

The impact of loss and damage from the adverse effects of climate change on human rights in Chile

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I. Concrete examples and stories: hydric defense by a female activist

Chile's water model began during the 1973-1990 military dictatorship and extended into democracy, which centers on privatizing water sources, leading to industrial dominance in water ownership and widespread inadequate access, especially in rural and urban areas.

Despite being a water-rich country, with rainfall-induced water flow 8 times the global average and well above sustainable development thresholds¹, Chile faces significant challenges: areas like Aculeo Lagoon and Petorca are severely drought-affected for years, even when the whole country is considered hydric-privileged.

Under the UN Framework Convention on Climate Change, Chile is recognized as vulnerable due to factors like coastal elevation, arid zones, forests, natural disasters, drought, urban pollution, and mountain ecosystems². Climate dependence intensifies these vulnerabilities³.

In addition, the climate crisis particularly endangers environmental activists, with women facing increased harassment and violence. An example is Verónica Vilches from Petorca, who confronts threats while fighting for water rights amid a worsening water crisis⁴.

Climate change predictions indicate a 2°C to 4°C temperature rise in Chile by 2030, particularly affecting the Andes and causing increased winter river flooding in agricultural areas⁵.

II. The impact: exceptional, or an example of many similar cases?

As the climate crisis escalates, so does violence against land and environmental defenders, with women activists often facing unique challenges and remaining underrecognized; which I would like to illustrate briefly below.

These are not exceptional or isolated cases: they are just an example of many cases of women defending their communities from *sacrifice zones*⁶ throughout Chile as the climate crisis gains ground, such as

¹ When considering the entire Chilean territory, the volume of water from rainfall that runs through the channels is 53,000 m³ per person per year, exceeding 8 times the world average (6,600 m³/inhabitant/year).

² (Poo, 2023, page 17)

³ (Castilla et al., 2019, page 278)

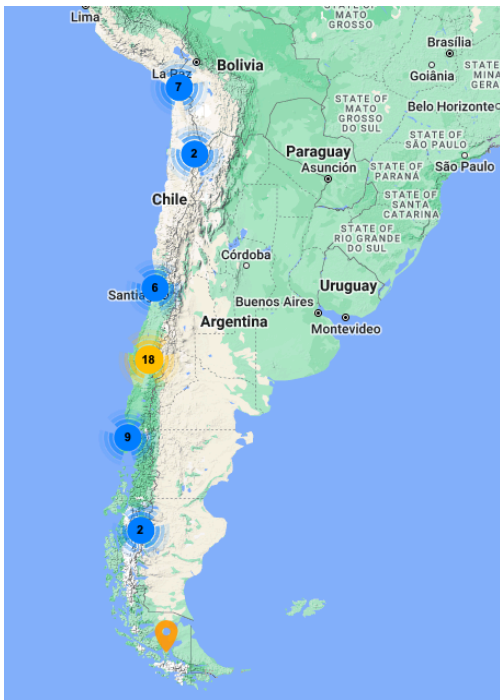
⁴ (Carrere, 2021)

⁵ (Banco Mundial, 2011)

⁶ '*Sacrifice zone*': term created by Chilean civil society to designate those areas of the country with a massive concentration of polluting industries, especially coal, close to the population, for the economic development of the country.

Marcela Nieto⁷, Javiera Rojas⁸, Macarena Valdés⁹ and Nicolasa Quintreman¹⁰ (both indigenous). All of them have been harassed, threatened of being raped or even killed, which leads to consider a strong relationship between gender-based violence, social vulnerability and environmental risks. Being a woman defender of nature is a major risk factor in Chile.

III. Estimation of similar cases in Chile, plus relevant quantitative and qualitative data



According to the [Environmental Conflict Map](#) created by the National Institute of Human Rights (INDH), there are currently 45 environmental conflicts throughout Chile.¹¹

Regarding the productive sectors, 47% belongs to Energy, 27% to Mining, 7% to Environmental Sanitation and 19% to Other Sectors.

While regarding the causes, there are 7 conflicts that deal with Waste, Emissions and Immissions, 37 that are related to the Place of Exploration or Exploitation, and there are 8 that have to do with the Use and/or Pollution of Natural Resources.

It is especially interesting the fact that 78% of the environmental conflicts happen to occur in indigenous territory, and 10 disputes affect people with a poverty level belonging to Quintile IV¹².

