Could the Search for Sustainability Reinforce Socio-ecological Conflict?: The Mining Industry in Chile and Its Impact at the Local and Regional Level

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1 Introduction

The beginning of ecological institutional modernization in Chile started officially with the implementation of Law 19,300 "Environmental Bases",[1] which established the first Nation Environmental Commission (CONAMA) in 1994. The implementation of Law 20,417, under which the Ministry of Environment, the environmental superintendence,[2] the environmental courts, and the environmental assessment and biodiversity services were created in 2010, is considered the final stage of Chile's ecological institutional modernization. Chile then joined international efforts to organize a national response to its ecological crisis within an international context of increasing sustainable global governance (Speth and Haas 2006; Levy and Newell 2005; Akhtarkhavari 2010; Winter 2006; Jasanoff and Long Martello 2004; Park et al. 2008[3]).

Interviews The interviews quoted in this article, belong to the authors PhD thesis fieldwork, considering more than 25 interviews with academics from the so-called Chilean traditional universities, policymakers, representatives of NGOs, the local community and the mining sector. In terms of keeping the anonymity of the interviewees the reference are only general.

[1] In Latina America, the environment institution transformation in the 1990s was enforced by different laws commonly known as the "environmental bases" because a UNEP report with this title influenced them strongly.

[2] This is a specific word used in Chile.

[3] See Speth and Haas (2006), as well as Haas et al. (1995) for an integrated perspective of the principal events and concepts that have influenced the global environmental agenda over the past decades. To observe global environmental governance from an international law perspective, which is prevalent in the process of social learning, see Akhtarkhavari (2010). See Winter

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This article challenges the official representation of modernization as a simple institutional improvement. Further, as an alternative thesis, it suggests that modernization has contributed to the increasing depoliticization of the society-nature relationship over the last 20 years (Campos and Larenas 2012).[4] We support this interpretation by showing that basing the ecological debate on the notions of the sustainable extraction of natural resources and sustainable pollution management control is insufficient to deal with the negative and pervasive consequences of the extractive industries on which the Chilean economy is based.[5] The argument implies that it is possible to improve sustainable production and concurrently reinforce the socio-ecological conflict at the local level if industries are extended regionally.

Following Gligo (2006), the environmental-economic history of Latin America can be described as different waves of productive restructuring occurring at the regional level across the entire continent. As an example, Giglo mentions the transformation of the pre-Columbian cultures' agricultural orientation into the extraction of silver in the Colonial period in order to supply the Spanish metropolis. Thereafter, despite the independence movements, the situation did not change substantially; the nascent national states sought integration into the global markets through the consolidation of mono-productive regions. In the eighteenth and nineteenth centuries, Europe relied strongly on the import of products such as cocoa, coffee, rubber, and sugar cane to sustain everyday life, while imported minerals, such saltpeter, sustained the industrialization process. In both centuries, the governors and the political elites carried on as if the resources were unlimited and as if any previous forms of the society-nature relationship – from the pre-Columbian cultures – were inferior to those of Europe (Gligo 2006, 11).

The famous Potosi mine in Bolivia is a good example of the regional economic restructuring in Latin America and its devastating socio-ecological effects. The Potosi Mountains were rich in silver ore deposits; it has been claimed that, during the eighteenth century, more than the 50 % of the world's mineral production was extracted there. At the time, the city of Potosi had a population of 200,000, thus competing with big metropolises such as Paris and London. Moreover, it was larger

(2006) for an explanation of global environmental governance as a system of multilevel institutions and how they adopt the Earth system analysis derived from the natural sciences. For an account on the connection between the global and local forms of environmental governance, see Jasanoff and Long Martello (2004). See Park et al. (2008) for a critical perspective of global environmental governance in terms of the connection between sustainability and globalization and the effects of the environmental policies' marketization.

[4] Campos and Larenas (2012, 6) regard the ecological modernization in Chile as depoliticization because it implies a "constant decline in the public and social character of the ecological debate. The new environmental institution represents modern procedures' access to the ecological management, as well as the exclusion, of previous forms of socio-ecological conflict regulation." (Translation by the author.)

[5] Mining activity was responsible for 10 % of the national GDP in 1993; it achieved a peak of 20 % from 2006 to 2007, becoming stable at about 15 % in 2010 (based on the Chilean Central Bank's (n.d.) data, historical statistics, and the percentage of the GDP calculated at current prices).

than any city in the Spanish kingdom. Very few studies have investigated the scale of this transformation in production on the continent and the pressure this change exerted on the environmental components.[6]

This article calls for a redefinition of the notion of sustainability in the context of large industrial expansionism and regional productive restructuring. At the local level, we propose that sustainability should focus on everyday practices that ensure the local community can subsist despite the risk of water rights monopolization, the high demand for energy, and the concentration of land concessions for exploration and exploitation in the northern area of Chile. At the regional level, sustainability should not merely focus on clean production, but should also consider the negative effects of the mining cluster's expansionism. These negative effects not only affect local ecosystems, but also lead to rapid rural depopulation and accelerated urbanization, which in turn increases the number of informal settlements in the country's medium-sized cities.

2 Productive Regional Restructuring and Socio-ecological Conflicts

The abovementioned process of territorial restructuring, which will be referred to as *regional production specialization* from a theoretical standpoint, is the result of the coincidence of a territorial and an action orientation deployed at the local level.[7] The economic literature has equated this territorial tendency toward mono-production – in which single projects bring about an aggregated effect on a regional scale – with the notion of productive regional performance by calculating the coefficient of localization, or the index of production specialization.[8] From this

[6] For a more detailed view of the analysis of socio-ecological conflicts in Latin America, see Galeano 2004.

[7] Here, we analytically distinguish between "action orientation" and "territorial orientation" in order to describe the difference between activities that primarily mobilize actions pertaining to entrepreneurialism and market-oriented logic, and those activities geared toward rearticulating the territory for regional specialization. Max Weber coined the action orientation concept in his classical book Economy and Society (2002), in which he defines the types of action orientation in the concepts as: usage, custom, and self-interest. Giddens's (1986) structuration theory provided possible variants in terms of action orientation. Giddens's (1986) book was one of the first sociological attempts to incorporate the notion of time-space in a theoretical explanation, using the idea of regionalization. This distinction is totally analytical because, from a comprehensive perspective, every action spacializes and every meaningful space is constructed by territorially unfolding actions. For this integrative framework, see Werlen's (1993) "everyday regionalization" concept.

[8] In both cases, the analysis determines a territory under study and a territory of reference as a total universe (national state or supranational level). The relationship considers the percentage of employment in a particular economic activity in that region in relation to the total universe. Values around 0 show the non-presence of the activity in the territory, a value of 1 indicates equal

perspective, the degree of specialization is a valuable index for economic performance and a good proxy for the degrees of development. Territorial public policy tries to reinforce this economic orientation without much reflection on its consequences at the local level. Human geography, regional planning, agriculture, and ecological studies give us a different perspective, from which specialization is always contrasted with regions' possibility to sustain other relevant activities for the local community. This is especially significant for small-scale agriculture, which has always been represented as an integral part of rural communities' spirit.

