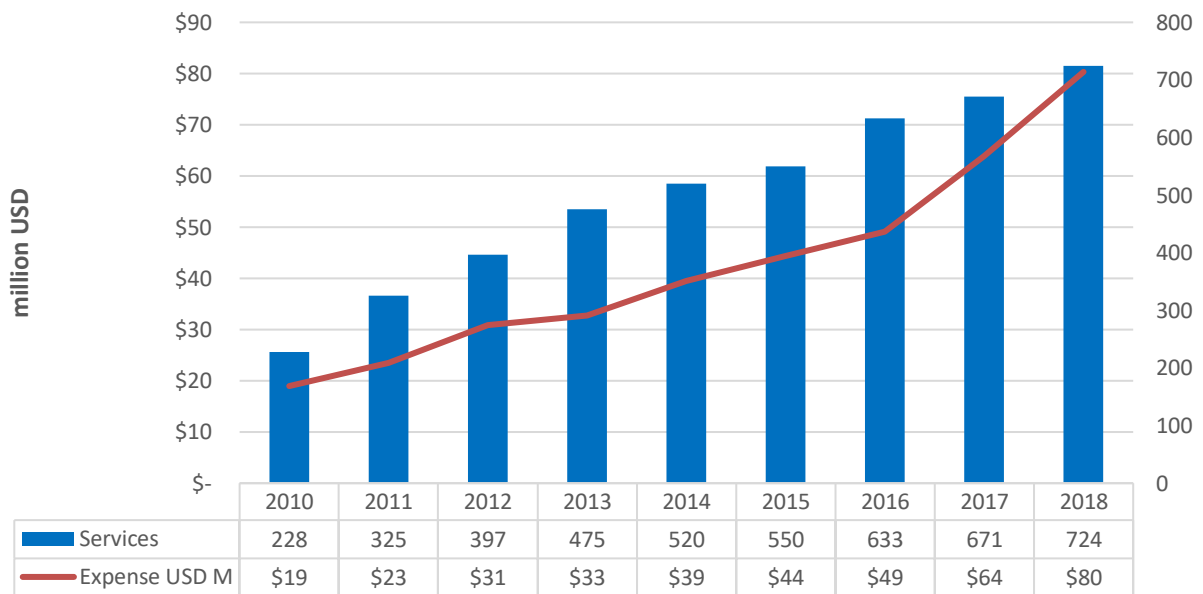
Resources have increased by more than 320%, from almost USD 19 million in 2009 to more than USD 80 million in 2018.

In 2018, a total of 724 transport services for isolated areas were financed, providing connectivity for almost 400 000 inhabitants, with a total expenditure of USD 80.3 million annually. The number of beneficiaries is greater than the total number of inhabitants of isolated areas because public transport services, which connect with urban centres, benefit other communities on the route.

Most of the services correspond to land transport (78%). However, the largest amount of budget is allocated to services in sea, lake and river modes, due to the high operating costs (Figure 3).

No less than 70% of the services are concentrated in the southernmost part of the country, from the Araucanía region to Magallanes and the Chilean Antarctic (Figure 4).

Figure 2. Number of services per year and expenses in millions of USD, 2010-18



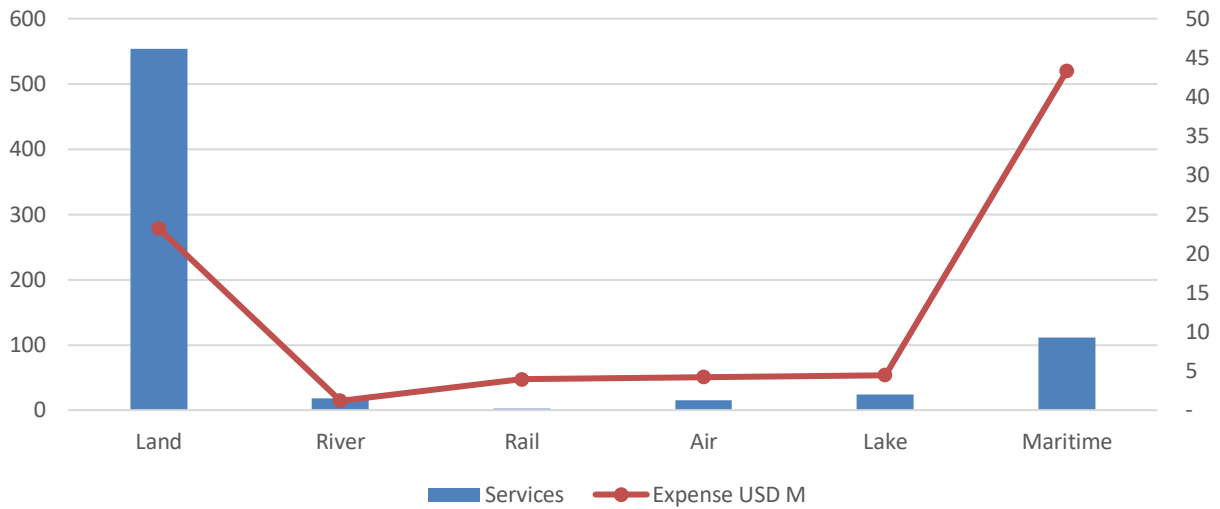
Source: Ministry of Transport and Telecommunications, Chile.