⁷ Marcela Nieto is a resident nurse in the Quinteros slaughter zone, in the V Region of Valparaíso (Chile). She has dedicated herself to explaining how the presence of pollutants such as coal and heavy metals affect people's health, due to the 15 energy, chemical and fuel companies present in her territory. Nieto has been threatened and harassed for years because of her role.

⁸ Javiera Rojas (1978-2021) was found dead in an abandoned house in the city of Calama, Antofagasta Region (Chile). She was a defender of a town that was threatened by the construction of a reservoir, which intended to flood hectares of geological and biographical memories built under the tutelage of a hill. In addition, the activist was involved in the defense of a territory, because of the installation of a thermoelectric plant.

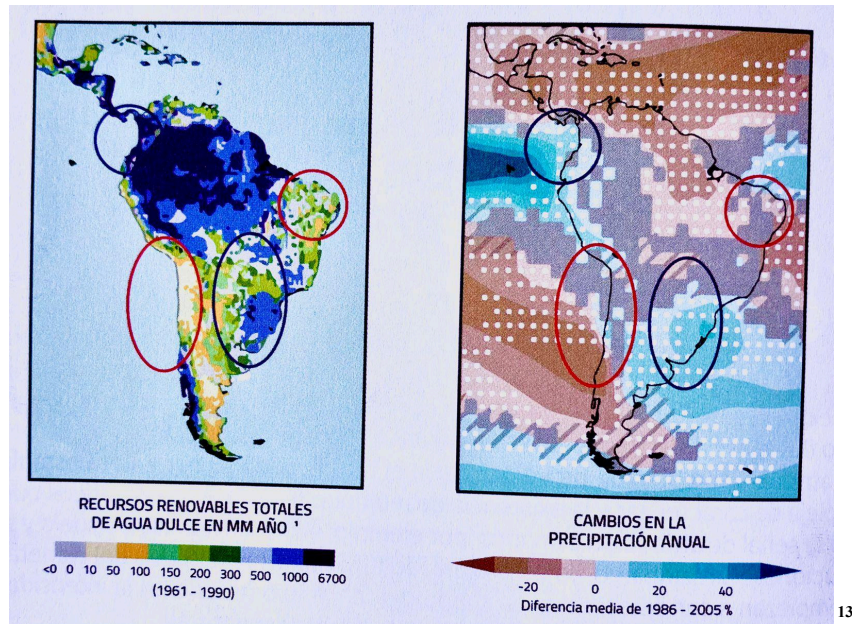
⁹ Macarena Valdés (1983-2016) was an indigenous and environmental activist who led the socio-environmental fight against a hydroelectric plant. She was found suspiciously dead in her house, hanged.

¹⁰ Nicolasa Quintreman (1939-2013) was an indigenous and environmental activist and staunch opponent of a power plant project, in Alto Bío Bío, Araucanía Region (Chile).

¹¹ Updated map (january 2024) of Environmental Conflict in Chile - National Institute of Human Rights.

¹² Quintile (“*Quintil*” in Spanish) is the name given to the five groups that classify the Chilean population by income levels. This is determined from the total sum of the household income and is divided by the number of family members.

IV. Relevant quantitative and qualitative data of the impacts of climate change in Chilean hydric resources



There is an expected heterogeneity in future precipitation projections, finding areas where there would be an increase in precipitation (e.g. the northern part of the Pacific coast of South America) and others where precipitation would tend to decrease (e.g. central Chile). Unfortunately, these changes tend to coincide in regions where there are already marked differences in the availability of resources, so climate change would tend to accentuate these differences¹⁴.

According to the main conclusions of a [study](#) published in the scientific journal *Nature*, the water we find on the surface is not the only water vital for the planet. So are the underground reserves, which support homes, farms, industries and entire cities. But aquifers, like rivers, are also suffering from drought: almost a third of all aquifers globally are rapidly emptying in the last four decades, especially in dry regions. The water stored in the subsoil is registering decreases of up to half a meter per year. Among the most affected countries is Chile, with very significant decreases¹⁵.