The Chilean territorial specialization – represented by large extractive industries, especially mining and forestry, but also energy production, large fishing companies, and salmon aquaculture – has been extensively criticized in the academic and public sectors. The mining and forestry industries are criticized for engendering water shortages, thus contributing to losses in agricultural activity and the depopulation of rural areas. The following excerpts explain how academics and policy makers assess the socio-ecological problems due to the water scarcity in the Atacama Desert and due to the poor water quality in the southern rain forest. This socio-ecological conflict runs concomitantly with the struggle for land and the monopolizing of energy.

> The traditional activities, which justified the presence of rural human settlements and which generated communities' control of water resources, are disappearing [...] A community that does not have a water supply cannot exist as a community and is unable to work; therefore, it loses its social discipline, which implies protecting terraces, maintaining crops, cleaning irrigation channels, and distributing water in a socially equitable way. The community has no reasons for continuing to exist if this social discipline disappears; hence, most of its residents will move to the city (Academic State University).[9]
>
> In the southern lands [indigenous groups] cannot sell their land, but they are available for lease. So, what could I do? Forestry companies lease these lands to plant eucalyptus and pine forests, which implies degradation of the soil quality, as well as groundwater pollution. This problem occurs in communities such as Renaico and Collipulli where there are large forestry plantations; therefore, all the water is used, which makes impossible to cultivate anything in the fields close to these forests (Director of the National Agency)[10]

At this point, it is important to mention that the notion of territorial economies of scale, which underlies ideas such as economic efficiency and/or economic advantage, cannot solely explain the emergence of a regional specialization. This explanation, widely accepted in the economic literature, justifies the concentration of production clusters in specific areas. Furthermore, this explanation only highlights the benefits of economies of scale for the emergent companies without considering their negative effect on other activities in the territory.[11] On the contrary, and from

distribution of the activity in the regional and in the total universe, while values above 1 represent the specialization of certain activities in the region.

[9] Translation by the author.

[10] Translation by the author.

[11] This refers to the tension between the mining industries and agricultural activities; mining projects compete with preexisting agricultural activities because they are located in the same areas, or use the same water sources. The Latin American Observatory of Environmental Conflicts and

an environmental conservationist perspective, the emergence of regional production clusters[12] is due to the lack of mechanisms to measure the aggregated environmental impact of single megaprojects on a regional level. In this sense, it can be argued that the traditional environmental impact assessment mechanism is only applied to single projects. Consequently, it becomes a blind institutional tool for tackling productive restructuring at the higher territorial levels. We will argue that this form of environmental impact evaluation is incapable of explaining, measuring, and controlling the aggregated effects of the productive clusters emerging and expanding in different regions of the world.[13]

From this theoretical perspective, the regional productive restructuring is responsible for the reemergence and intensification of socio-ecological conflicts if its expansive nature is not counteracted. This restructuring – in the form of a mono-production specialization – only appears to be an active social reality under two circumstances in which capitalism unfolds: an inclination toward entrepreneurialism in the form of innovative enterprises and processes, and the intention to ensure and extend projects that have proven to be profitable. This discursive orientation becomes clear in terms of the mining industry and the consolidation of the regional mining cluster when companies are given national concessions to explore (innovation) and exploit (assurance) mineral deposits. It should be emphasized that the tendencies of extractive industries to explore/innovate and exploit/extend are an integral part, and not just a side effect, of the business model. The consolidation of big regional production clusters, even if they are based on green or sustainable measures, is an emergent social reality with an unknown magnitude and consequences.

When the capitalistic orientation of entrepreneurialism and assurance coincide regarding territory, strong pressure is exerted on the productive inputs: land, water, energy, and work. This intensifies tendencies to reorganize the environment and people's living conditions at the local level. In this context, we understand *innovation* as the development of new resource extraction areas. Complementarily, *assurance* is understood as the intensive exploitation of successful enterprises already anchored in the territory.

In respect of the mining industry, a methodology that combines a discourse analysis of national environmental laws and interviews with key actors will show that the advancement in sustainability is linked to the strong pressure on

the Latin American Observatory of Mining Conflicts (OLCA/OCMAL 2012) have identified 25 environmental conflicts that the mining industry has caused in Chile. All of these conflicts have occurred in the Atacama Desert region. In Latin America, 161 conflicts are recognized, affecting 212 communities; 5 of these conflicts occur on transnational borders. See OLCA.

[12] Here, the cluster notion is used in a very broad sense as the aggregated effects of different single mines located in the Atacama Desert region. For a critical perspective of this concept, see Martin and Sunley (2003).

[13] Among many others, the uranium exploitation in Argentina and that of the oil sands in Canada are examples of other socio-ecological conflicts emerging from different types of mining activities. These activities require large regional production restructuring and have important consequences for the local communities.

particularly scarce resources in the Atacama Desert. The sustainable extraction of copper and different improvements in mineral waste treatment cannot solve the mining industry's high demand for water in the world's most arid desert, or ensure that water will always be available for human consumption in the northern cities of Copiapo, Antofagasta, and Calama,[14] and especially for the Atacameños and Aymara[15] in rural areas. Similarly, the mining industry cluster's demand for energy requires a redefinition of the entire national energetic matrix through the construction of mega hydroelectric power stations in the south and new thermoelectric coal plants in the north of Chile. The following quote from a local radio interview suggests that the water conflicts are provoked by the incorporation of economic rationality to manage the distribution of water, which has been government policy since 1981.[16]

> They polluted our water in 1998. In 2001, the Chilean State declared the Loa River exhausted and since then nothing has been done to resolve the problem. Those responsible for this pollution are Codelco Chile and Soquimich. These companies still continue purchasing water rights, taking advantage of people's financial needs. Currently, we do not have water resources for agriculture. Quillagua received polluted water from Calama. I am angry with the Chilean State (President of an Aymara community).[17]

The following sections deal with two issues: The first discusses *ecological modernization* as an analysis perspective with a focus on the central characteristics that link environmental institutional modernization processes and the search for sustainable production. The second section presents an analysis of the mining industry cluster in the north of Chile in terms of: (i) ecological institutional modernization as a form of place achievement, (ii) the unequal distribution of environmental roles in national and international contexts, (iii) the construction of a spatio-temporality in environmental issues that reinforces economic entrepreneurship, and (iv) a goal-oriented understanding of sustainability linked to the assurance of highly profitable enterprises.

3 Ecological Modernization as an Analysis Perspective

The notion of ecological modernization has two opposing meanings. On the one hand, the modernization process is often understood in everyday language as an initiative to improve efficiency and efficacy in institutions. If so, this improvement

[14] For an in-depth discussion of the water conflict in Chile, see Larraín and Poo (2010).