Table 2. Budget per region from 2010-18, millions of USD

| Region | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Arica y Parinacota | 138 | 135 | 142 | 162 | 194 | 220 | 237 | 209 | 261 |
| Tarapacá | 198 | 319 | 392 | 373 | 435 | 458 | 515 | 572 | 616 |
| Antofagasta | 125 | 160 | 313 | 310 | 360 | 404 | 445 | 605 | 1.15 |
| Atacama | 42 | 47 | 92 | 104 | 177 | 363 | 433 | 365 | 694 |
| Coquimbo | 239 | 412 | 688 | 670 | 798 | 850 | 805 | 1.15 | 1.40 |
| Valparaíso | 1.10 | 1.09 | 1.28 | 1.51 | 2.09 | 2.92 | 3.00 | 3.84 | 3.69 |
| Metropolitana | 1.74 | 0 | 0 | 0 | 0 | 176 | 135 | 127 | 329 |
| Libertador General Bernardo O'Higgins | 274 | 427 | 562 | 551 | 700 | 707 | 662 | 676 | 891 |
| Maule | 742 | 773 | 1.13 | 586 | 1.19 | 1.14 | 1.38 | 1.61 | 1.90 |
| Nuble | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biobío | 464 | 1.52 | 2.88 | 2.01 | 3.63 | 3.44 | 3.71 | 4.84 | 5.11 |
| Araucanía | 935 | 1.83 | 2.53 | 2.92 | 3.51 | 3.86 | 4.30 | 5.56 | 6.20 |
| Los Ríos | 1.85 | 1.92 | 2.09 | 2.13 | 2.86 | 2.67 | 3.01 | 4.08 | 6.01 |
| Los Lagos | 3.72 | 6.61 | 8.86 | 11.64 | 11.73 | 15.02 | 16.80 | 20.78 | 31.82 |
| Aysén del General Carlos Ibáñez del Campo | 5.04 | 5.85 | 7.09 | 6.80 | 7.78 | 7.84 | 9.18 | 13.11 | 12.70 |
| Magallanes y Antártica Chilena | 2.36 | 2.41 | 2.77 | 2.94 | 4.01 | 4.33 | 4.48 | 6.38 | 7.57 |
| Total | 18.97 | 23.49 | 30.82 | 32.71 | 39.47 | 44.40 | 49.08 | 63.90 | 80.33 |