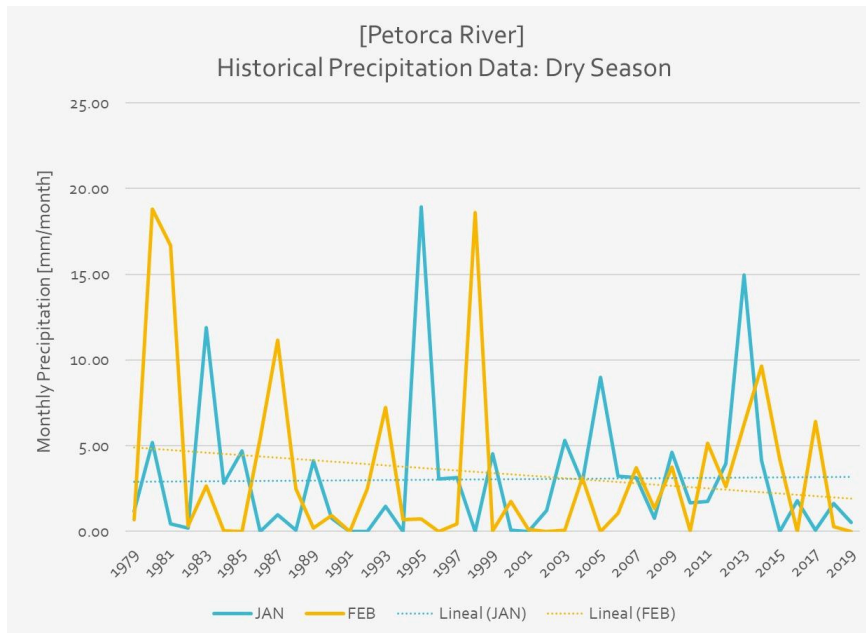
V. Mechanisms and tools regarding the impacts of Chilean hydric loss and damage

- A) Through a basin exploration platform, such as [CAMELS-CL Chile](#) (Catchment Attributes and Meteorology for Large Sample Studies, Chile Dataset), which integrates physical and hydro-meteorological information from basins throughout Chile, it is possible to analyze Petorca's river historical precipitation data, regarding its Dry and Wet Season:

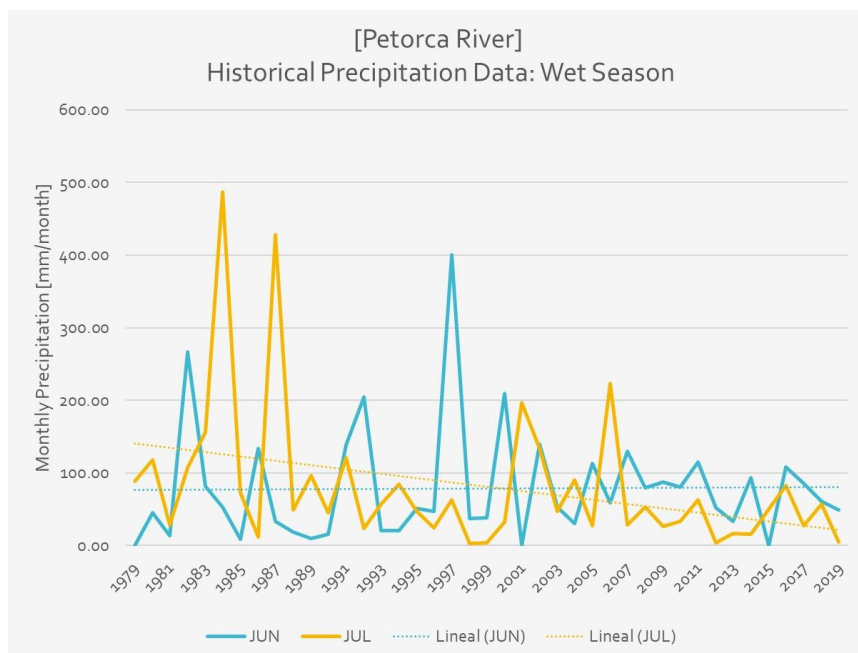
¹³ Availability of water resources in South America (Left) and projections of change in precipitation associated with the RCP8.5 scenario (Right). Areas with high (low) levels of resource availability and that increase (decrease) precipitation in the future are highlighted. (Source: Adaptados de Jiménez et al., 2014 y Magrin et al., 2014).

¹⁴ (Vicuña et al., 2019, page 306)

¹⁵ (Jasechko et al., 2024, pages 715 - 721)



While in 1979, the monthly precipitation during the Dry Season in Petorca was almost 20.00 mm/month, in 2019, it minimally surpassed 5.00 mm/month, which is alarming.