[15] The Atacameños and Aymaras are two pre-Columbian native groups; the Atacameños inhabit the Atacama Desert in Chile and Argentina, while the Aymaras inhabit the Andes in North Chile, South Peru, and Bolivia. It is estimated that the Atacameños have been around since the fifth century while the Aymaras' origins can be traced back to around 2,000 years BC, even before the Inca Empire ruled the region.

[16] Chilean water code.

[17] Radio Station, University of Chile (2012). Translation by the author.

should be applied to environmental institutions by promoting the centralization of their control and supervision mechanisms. In Chile, the underlying hypothesis is that environmental responsibilities and norms are spread across a large number of state departments and legal bodies. Consequently, it has become essential to coordinate control and supervision in order to gain efficiency. This argument was used during the two major waves of environmental institutional modernization in Chile, and explicitly mentioned in the presidential speech introducing Law 19,300 of 1994 and Law 20,417 of 2010.

> However, this study also proved to be a large-scale diffusion, incoherent, and lacking management of the current sectorial legislation and its multiple amendments; therefore, it has caused great ignorance of its scope, uncertainty about the validity of the original texts, and a serious breach of law. Additionally, it has been found that the environmental protection public authorities are scattered across many different agencies, which operate in a non-organic way and whose responsibilities run in parallel and are ambiguous (Aylwin 1992, 10)[18]
>
> The re-design seeks to rationalize the competencies in order to have an authority which can issue policies and regulations for the protection of environmental resources; the sectorial competencies will therefore be organized and the coordination facilitated within the public system (Bachelet 2008, 11)[19]

In a similar vein, Mol and Jänicke (2009) argue that, originally, ecological modernization began as political projects in Germany and the Netherlands. There, the concept was approached as the "social scientific interpretation of environmental reform processes at multiple scales in the contemporary world" (Mol et al. 2009, 4), especially in projects in which caring for the environment do not restrict economic development but actually produce a benefit. On the other hand, certain groups of scholars use the notion of ecological modernization to criticize environmental public policy's new orientation, which was internationally implemented in the early 1980s and is still applied today. The main characteristic of this policy orientation is the extended belief that it is possible to maintain the economic system and simultaneously comply with environmental goals. In other words, satisfying the need for growth and protecting and improving environmental conditions[20] are feasible if new technologies and market mechanisms are incorporated into the sustainability development framework. This critical perspective was formed because no international environmental protection goals have been fully realized in the last two decades. For example, global warming has worsened (Intergovernmental Panel on Climate Change 2007, 2013),[21] the territorial roles and the inequalities between the northern and southern regions have been strengthened

[18] Translation by the author.

[19] Translation by the author.

[20] In some ways, all the critical literature on ecological modernization recognizes this characteristic.

[21] "Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850 (see Figure SPM.1). In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1,400 years (medium confidence)" (IPCC SPM: 3).

(Roberts and Parks 2007; Gonzáles et al. 2007), and socio-ecological conflicts seem to increase in many countries.[22]

Both the above interpretations of environmental institutional modernization are based on the idea that certain social institutions need to be changed in order to tackle the environmental crisis. However, the main difference lies in various social actors' reasons for the transformation. According to its advocates, modernization should improve every social life sphere in order to ensure a more rational use of resources. Modernization should help environmental institutions incorporate economic rationality in order to coordinate decisions; that is, they should become more efficient and effective, and the social costs they incur in meeting their objectives will be minimized.[23]

In contrast, for their detractors, modernization processes always have pros and cons (Van der Loo and van Reijen 1992; Rosa 2009); the ecological institution is no exception. The pursuit of the rational use of resources may lead to a liberal economic rationality's colonization of the ecological sphere that confuses the process's means and ends. In this sense, social, economic, political, and environmental institutions are changing in order to face the ecological crisis, but with the implicit intention to protect the economic imperative of growth, and not basically to defend nature, the local ecosystem, communities, and biodiversity. From this critical standpoint, the subordination of nature during the last three or four decades has been reinforced by the ecological modernization process in Latin America (Altieri and Rojas 1999; Guimaräes 1999; Gudynas 1999).

Our argument is based on a critical perspective of modernization. The main question is whether, given the many examples of the devastating human consequences of environmental changes around the world, it is possible to merely conceptualize institutional modernization as social improvement. Megaprojects related, for example, to raw material extraction, energy production, and waste deposits – especially in developing countries – should be conceptualized as a specific form of global integration in these regions, which runs parallel to other waves of environmental issues' globalization regarding green production, decontamination processes, and the combatting of global warming.

In this article, ecological modernization is understood as the modernization process that all governments promote and which is applied to environmental institutions at the national state level. This conceptualization challenges the idea that ecological modernization is a process that describes the situation in developed countries with a market economy and a welfare state; that is, especially the primary OECD countries. Ecological modernization has been the socio-political answer to

[22] In respect of Chile, see Campos-Medina and Campos-Medina (2012).

[23] Ecological modernization gives rise to a particular form of rationality, which some authors have subsumed under the economic rationality concept, while others have considered it independent of other social spheres. Nevertheless, the particular characteristics of this "ecologic rationality" should be the object of empirical research. Describing the integrative character of all the material and symbolic interactions between society and nature, Leff (1986) argued that "[e]very society creates its own environmental rationality."

the national-level environmental crisis since the 1970s, regardless of the country's political, economic, or social situations. We can thus assume that, even if the industrialized countries were the forerunners, every country in the world has currently undergone a transformation of its environmental legal frameworks and institutions in order to address its ecological challenges. In other words, it is highly improbable that there is a country that has not mobilized resources of every kind to address these problems.

Since the ecological modernization process is limited to certain successful institutional transformations, it assumes that peripheral countries' modern environmental progress follows the same predefined patterns as those of developed countries. In this sense Mol asks: "[W]hat are the opportunities for non-triad countries in particular, to pursue development paths that differ from the dominant Western models of environmental reform, which seem so strongly connected to the ideas of ecological modernization?" (Mol 2003, 63). We conversely propose that every country represents a different form of modernization that responds to a different international integration imperative, whether ecological and/or productive.[24] The international level plays a fundamental role because multinational agencies influence the management of ecological policy, help shape the environmental crisis narrative, and facilitate the setting of priorities and the defining of the procedure.

In summary, ecological modernization is the transformation of the society-nature relationship at the national level, but in the context of a global transformation during which different roles are redefined. Lastly, we regress from the conceptualization of ecological modernization and sustainable development as the two main ways in which environmental institutional transformation could occur. From our perspective, even if the two orientations for action – ecological modernization and sustainable development – are not conflated (Langhelle 2000), it is theoretically and empirically impossible to separate them as two distinct tracks. The notion of sustainability is highly embedded in the modernization rhetoric, and the movement toward sustainable forms of production is therefore a central part of the modernization process in all analyzed international cases.