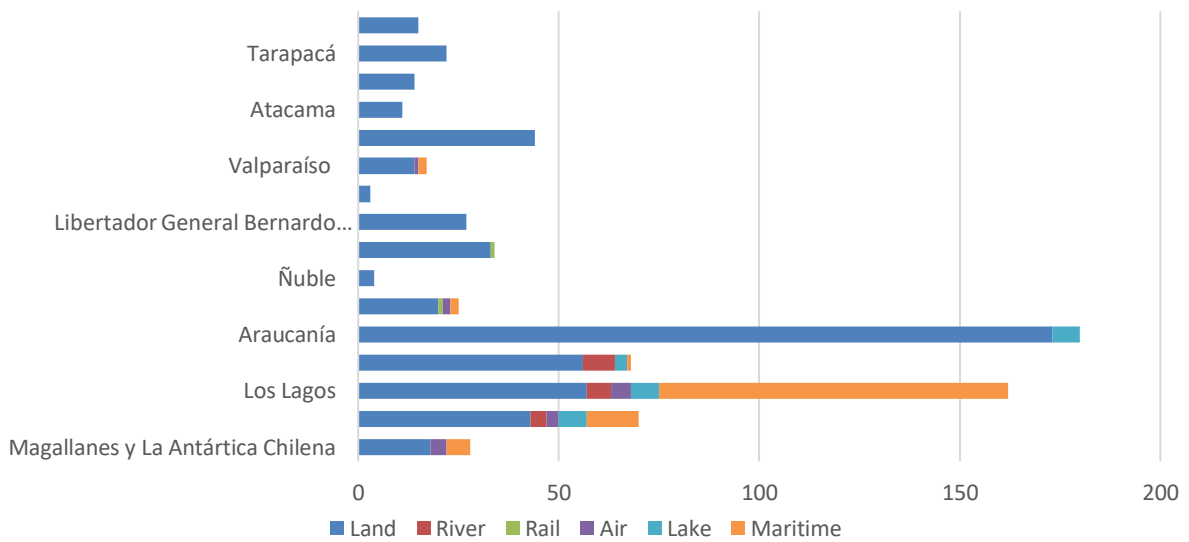
Source: Ministry of Transport and Telecommunications, Chile.

Figure 3. Service distribution and expenditure per transport mode, millions of USD



Source: Ministry of Transport and Telecommunications, Chile.

Figure 4. Number of services per region and mode



Source: Ministry of Transport and Telecommunications, Chile.

The total expenditure on subsidised transport services in Chile’s regions in 2018 is summarised in Table 3. Connectivity support for remote areas represents more than 30% of the total expenditure.

Table 3. Public expenditure on subsidised transport services, 2018

| Programmes | Million USD | % | Number of beneficiaries | Average annual subsidy per beneficiary (USD) |
|---|-------------|-------------|-------------------------|--|
| Connectivity for remote and rural communities | 81 | 31% | 398 856 | 203.88 |
| Bus fare reduction | 108 | 42% | 3 415 270 | 31.67 |
| Free school transport | 38 | 15% | 60 326 | 624.18 |
| Investment Initiatives | 18 | 7% | n/a | n/a |
| Others | 14 | 5% | n/a | n/a |
| Total | 259 | 100% | | |

Source: Ministry of Transport and Telecommunications, Chile.

Strengths and needs for future improvement

One of the main strengths regarding the implementation of the subsidy programme in remote areas is the availability of technical teams in each of the 16 regions of the country. These teams carry out key information collection and are responsible for meeting possible user requirements.

In the bidding rules and in the evaluation of offers, objective criteria allow these evaluations to be carried out in a transparent manner. The bidding processes are carried out in a systematic way and on a large scale, which generates transparency at each stage of assigning a service, avoiding discretion and promoting free access to information.

There is a robust territorial isolation-analysis methodology and module, supported by several previous studies. These allow officials to look at transport in the sector to identify precisely the level of isolation in each locality.

Subsidised services in isolated areas are based on the 2009 National Public Transport Subsidy Law, which provides stability to the programme over time, ensuring certainty for those interested in participating in bidding processes and the beneficiaries of the different services. It ensures that when there is a local need the government will guarantee a solution in time.

Although the coverage has expanded considerably in the last ten years, there are still areas that require subsidised transport services. A recent objective has been to not only expand service coverage but also progressively improve quality standards, however limited by the ministry's budget constraints.

One area that could be improved is the competitiveness of bidding processes, considering that in some areas of the country – and mainly in maritime, lake, river and air modes – the number of bidders is low. To allow for more bidders to participate, it is necessary to make calls for bids in advance to have enough time for bidders to visit places, make evaluations and prepare their offers in an informed manner. Also, it may

be useful to offer longer-term contracts (minimum five years) so operators have greater projection over time. This allows them to make investments that are more attractive.

The need to generate formal and frequent follow-up procedures has also been identified. This will enable the collection of relevant information to support the development and continuous improvement of the service. In this context, it is a challenge to be able to establish a baseline to compare the localities before and after the subsidised service. It is also difficult to carry out impact assessments at the national level to know more specifically what aspects are effectively improved upon, e.g. with regard to the availability of transport and in terms of the economic and social development of the localities.