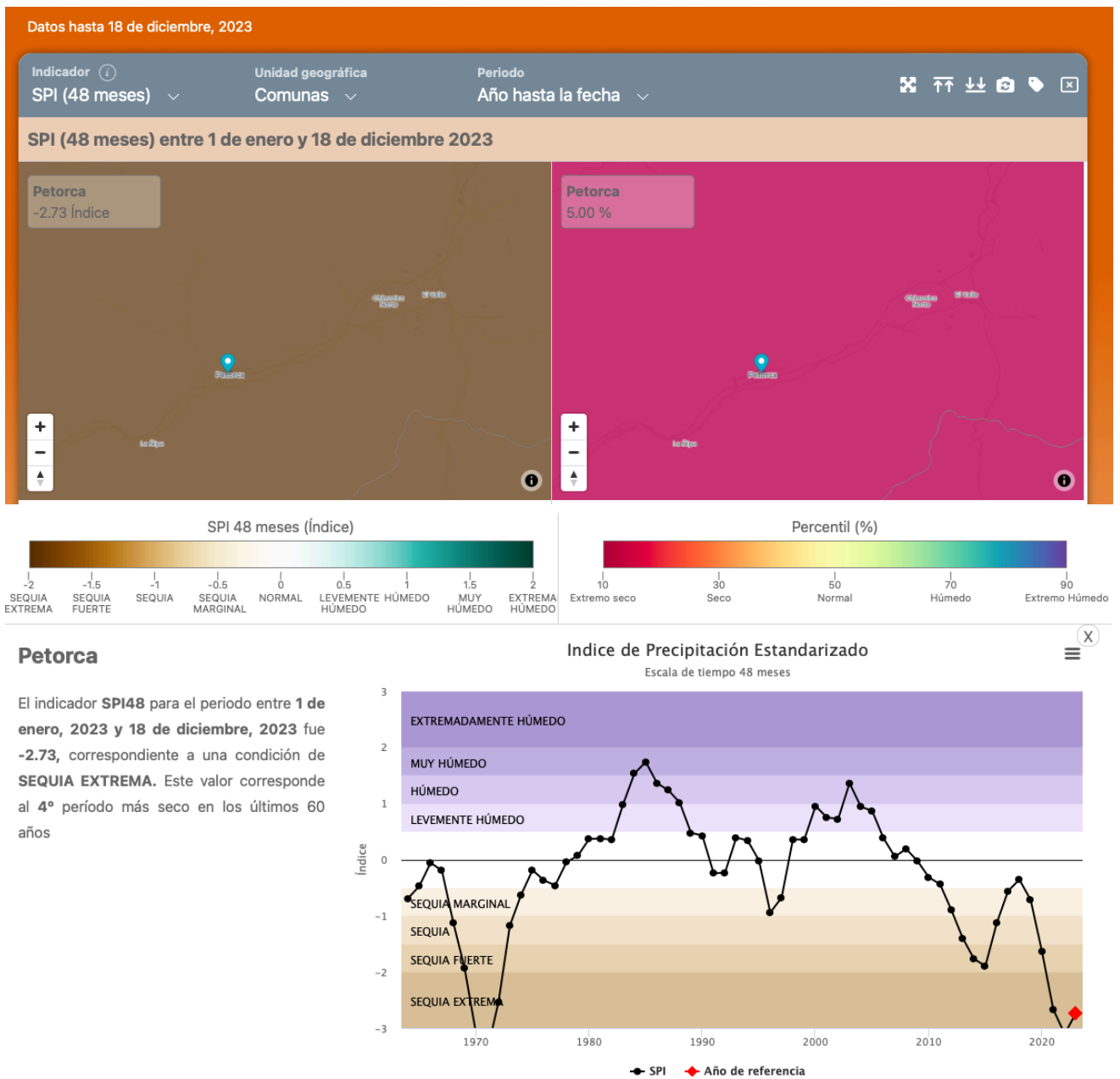


As shown, there has been a decrease in precipitation during the Wet Season, whereas precipitation tends to be out of phase regarding its historical seasons, which has a significant impact on the natural cycles of flora, fauna and fungi.

While in 1984, the monthly precipitation during the wet season in Petorca was almost 500.00 mm/month, in 2019, it almost reached an average of 50.00 mm/month, an extremely shocking fact.