[24] The arguments presented here are based on sociological critique of the theories of modernity, which regard the modernization in Central Europe and North America as an unavoidable track that every other society has to follow. The modernization process can differ from society to society because the core of this sociological explanation is not the result, or the last stage, of modernization tendencies, but, conversely, the requirements that every society confronts in a growing and unavoidable modern context (see Touraine and Bixio 2000). In another variant, this argument is based on the idea of universalistic integration as presented by Chernilo and Mascareño (2005). Here, environmental international integration is compelled by universalism and particularism in a normative, as well as functional, context.

4 Sustainability as a Normative Referent and Factual Phenomenon

From a normative perspective, ecological modernization strives for an ideal state of sustainability by harmonizing the society-nature relationship. Even though the idea of sustainability as a normative referent dates back to the middle-ages (Bosselmann 2008), it is still considered a non-achieved stage, a goal to be socially pursued, which evolves in the same way as ecological consciousness. As a normative referent in the context of ecological modernization, we understand sustainability as a social ideal or, in other words, as an evolutionary orientation toward present and future actions. From a different perspective, sustainability has historically materialized in various ways. It may therefore represent different factual strategies and measures within the ecological modernization process, which covers different waves of sustainability deployment across time. Consequently, we consider sustainability a factual phenomenon.

A normative referent and factual phenomenon are closely interwoven; their differences can only be reflected in theoretical terms. None of their actions lack further orientation, in the same way that no meaning is socially relevant if it has not materialized, even if this materialization is at the level of language and narratives. Nevertheless, confusing the two dimensions, or, even worse, rejecting one dimension by favoring the other, complicates analyzing the ecological modernization process from a perspective in which the factual unfolding of sustainable strategies has positive and negative effects. Given the distinction between sustainability as a normative referent and a factual phenomenon, we consequently propose analyzing the negative effects of the ecological modernization in Chile. This ecological modernization is primarily oriented toward supporting the extractive industries and supplying materials to global markets, and only secondarily toward the protection of ecosystem and local communities.

The next section shows how ecological modernization oriented towards achieving sustainability has, in the Chilean mining industry, increased socio-ecological conflicts with the local communities. The analysis is based on four dimensions: (i) the expansionist character of copper exploitation in the industry and the tendency to monopolize all other production inputs, (ii) the consolidation of the Atacama Desert area's regional production role as a place of copper exploitation to the dramatic detriment of other traditional activities, (iii) the spatio-temporality of the mining activity, which reinforces the entrepreneurialism orientation, and (iv) the goal-oriented sustainability regarding pollution management and the rational use of resources while excluding all references to understanding and incorporating the negative consequences for the local ecosystem, the biodiversity, and the living conditions.[25]

[25] *Traditional living conditions* do not refer to a conservative perspective. On the contrary, it means that, in order to support extensive industrial activity, ecological modernization dramatically and daily reorganizes social practices. Examples are the transformation of the labor market, the

Our thesis proposes that, together, these four orientations form a comprehensive narrative about sustainability that has become key in Chilean ecological modernization. We argue that these orientations are the drivers behind the extractive industries' expansion over the last 20 years. Sustainability has become the centerpiece of the consolidation of certain economies and regions as suppliers of raw materials to international markets. International pressure to adopt green forms of production is without a doubt a positive transformation. Nevertheless, the incorporation of new technologies will increase the extraction of natural resources and further increase pressure on the so-called environmental services. In this sense, we have ascertained that the search for sustainability in the extractive industry – the main target of the Chilean ecological modernization process – will lead to the intensification of socio-ecological conflicts with local communities in the country's vast rural areas.

5 The Mining Industry Analyzed from a Territorial and Action Perspective

5.1 Place Achievement as Territorial Expansion: A Key Part of Ecological Modernization in the Context of Sustainability

Many attempts have been made to understand how economic development takes place. These actions are not casual; economic accumulation is based on very specific patterns of spatial restructuring, in which the territorial expansion process is simultaneously a condition for, and a consequence of, further capitalistic developments. The traditional Marxist definition of capitalism is rooted in what has been labeled land acquisitions or, more accurately, the German concept of *Landnahme*. Following Klaus Dörre's (2011) theory, *Landnahme* describes a process of constant territorial expansion, in which capital reproduction is not only produced by the internal movement of goods and money, but fundamentally also by acquiring new places for capital development "at the cost of none-capitalistic ones" (Dörre 2011, 91). As soon as we accept that capitalistic expansion does not fully comprise an internal improvement of capital efficacy, we are drawn to search for other strategies in which capitalism acquires strength and in which spatio-temporal restructuring can deliver useful insights. In this regard, it is possible to connect the improvement in sustainability with negative territorial expansionism.

Based on Dörre's conceptualization (2011), we propose environmental reforms that explain acquiring place by means of two parallel and interrelated processes. These processes have been labeled *Landnahme as territorial acquisition* and

intensification of immigration flow patterns, increasing housing prices and informal urbanization, as well as the trade and supply of products, energy, and services.

Landnahme as domain acquisition. The former is the obvious and empirically demonstrable expansion of the territorial dimension on which productive clusters operate, while the latter involves the incorporation of new activities, which capitalism's socio-economic principles determine.

These two phenomena were clearly observable in the copper industry in Chile between 1989 and 2012. In terms of territorial acquisition, the national copper production could be regarded as a proxy for territorial expansionism. Figure 1 shows that Chile's participation in the international copper market grew from 17.8 % in 1980 to 32.4 % in 2010.[26] This increment in the production was mainly due to the incorporation of private investments in order to explore and exploit new reservoirs in the form of megaprojects. These megaprojects involved the five big mines that were operative in 1993 but grew to include to more than 25 in 2012. In the mining industry, it has become standard practice to take on big private projects like the Doña Inés de Collahuasi (Developed by Anglo American Company 1999) and Los Pelambres (Developed by Antofagasta Minerals Company 1999), which were undertaken by some of the biggest mines in the world.

Figure 2 shows how the increment in the production of minerals was distributed over the territory between 1993 and 2012. In a temporal comparison, the production in the traditional mining area in the Atacama Desert grew by almost 200 %, while it increased almost five times in the fifth and metropolitan region. The only region that showed a shortage was the sixth, where the biggest underground copper mines in the world are located, which should provide a constant production during the next 50 years. The third region, which traditionally comprises small or middle mines, almost tripled its production. Importantly, in this period, the first and fourth regions began exploiting their biggest investment. In the southern regions of the mining cluster, this investment is not fully dedicated to copper extraction, but primarily to other minerals, such as silver and gold at the Pascua Lama (Barrick Gold 2011) mine – a big mine operating on the national border between the Argentinian San Juan province and Chile's third region, Atacama.[27]

From a domain acquisition perspective, *Landnahme* should be understood as the ability of capitalism to always refer to outside areas in the form of "non-capitalist [social] formations or some sector within capitalism, such as education, that has not been proletarianized" (Dörre 2011; quoting Harvey 2003). The interconnection between the political and economic systems that promote the extractive industries inside the Chilean environmental legal framework is a good example of this domain acquisition. The first central environmental law in Chile (Law 19,300 of 1994) could be considered a landmark in the territorial expansionism of mining activity, as well as in the industry's domain acquisition. We aim to prove that, since 1994,

[26] In order to better understand the relevance of Chile in the copper international market, it can be compared to the world's petroleum production, with the two main producers, Russia and Saudi Arabia, only contributing around 12 %.