Technologies on board vehicles must be improved to clearly identify the routes used and the times the service is provided. Based on this information, they can generate subsidy payment indicators.

Finally, it is essential to periodically update and improve the methodological tool to make it more flexible in incorporating new information or new parameters. Today, it is a fairly static tool that does not allow modifications, and new studies must be contracted every three to four years for updating.

Studies have been commissioned on user satisfaction and service quality, from which substantially positive results have been obtained. In 2009, the study “Quality analysis of the services that receive a subsidy for transportation in isolated areas” was commissioned to analyse and diagnose the level of quality with which the different types of services are provided, specifically in the southern regions of the country. Among its main conclusions, it indicates that services are mostly favourable in terms of improving user connectivity. However, the study also pointed to inadequacies in frequency, capacity and comfort. These issues have been addressed over time to improve standards. For example, officials have attributed a higher score in the evaluation process to vehicles or ships when they are newer.

In 2010, the study “Evaluation of the results of the subsidy programme’s services in isolated areas” was commissioned. The study looked at the level of integration and accessibility achieved in isolated communities. Six services were chosen from the Aysén region of General Carlos Ibáñez del Campo. The study concluded the subsidies indeed facilitate the connectivity of residents of isolated areas. They provide broader and better access to public services, ensuring a better quality of life for inhabitants, in particular through access to health-related services.

In 2011, the “User satisfaction perception study on the subsidy programme's subsidised services in isolated areas” was carried out. It aimed to design, adjust and apply a model for measuring the satisfaction of beneficiaries of the Public Transport Subsidy Programme in isolated areas. The level of satisfaction of the users of these services corresponded to 6.1 on a scale of 1.0 to 7.0. The study captured the aspects most and least valued by the users of each service, which has made it possible to define improvements.

Before the end of each contract, a thorough evaluation of the service is carried out in terms of demand, vehicle occupancy, frequencies and routes. Together with representatives of the beneficiary locations, each evaluation identifies aspects that could eventually be adjusted in the design of the service for the next bidding process. However, it is not possible today to establish in quantitative terms what aspects and in what way it has impacted the economic development of the isolated towns and their inhabitants, given that a specific measurement of this type has not been carried out.

In some cases, better transportation links have been important in establishing regular services for tourism in southern Chile. For example, the transport service that connects Hornopirén to Leptepu (maritime), Leptepu to Fiordo Largo (terrestrial) and Fiordo Largo to Caleta Gonzalo (maritime) has generated great interest from tourists. This service started in 2009, with two trips a week. Since 2013 there have been two trips daily in the summer.

Public transportation and road improvement in remote and isolated communities

Public transport in isolated areas requires a transport network and infrastructure that allows vehicles, ships and aircraft to move. If there is a fleet that meets the service requirements but the levels of road conservation are insufficient, connectivity will naturally suffer. Conversely, the best roads are of little use to all residents if the public transport vehicle fleet has a low frequency, capacity or service level.

The operations costs of vehicles travelling on a road are dependent on both vehicle conditions and infrastructure conditions. The lower the quality of the road, the higher the operational costs per kilometre travelled. Low infrastructure quality may significantly increase the size of public transport subsidies for remote areas, considering the greater amount of resources spent on tyres, fuel and lubricant, as well as the reduction of the lifespan of vehicles. In addition, lower comfort can reduce the attractiveness of transport from a user's perspective.

The first part of this paper has focused on state subsidies for public transport services on routes where operations are not profitable for private companies due to low demand and low revenues relative to operational costs (e.g. long distances and often more difficult driving conditions). Investment in roads represents the necessary complement to public transport connectivity, but a challenge is that project costs are high relative to the level of vehicle demand for the roads.

In Chile, cost-benefit analysis (CBA) has been the standard of analysis for the acceptance of economic infrastructure projects such as roads, transfer ports, reservoirs and rail projects. Chile has stood out above the rest of the developing world with respect to its institutionalised system for evaluating evidence-based projects. This section explores alternatives for evaluating and selecting infrastructure projects when costs exceed by far the measurable benefits of transport in remote and isolated regions.