B) On the other hand, tools such as the [Drought Monitor](#), belonging to the Drought and Water

Security Platform in Chile, show the following results: the SP148 indicator for the period between 01/01/2023 and 12/18/2023 in Petorca, Valparaíso Region (Chile) was -2.73, corresponding to a condition of EXTREME DROUGHT. This value corresponds to the 4th driest period in the last 60 years, as seen below:



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¹⁶ (Center for Climate and Resilience Research, 2024)

VI. Specific measures the Chilean government has undertaken or plans to undertake (public policies, legislation, practices, strategies or institutional arrangements) due to the hydric crisis

A) Measures undertaken by the Chilean government:

- a) The Escazú Agreement¹⁷, the first global treaty for environmental defenders' protection, was ratified by Chile;
- b) Analysis of Public Programs by Dimension and Main Problem¹⁸: in 2022, Chile executed 38 environmental and energy programs, spending 629 billion CLP, mainly on Climate Change and Natural Disasters, with a small portion for Environmental Degradation.

Programas públicos y presupuesto ejecutado por la oferta pública según dimensión y problema principal, 2022.

(Número de programas y presupuesto ejecutado en miles de pesos de 2023)

Dimensión y problema principal	Número de programas	Presupuesto ejecutado (miles de pesos)	Distribución porcentual respecto al presupuesto ejecutado de la dimensión (%)	Distribución porcentual respecto al presupuesto ejecutado total(%)
Medio Ambiente y Energía	38	\$629.286.821	100,0%	1,9%
Cambio climático y desastres naturales	11	\$503.536.239	80,0%	1,5%
Deficiencias en la producción, transmisión y uso de energía	14	\$78.642.944	12,5%	0,2%
Deterioro o degradación del medioambiente y ecosistemas	13	\$47.107.638	7,5%	0,1%

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B) Measures the Chilean government plans to undertake:

- a) The [Climate Change Adaptation Plan for Water Resources](#)²⁰;
- b) The [National Water Resources Strategy](#), prepared by the Ministry of Public Works (MOP)²¹.

¹⁷ Escazú, whose technical name is *Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean*, aims to guarantee access to environmental rights and protect environmental activists and biodiversity in times of climate emergency.

¹⁸ (Ministerio de Desarrollo Social y Familia - Gobierno de Chile, 2023, page 51)

¹⁹ Tabla II.2 Programas públicos y presupuesto ejecutado por la oferta pública según dimensión y problema principal, 2022.

²⁰ Which is in its stage of generating the information necessary for its preparation and formation of the technical work teams.

²¹ Carried out between 2012-2025 period.

VII. Examples of promising practices in the promotion, protection, and fulfillment of the full enjoyment of human rights in the context of hydric loss and damage in Chile

- A) The bill for the Biodiversity and Protected Areas Service (SBAP), a public service, dependent on the Ministry of the Environment, which will be in charge of the conservation of biodiversity and whose main instrument will be the administration of a national system of protected areas;
- B) The Escazú Agreement.

VIII. Specific recommendations on how to address the critical challenges that have been identified

A key challenge for human rights in the context of Chile's water crisis is reforming the prevailing water management model. This requires balancing industrial and personal water use, prioritizing the latter. How is it accepted that communities are running low on water for their own consumption, while big industries have monopolized everything? Similarly, it is necessary to suggest that nature-based solutions be implemented to address critical problems such as those regarding the actual water management.

A prime example is halophytes plants native to saline environments. These plants have developed adaptations in structure, function, and biochemistry that allow them to thrive in high salinity conditions, potentially offering insights into making common plants more salt tolerant. Could we imagine a future where we cultivate salt tolerant plants on floating farms at sea? Such innovations could alleviate space and water constraints significantly mitigating food security threats. Fresh-water scarcity is a well-known problem²².

Likewise, gender justice should be fully integrated by now to climate justice in Chile, for the special and entire protection of female environmental defenders. Climate change is not gender neutral: there is no climate justice without gender justice.

IX. Useful additional information to support climate action and justice that promotes the full enjoyment of human rights in the context of hydric loss and damage in Chile

In order to address pressing environmental issues, new ideas and strategies are needed, such as the following:

1. The General Water Directorate²³ should adopt more advanced field work methods and improve monitoring and control;
2. Access to environmental justice needs enhancing, especially for defenders of land, communities, and natural resources;
3. It is important to consider gender and involve local organizations in decision-making;
4. Local organizations²⁴ should be consulted for valuable insights and advice;
5. Policies should promote integrated water resources management, protect water quality, and address water scarcity with innovative measures; prioritizing water consumption in communities while addressing indiscriminate extractivism, and
6. The institutional framework for water regulation should also be improved, with a focus on sustainability, legal security and gender-responsive and locally led adaptation. Measures such as reservoirs, artificial infiltration of aquifers, and desalination should be considered to address water scarcity.