[27] Currently, the operations in the mine are closed and Pascua Lama could be considered an emblematic case of socio-ecological conflict in Argentina and Chile.

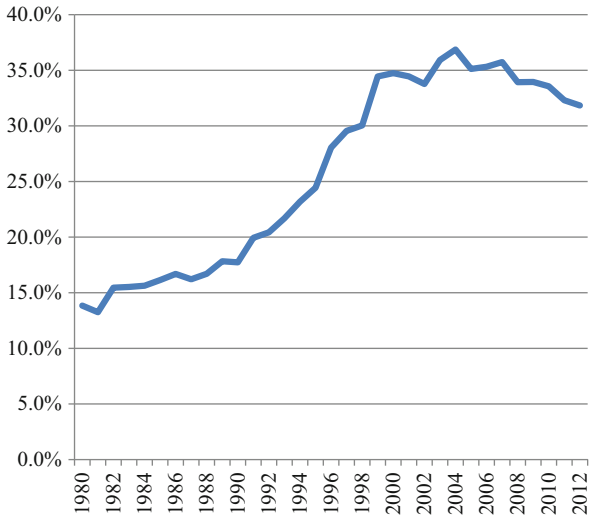

Fig. 1 Chilean participation in the world copper production. Self-elaboration using data from COCHILCO (Chilean Copper Corporation (n.d), Statistics)

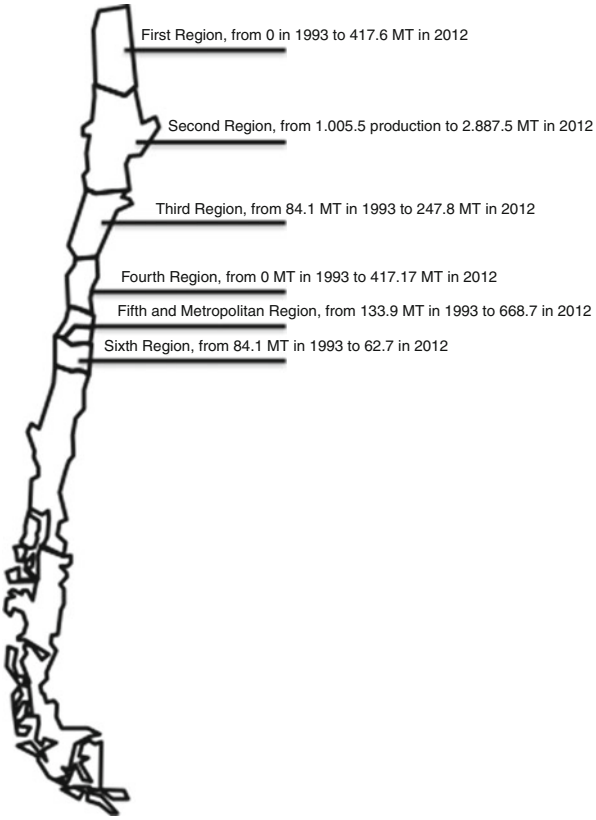

Fig. 2 Evolution of copper production by Chilean regions. Self-elaboration with data from COCHILCO (Chilean Cooper Corporation, Statistics)

market orientation has determined the environmental policy and that two political events were particularly relevant in this period: (i) the modification of Law 18,097[28] of 1982, which opened mining activity to private investors in the form of exploration and exploitation since 1990; and (ii) the presidential approval of a new environmental legal framework, which became explicit in his executive speech to introduce Law 19,300[29] in 1992. As the excerpt from the speech below suggests, the new framework's incorporation of sustainable ecological measures would be gradual and would not hinder economic development.

> Simultaneously, environmental protection cannot be considered in a restrictive sense. Our country should satisfy the increasing need for housing, health, education, electric power, etc. This means using the resources that it owns [. . .] this project has gradualism as its inspiring principle. It does not immediately require the most demanding environmental standards, or try to subjugate all the activities in the country without considering their importance for the evaluation process of the environmental impact. (Aylwin 1992, 16).[30]

At the beginning of the democratic transition in Chile,[31] the political system's explicit support of the extractive industries was the result of the expansionist character of the mining activities over the previous decades. Figure 3 shows the accelerated and sustained growth of Chile's GDP between 1986 and 2010. This exponential growth is largely explained by the development of mining. From 2000 onward, mining activities exceeded 10 % of the GDP, achieving a peak of 20 % between 2006 and 2008, and subsequently stabilizing at 15 % of the GDP.

In summary, if the perspective used here is accurate, the forms of place achievement through territorial and domain acquisition are strongly interrelated because territorial expansionism is based on the consolidation of a strong institutional framework that creates certainty for long-term investments. In empirical terms, this means highlighting the interconnection between social action, institutional transformation, and territorial orientation when explaining highly effective social phenomena.

5.2 Territorial Environmental Role Assignment: A Form of Unequal Distribution at the Core of Ecological Modernization

The unequal environmental role distribution is an interesting notion that complements the theory of ecological modernization. Unlike most theoretical approaches, it places the unfair allocation of specific functions in a territory at the center of the

[28] Constitutional Organic Law on Mining Concessions.

[29] The environmental bases law.

[30] Translation by the author.

[31] For a complete analysis of the Chilean democratic transition in the context of the socialist government, the coup d'état, and the dictatorship regime, see Boeninger (1997).

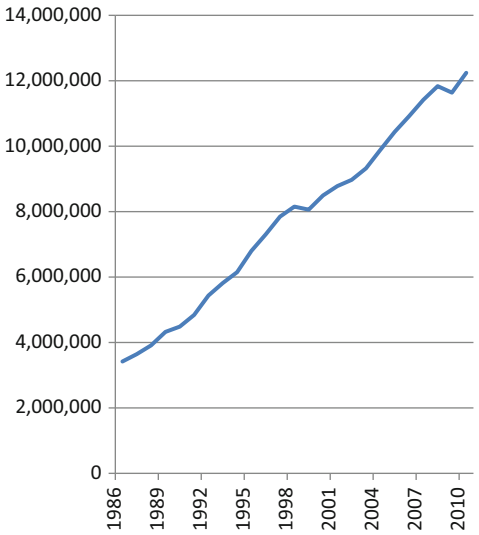

Fig. 3 Evolution of Chilean GDP. Self-elaboration using data from the Chilean Central Bank (n.d.), Statistic. Money valued at 1986

modernization process. This analysis reestablishes modernization as a powerful driver of spatial restructuring and criticizes the general assumption that sustainability is always a positive form of entrepreneurship.