Evaluating and selecting infrastructure projects in remote and isolated communities

Achieving objectives related both to public transport and infrastructure quality will improve accessibility and provide an important basis for the social and economic development in remote and isolated regions. Rodrigue (2020) comments on the close relationship between transport and economic development:

- a. When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets, employment and additional investments. When transport systems are deficient in terms of capacity or reliability, they can have an economic cost such as reduced or missed opportunities and lower quality of life.
- b. The road systems development is associated with significant economic opportunities as it can allow door-to-door transportation of goods and services and direct access for users to the different components of the activity system.
- c. Due to clustering and agglomeration, several locations develop advantages that cannot be readily reversed through improvements in accessibility. Transportation can be a factor of concentration and dispersion depending on the context and the level of development.

- d. When transport is efficient, the potential market for a given product (or service) increases, and so does competition. A wider array of goods and services becomes available to consumers through competition, which tends to reduce costs and promote quality and innovation.

Infrastructure services are generally part of national strategies to connect remote regions. Governments, however, face two important challenges: they seek to increase the portfolio of infrastructure projects, and at the same time they need to decide which projects to invest public funds in under resource constraints.

In addition to the growing infrastructure deficit that has been generated by population growth and economic activity in the last 20 years, there has been a shift towards decentralised infrastructure planning. Many subnational governments, regional entities and sector agencies have been delegating responsibility for planning their infrastructure to local entities.

The Chilean government has a public investment system for the proposal of projects and their evaluation and selection. It also in effect acts to bolster budget decisions, be it for the regional or central governments. This is carried out by the Ministry of Social Development and the Ministry of Finance. The National Investment System is used to consolidate project information and project evaluation to include sectoral plans and resource localisation.

The Ministry of Social Development and the Ministry of Finance's budget management office form the National Investment System. This system is used to define the methodologies and criteria for evaluating and selecting public investment projects to ensure the effectiveness and efficiency in the use of resources, particularly considering the provision of public infrastructure.

Among available methodologies to evaluate and select projects, the most technically accepted is the CBA. It consists of identifying, quantifying and assessing all the costs and benefits of a specific project and only those related to it. In this way, it is possible to compare the costs and benefits distributed over time to assess whether the project, as a sum of all these factors, is socially profitable or not. In Chile, it is based on the social net present value, which is an adaptation of the private net present value used in financial project evaluation. The Chilean social profitability indicator considers aspects such as travel time savings, resource use savings, greater consumption of goods and services or improving the quality and quantity of these.

Some economic sectors are evaluated under another criterion, known as the cost efficiency criterion. Under this criterion it is assumed the project is desirable *per se*, and therefore it is not necessary to perform a calculation of benefits and costs. The project needs to be proven relevant from a social or a legal point of view. The most efficient way to provide the necessary structure and service will simply be sought without linking it to the increase in benefits that it is expected to generate. This evaluation approach is applied to projects for schools, infrastructure dedicated to primary and secondary healthcare, the judiciary and prisons.

The transport sector in Chile has traditionally been evaluated under the cost-benefit approach. This is because it is considered possible and desirable to compare the benefits of the project with the costs. In addition, these elements can be disaggregated over time through travel growth rates, periodic maintenance costs, residual values of the structure, etc.

From an economic point of view, the transport offer is a provision of a public good, considering it is a non-exclusive and non-rivalrous good. There is a demand for this good, which reflects the willingness on the part of users to pay for trips. There is also an offer that represents the cost incurred for making such trips. In particular, the demand for transport, unlike other markets, corresponds to a derived demand, and therefore transport services allow people to pursue activities that are geographically separated from each other.

Making a trip always represents a cost that includes elements such as travel fare, travel time incurred, comfort, overcrowding and the use of physical resources (e.g. vehicle and tyre wear and lubricating material). The sum of the person's travel times, the fare and other elements corresponding to the travel experience are the generalised travel cost. The reduction of generalised travel cost is one of the main benefits associated with the improvement of transport infrastructure.

An important benefit is the travel time saved, which is multiplied by the social value of a person's travel time to obtain a monetary benefit that is calculable and comparable with the investment and operation costs of the project.

Important benefits arise from reduced operational costs. For example, by improving the quality of the road's rolling folder, there is an improvement in the performance of lubricants, the tyres and the vehicle over time.