²² (Mancuso, 2017, pages 226-227)

²³ Dirección de Aguas in Spanish.

²⁴ Such as MODATIMA or ONG Defensa Ambiental.

Bibliographical references

1. Alvarez-Garreton, C., Mendoza, P. A., Boisier, J. P., Addor, N., Galleguillos, M., Zambrano-Bigiarini, M., Lara, A., Puelma, C., Cortes, G., Garreaud, R., McPhee, J., and Ayala, A. (2018). The CAMELS-CL dataset: catchment attributes and meteorology for large sample studies – Chile dataset, *Hydrol. Earth Syst. Sci.* 22, 5817-5846, <https://doi.org/10.5194/hess-22-5817-2018>.
2. Barría, P., Sandoval, I. B., Guzman, C., Chadwick, C., Alvarez-Garreton, C., Díaz-Vasconcellos, R., Ocampo-Melgar, A., Fuster, R. (2021). Water allocation under climate change: A diagnosis of the Chilean system. *Elem Sci Anth*, 9(1), 00131, <https://doi.org/10.1525/elementa.2020.00131>.
3. Banco Mundial (2011). Chile: Diagnóstico de la gestión de los recursos hídricos. Departamento de Medio Ambiente y Desarrollo Sostenible. Banco Mundial.
4. Carrere, M. (2021, June 21). “Te vamos a matar, déjate de “hueviar” por el agua” | Entrevista a Verónica Vilches, defensora del agua en Chile. *Mongabay Latam*. <https://es.mongabay.com/2021/06/entrevista-veronica-vilches-defensora-del-agua-chile/>.
5. Castilla, J.C.; Meza, F.J; Vicuña, S.; Marquet, Pablo & Montero, J.P. (Eds.). (2019). Cambio climático en Chile: Ciencia, Mitigación y Adaptación. Ediciones UC.
6. Center for Climate and Resilience Research. (2024). Monitor de Sequías. Plataforma de Sequías y Seguridad Hídrica en Chile. <https://anidsequias.meteodata.cl/monitor/>.
7. Duclos, E. (2020, May 27). Escasez hídrica en Petorca: “Acá la gente no tiene agua para lavarse las manos y prevenir el contagio de Covid-19”. *La Tercera*. <https://www.latercera.com/paula/noticia/escasez-hidrica-en-petorca-aca-la-gente-no-tiene-agua-p-ara-lavarse-las-manos-y-prevenir-el-contagio-de-covid-19/3KDCH2CUNZDNDQ31RJX3K3FDI/>.
8. Jasechko, S.; Seybold, H.; Perrone, D.. et al. (2024). Rapid groundwater decline and some cases of recovery in aquifers globally. *Nature* 625, 715–721 (2024). <https://doi.org/10.1038/s41586-023-06879-8>.
9. Jiménez, B.E., T. Oki, N.W. Arnell, G. Benito, J.G. Cogley, P. Döll, T. Jiang, y S.S. Mwakalila, 2014: Freshwater resources. En: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C.Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, y L.L. White (eds.). Cambridge University Press, Cambridge, Reino Unido y Nueva York, NY, EE.UU., pp. 229-269.
10. Magrin, G.O., J.A. Marengo, J. -P. Boulanger, M.S. Buckeridge, E. Castellanos, G. Poveda, F.R. Scarano, y S. Vicuña, 2014: Central and South America. En: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, y L.L. White (eds.)]. Cambridge University Press, Cambridge, Reino Unido y Nueva York, NY, EE.UU., pp. 1499-1566. Millennium C.
11. Ministerio de Desarrollo Social y Familia - Gobierno de Chile. (n.d). Tabla II.2 Programas

públicos y presupuesto ejecutado por la oferta pública según dimensión y problema principal, 2022.

<https://www.desarrollosocialyfamilia.gob.cl/storage/docs/ids/Informe-desarrollo-social-2023.pdf>.

12. Mancuso, S. (2017). El futuro es vegetal (D. Parabela López, Trans.). Galaxia Gutenberg.
13. Poo, P. (2023). Punto de inflexión: crisis climática y ecológica (D. Campusano, Ed.). La Pollera Ediciones.