Building on Smith's theory of "uneven development" (1984), we argue that ecological modernization (like capitalism) has a structural orientation toward the consolidation of uneven development patterns during the capital accumulation process, whether or not it is based on green technologies. Particular attention should be paid to the dynamics of the unequal territorial distribution of environmental roles, as well as to the distribution of the burdens and benefits. Here, the most relevant categories are found in a threefold production-consumption-deposit structure, which forms the basis of territorial differentiation. For example, places are defined in order to concentrate consumption and avoid dealing with the dynamics of production and deposits; this can be considered the key distinction between northern global cities and the periphery. Furthermore, using the same example, when the principal activity in a big metropolis is the consumption of products, merchandise, services, energy, and water, the common discourse on ecological modernization pays no attention to the territorial relations that support this privilege (consumption). Similarly, certain areas in Africa are internationally solely presented as non-treated waste deposit sites, while certain places in Latin America are frequently presented as raw material extraction areas. China, India, and other countries in Southeast Asia have acquired a specialized role as industrial producers, while Western Europe and North America have become known as knowledge creators.

The principle of territorial rearticulation, which Smith (1984, 4) considers "structural rather than statistical," is an important characteristic of uneven development. This means that the consolidation of uneven territorial patterns is not a side effect of development, but a very basic way in which ecologic modernization

rearticulates territories. This phenomenon is also observable at the national level, for example, when developing countries consolidate an economic development pattern, in which large, uninhabited, and remote regions are responsible for producing and supplying energy and environmental services for megacities that, in many cases, house more than a third of the national population.

While there is no doubt that ecological modernization is an important driver of this development pattern, it cannot be seen as the only cause of this territorial rearticulation. The government's new environmental institutions have reinforced two notions: territorial speculation and territorial concentration. The first notion is to profit as much as possible by investing capital in a territory on the basis of future transaction projections. The second notion addresses the inclination to selectively concentrate either positive investments, or undesirable activities, in certain areas. When a speculative orientation is applied to a territory, there are very limited incentives to invest in deprived areas because the desire to maximize utilities leads to large investments in more profitable places. Similarly, when a territory is associated with a non-desirable activity, there is a growing impulse to allocate more such activity to the same place, because the area will increasingly lose value. If there is no strong political control of the territorial articulation of the environment, it is possible that large mono-oriented regions will emerge at the end of this cycle.

In the case of the mining industry, three situations are generally relevant: (i) consolidation of the mining cluster in the Atacama Desert region, for which important growth is foreseen in 2020; (ii) strong pressure on productive inputs, especially energy and water, but also land and the workforce, which, together, weaken traditional activities such as subsistence agriculture and livestock production on the Andes Plateau; and (iii) the unequal patterns of territorial allocation, especially concerning energy production and residual deposits, which damage the vulnerable population by favoring the mining industry.

The mining cluster was responsible for more than 15 % of the national GDP in the first decade of the twenty-first century. Figure 4 shows the stability of the mining sector and the extent (in percentage) to which it has contributed to the national economy. In the most important extractive areas, the mining industry achieved a record of 60 % participation in the regional GDP. With this data in mind, and given that mining activity not only involves extractive practices, but also the industrial process needed to transform minerals and the construction of large-scale infrastructure, it is possible that the highly specialized mining sector will exert pressure for the establishment of mono-productive structures at the national and regional levels. The extension of the mining cluster and the high level of profitability do not compensate for the declining relevance of various other activities in the region. One consequence of this poor quality of life in the mining region is the large number of mine employees who commute to the principal mining city of Calama, principally from La Serena and Santiago (respectively 1,097 km and 1,573 km away).

In Fig. 5, it is apparent that there is a link between the Chilean GDP and electric power production. Given the mining activity's large contribution to the national GDP and its energy consumption, it can be assumed that the increasing production

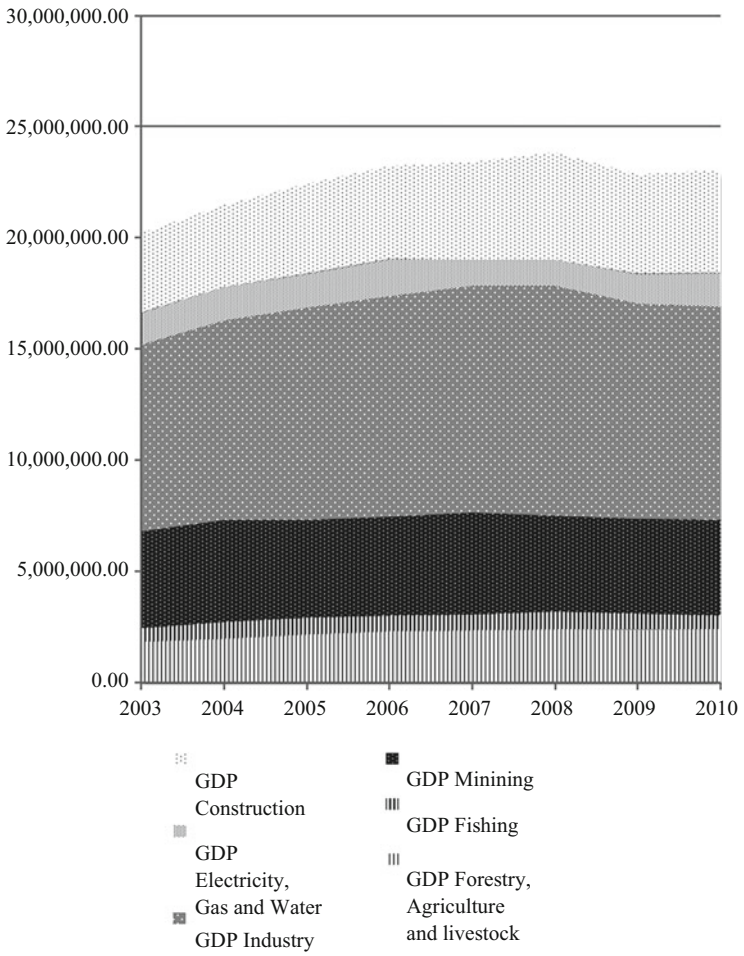

Fig. 4 Chilean GDP of relevant environmental activities. Self-elaboration with data from the Chilean Central Bank (n.d.), Statistic. Money valued at 2003

of copper between 1990 and 2011, which was the country's main source of revenue, was due to an excessive use of electric power. This tendency to require higher amounts of energy in order to ensure stable levels of production is another way in which the mining cluster pressurizes the territory, consolidating a mono-productive region in which no other forms of local activities are possible. Figure 5 suggests that the Chilean economy's politically reinforced tendency to promote extractive industries is dangerously dependent on energy, which, in the case of the mining industry, is generated by thermoelectric stations that rely on the burning of coal.