Another benefit is an increase in transport demand, which can happen due to the decrease in travel costs between two points, for instance. From an economic point of view, and under theoretical supply and demand conditions, if generalised travel costs decrease, the observed demand increases.

In the context of social evaluation, externalities are relevant, including noise, emissions of local pollutants and the impact on global warming, which is reduced when CO₂ emissions are limited due to decreases in fuel use, for example.

Finally, important benefits are evidently generated through the reduction of road accidents. An accident has multiple associated costs, the main being the loss of human lives and others such as property damage to vehicles, treatment of the injured, and legal, insurance and administrative costs.

To generate these benefits, governments incur costs related to infrastructure investment, maintenance and conservation, as well as replacements due to material wear.

Once all the social costs and benefits of the project are calculated using conversion factors to transform private prices into shadow or efficiency prices, the economic indicators of the project are estimated. An annual cash flow is defined considering all costs and benefits, and the social net present value is calculated using the social discount rate, which is provided by the National Investment System.

Territorial inequality and public infrastructure appraisal

Under classic project evaluation, all benefits depend on the estimated vehicular flow. If there is a high vehicular flow, then there will also be high levels of benefits in terms of travel time reductions, pollutant reductions and operational cost reductions. The greater the vehicular flow in a section, the greater the benefits of reducing the generalised travel costs for that section. If the vehicle flows are too low, then the benefits will also be expected to be low, and therefore it is very likely the savings in the use of resources generated in the project situation will not be sufficient to offset the costs of investment, maintenance and road conservation.

The National Investment System evaluates public infrastructure projects with a cost-benefit approach that assigns greater benefits to plans that benefit more people. Therefore, projects in more populated areas tend to receive a better assessment than those in regions with lower population density. At the same time, isolated territories with extreme geographic conditions generally require higher investment (e.g. construction of bridges). Applying such a cost-benefit rationale makes it even more difficult to justify public investment in these localities. For sparsely populated areas, this means low levels of investment in public infrastructure, which can lead to high levels of territorial inequality.

This can provoke a vicious circle, in which the government invests in heavily populated places, and investments in sparsely populated places are postponed. Places become unattractive and people decide to migrate to urban areas with better levels of infrastructure. The results are increasing population density in places that are already densely populated, while other places will lose population and become increasingly isolated economically. Finally, local economies suffer because of the lack of infrastructure.

In 2011, the Chilean Highway Management launched the Basic Roads Programme. Its objectives are as follows: provide a comfortable and more durable tread surface than traditional roads; reduce or eliminate dust generated by vehicles; eliminate the harmful effect of dust on roadside crops; reduce the amount of conservation interventions; reduce effects on the environment; provide a better quality of life for people living in rural sectors; and create conditions conducive to local development.

The programme first identified the basic and intermediate roads and then defined what types of projects could happen under this evaluation approach. Basic conservation projects mostly include an asphalt protection layer or the addition of dust suppressants. The intermediate path solutions include reinforced primer, single or double surface treatments, asphalt grout or hot asphalt mixing.

The entire cost-benefit evaluation exercise was translated into a simple application table for all roads with a range of daily average traffic between 200 and 400 vehicles per day. Costs that did not exceed USD 1 000 per km could be directly approved. This solved investment gaps for a large part of the roads with insufficient vehicle flow.

However, some geographically isolated territories still had implementation costs higher than those defined in the application table (i.e. the instructional criteria) due to poor geographical connectivity, especially in the southern part of Chile. In the south, the territory is fragmented and therefore the number of bridges and special solutions needed to link roads is much higher.

Remote territories with a low level of economic development often do not reach the minimum level of vehicular flow of 200 vehicles per day to be eligible for the intermediate basic road support.

The use of objective criteria to balance infrastructure investments

The undersecretary of regional development at the Ministry of the Interior implemented the Instruction and Decree of Isolated and Lagging Territories policy. Its main objectives are promoting harmonic integration of all sectors of the nation and promoting regional leadership for the management of their isolated locations.

It acknowledges that remote localities require special policies that allow improving residents' quality of life and meeting their needs in terms of connectivity and quality of services.