Unlike hydroelectric power plants that require large water sources, the location of thermoelectric power plants is independent of territorial conditions. Thus, thermoelectric plants are built in areas with low land prices, leading to a

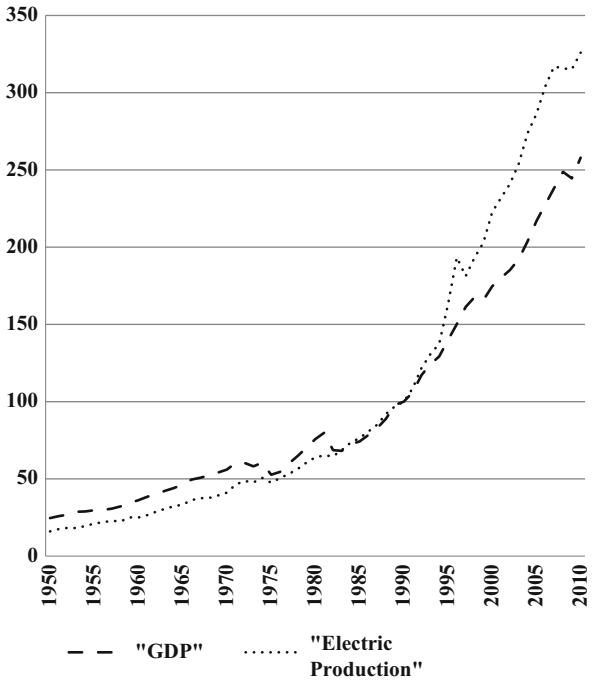

Fig. 5 Relationship between GDP and electricity production. Self-elaboration with data from the Chilean Central Bank (n.d.), Statistic

concentration of projects in the poorest municipalities of the northern region, where the most socially vulnerable populations live.[32] The territorially uneven distribution of roles associated with the mining industry affect local communities in two ways. On the one hand, the mining industry affects the communities on the Andes Plateau detrimentally by depriving them of the water resource necessary for agriculture. On the other hand, by allocating thermoelectric stations in poor municipalities, these communities are becoming increasingly socially excluded, thus aggravating other social problems.

5.3 Constructions of a Spatio-Temporality Oriented Toward Economic Entrepreneurship at the Core of Ecological Modernization

Introducing his understanding of time-space and his central concept of "regionalization," Anthony Giddens stated that "[m]ost social analysts treat time and space as mere environments of action and accept unthinkingly the conception of time, as measurable clock time, characteristic of modern Western culture" (Giddens 1986,

[32] For example, the coastal city of Tocopilla where two big hydroelectric plants are located.

110). Later, Giddens (1986, 110) took a more radical stance, arguing that, with the exception of some geographers, "social scientists have failed to construct their thinking around the mode in which social systems are constituted across time-space". However, what would such failure comprise? In his initial attempts, and following Hägerstrand's time geography concept, Giddens stresses that the "routinized character of the daily life" presents time and space as constraints to social action. From this point of departure, the notion of regionalization refers to zones "of time-space in relation to routinized practices" (1986, 119). However, the intention of this section is not to discuss this approach in depth, but to point out that the development of action theory was the first attempt to conceptualize space and time's capability to constrain action, and, in doing so, it reduces the possibility to account for actions' ability to structure time and space. In other words, actions are regionalized to such an extent that they lose their power to regionalize.

In his research project to develop action theory, Benno Werlen's (2005, 47) notion of everyday life regionalization helped fill the gap between the role of time and space in social action. He states: "...thus the *bordering of spaces*, in the broad sense, which should be seen as a means of everyday activities, never as their aim." (Werlen 2005, 47) and, in a more explicit formulation: "*space* is an element of *action* and not *action* an element of *space*, as a majority of geographical approaches – implicit or even explicitly – still claim" (Werlen 2005, 48).

The notion of *everyday regionalization* is central to analyzing the spatio-temporal restructuring that every new wave of ecological modernization requires. The project to expand the extractive industries in Chile to a major level in the international market, and maintaining them in this position for decades, requires a particular type of action, which we argue should have the ability to organize time and space and should not only be constrained by them. We propose that the intensification of the extractive orientation in the Chilean economy is rooted in a form of entrepreneurialism that overcomes the restrictions of time and space and instead orients actions toward stabilizing a particular representation of the two categories. Similar to large and long-run extractive enterprises, this representation is central in the production and reproduction of legal environmental procedures.

It is possible to highlight three discursive movements in the new Chilean legal environmental framework that promote a particular understanding of time and space in accordance with economic entrepreneurialism: (i) the intention to gradually incorporate ecological measures into productive processes; (ii) the spatio-temporality of nature's regenerative capability as the last frontier of economic speculation; and (iii) the ability of the economic and political systems to define a pollution-free environment as already contaminated.

When having to comply with new environmental standards, the idea of gradualism appears reiteratively in political discourses and industrial declarations. The official narrative highlights the gradual formation of the environmental crisis, or, in other words, its slow-motion consolidation, to propose a measured incorporation of higher environmental requirements in the productive processes. This discursive orientation forms the basis of the expansive wave seen in Chile's extractive industries after the country's environmental modernization. As a technical tool,

the environmental impact assessment legitimates the sustainability of the project under evaluation. Nevertheless, due to the gradualness of the actualization and the application of the normative, an intermission was generated,[33] during which entrepreneurialism blossomed in the form of environmental speculation. The following translated excerpt from the Presidential Speech of 1992 defines gradualism.

> In this regard, there are two features of the environmental policy that have to be emphasized. These principles allow the basic goals conceived for this environmental bases project to be understood. In the first instance, one of its characteristics is gradualism. The country's environmental problems are the result of decades of applying policies, in which the environment was not a relevant aspect. Thus, reversing the causes of this degradation and searching for methods to combine a great development, progress, and environment protection, require structural modification that transcends measures in the short term (Aylwin 1992, 11).[34]

From the 1990s onward, the extractive industries have functioned under a narrative that strengthens the spatio-temporality of nature's regeneration as a last step in the productive process. The level of mining extraction activity cannot rely on preserving deposits, but on the ability to find new mines to replace exhausted ones. Water and energy requirements have been managed to extract all existing mineral deposits in such mines, because when the concentration of minerals decreases, the demand for productive inputs increases. From a different perspective, the mineral extraction narrative rejects the possibility of moderate or gradual exploitation. On the contrary, in the official discourse, extractive industries are expected to work fast while the market conditions are favorable, avoiding unfavorable substitution, as happened with Chilean saltpeter in the first half of the twentieth century during what was referred to as the saltpeter crisis. In this period, the development of the synthetic version in Germany made further saltpeter exploitation unprofitable, resulting in large unexploited deposits and completely abandoned towns. In sum, it can be argued that, as an action orientation in the mining activity, entrepreneurialism overcomes the limits of a sustainable production at the local, as well as the regional level. Therefore, this action can only be accepted if it is grounded in a redefinition of the spatio-temporality, according to which the environmental institution defines the society-nature relationship and accelerates extractive activity, without any intention of slowing it down.