This policy justifies the existence of a government policy that assumes the issue as a whole, thus enabling the administration to meet public needs continuously and permanently, complying with the principles of efficiency, effectiveness, co-ordination and unity of action.

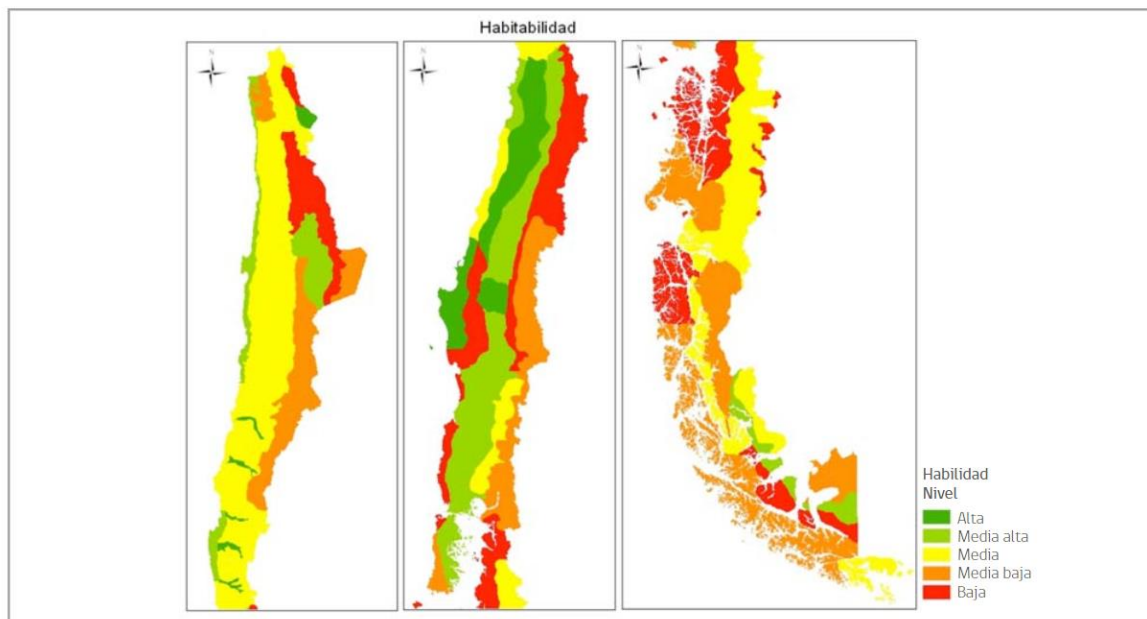
This policy includes a methodological scheme that defines geographical isolation or socioeconomic segregation. This has helped to eliminate discretion in the choice and definition of isolated or segregated territories and reduce arbitrary allocation of resources.

The structural isolation component of the index considered physical geographical elements and demographic elements. The physical elements include the level of access, measured as the distance to other developed centres, and habitability as a measure of the difficulty of inhabiting the territory.

Demographic elements considered the percentage of the elderly population and population differences with respect to the regional average.

Based on this method, the identification map of isolated territories shows habitability levels of different areas (Figure 5).

Figure 5. Degrees of isolation and habitability in Chile



Fuente: Elaboración propia, en base a información digital del estudio "Metodología para la identificación de Territorios Especiales" PUCV - SUBDERE (2002).

Source: SUBDERE (2002).

After agreement between the undersecretary of regional development and the Ministry of Social Development, road and connectivity projects in isolated or lagging territories are now evaluated under the cost-efficiency criteria, which are not profitable under the traditional cost-benefit assessment.

A precondition for this agreement was to make the methodology sufficiently robust to avoid any possible arbitrariness in the definition of isolated territories and to maintain a technical and analytical vision in the selection of projects. This would eliminate the likelihood that territories that do not require this special treatment receive project financing for political reasons. It would also ensure decentralised investment and prioritisation of projects, maintaining efficiency in the allocation of resources through the use of objective indicators and avoiding so-called white elephants. Its implementation would encourage the development of lagging areas and would resolve the chicken-and-egg relation between economic development and infrastructure.

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A Review of Public Transport Policies in Remote Communities in Chile

This report looks at the policies and programmes Chile has been putting in place over the past few decades to foster the development of public transport in remote communities. In particular, it has been taking a regional approach and encouraging private investment in transport.

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