Finally, and closely connected to the predominant spatio-temporality of nature's regeneration, the official discourse regards a pollution-free environment as already contaminated. According to Chile's legal definition of the concept, pollution-free ecosystems present contaminants under the legally defined levels (Aylwin 1992), or in levels that do not endanger human health. This situation, which has not gained

[33] The Chilean central government only passed the regulation to operationalize the new environmental framework in 1997; surprisingly, three years after Law 19,300 "Environmental Bases" was approved. It is important to take this into account if one considers the start of a new environmental institution a non-regulated intermission, during which the extractive orientation of the economy is exacerbated.

[34] Translation by the author.

much attention, plays a fundamental role in a national economy based on extractive activities. The mining industry produces significant levels of contamination during the mineral extraction process, for example, by separating minerals from the ground, and the later smelting process. Recognizing that no ecosystem is free of pollution implies that the mining industry cannot be held accountable for environmental damage, or the negative effects it has on other activities.

5.4 *A Goal-Oriented Understanding of Sustainability Regarding the Assurance of Highly Profitable Enterprises*

In growth-oriented capitalistic societies, the conceptualization of an ecological crisis should be translated into economic language to make it effective (Hajer 1995, 31).[35] In this sense, the terms entrepreneurialism, innovation, and industrial consolidation have become part of a narrative from which profitable enterprises are created to face environmental problems. We use the ecological modernization notion as a procedure through which political and scientific systems converge to create a social space that nurtures extractive enterprises.

This section describes the rational use of sustainable principles and technologies to increase the extractive industries' productivity in the 2000s. In Chile, one of the most dynamic economies in the region, the consolidated extractive orientation toward mega-regional clusters becomes apparent. This territorial formation has become part of, and is compatible with, the current wave of global productive restructuring.

The increasing level of production in the mining industry is based on the depletion of fossil water deposits and the growing demand for energy. There is increased competition for water between industries and local communities in the world's most arid desert, while the energy requirement has led to dramatic changes in the national energetic matrix.[36] This process of industrial expansion in terms of regional mono-productive clusters is a result of the first wave of ecological modernization outside the developed economies. In the peripheral regions, and particularly in the case of Latin America as a supplier of raw materials, environmental institutional modernization has had an exploitation-exportation function. To achieve economic growth, the democratic government (following the military

[35] "Ecological modernization uses the language of business and conceptualizes environmental pollution as a matter of inefficiency while operating within the boundaries of cost-effectiveness and administrative efficiency" (Hajer 1995, 31).

[36] In Chile, The energetic matrix is based on thermoelectric plants, which supply energy to the Big North Interconnected System (SING), and hydroelectric plants that do so to the Central Interconnected System (SIC).

dictatorships) reinforced the existing extractive enterprises and linked them to a national success rhetoric.

The biggest open mine in the world and the first international producer of copper[37] is part of Chile's national pride. Regardless of their political orientation, different regimes have coupled this narrative to the idea of economic development. Consequently, there is a lack of critical reflection of the changing scales in the productive processes. The competition for land and water has led to (i) a loss of agricultural activity in the rural areas where the productive industries are located, (ii) the depopulation of small inland cities and towns, (iii) rapid urban growth in mid-sized cities, mainly in informal settlements, and (iv) unstable national and international migration flows.

It is impossible for regional industrial clusters to emerge without integrating the "sustainable mechanisms" in the extractive activities. Moreover, it cannot be argued that Chilean mining companies' extraction and processing methods have become worse in terms of the amount of pollution caused, or that they have been exploiting resources irrationally over the last 25 years. The future development of the industry, which intends to double its production in the next decade, will lead to the increased incorporation of green technologies. International markets are increasingly applying pressure on industries to extract resources and produce products in a socially and environmentally friendly way. Similarly, international agencies constantly advocate incorporating market mechanisms to regulate contamination and ensure the rational use of resources.

> The mining industry is a large consumer of energy and in the next years their generation of new non conventional renewavel energies [NCRE] will not meet the demand for new projects to be developed between now and 2020 [. . .] therefore, the industry will at present continue to rely on an energy matrix in the SING [Big North Interconnected System] that is primarily based on the use of coal. This [is applicable] regardless of several mining companies' efforts to use NCRE supply in specific sectors of their operations. (El Mercurio 2012)

Nevertheless, the future growth of the mining industry cannot merely depend on the incorporation of green technologies. As the abovementioned quotation suggests, NCRE would not be the main sources of the energy supply. Scholars have argued that, in Chile, renewable energy is incorporated solely to support the thermoelectric plants in the desert region. Thermoelectric plants will be responsible for the additional energy required to desalinize water, on which the mining industry will rely when the area's fresh water has been exhausted.

> The solar projects to be installed on the Salar de Pintao, surrounding the Pica Oasis, will cover 5000 hectares [. . .] These issues are not solved; again, each of these projects is evaluated regarding its individual effect, but not for their total agglomerative effects [. . .] these 5000 acres of solar panels are designed to generate energy to operate thermoelectric plants, whose main objective is to desalinate seawater for the mining activities and cities, and which are due to large mining investments [. . .] all plants or mining facilities are planning to desalinate seawater in case of water resource depletion, but this requires large amounts of energy, which we do not have in the north. Installing these panels, which simultaenously support the series

[37] Chuquicamata is the world's biggest open mine and belongs to the National Copper Corporation of Chile (CODELCO).

> of thermoelectric plants on the coast is not irrelevant; millions of cubic meters of sea water will be desalinated to support this activity. (Academic State University)

Different organizations have predicted that there will be significant growth in mining activities by 2020. Therefore, they suggest that in just 11 years – from 2009 to 2020 – the investment will deliver greater returns than in the 32 years from 1977 to 2008; increasing from USD 38.665 million to USD 42.448 million. Copper production will increase by 36.8 % in 2020, with private investment representing 53.5 %, and the participation of the National Copper Corporation of Chile representing 45 % of the total (Minería de Chile 2012).

It can thus be assumed that since the political system had in the 1990s ensured that the consolidation and maintenance of the extractive industries would remain the central drivers of the national development, the national environmental institution's role is to create prime conditions for its expansion at the regional level during the twenty-first century. In the 1990s, the main mechanism for ensuring the industry's sustainability was defining the levels of pollution and resource exploitation that the ecosystems could possibly endure. It is highly unlikely that this social goal was accomplished holistically. Moreover, these industries' degree of compliance was based on a restrictive definition of the environmental impact, which only applied to individual industries and never to an aggregated level. In the first decade of the twenty-first century, the main strategy to promote industrial expansion was the incorporation of market mechanisms to regulate environmental problems. It was believed that the low degree of success in terms of auditing and controlling the productive industries would be solved through compliance incentives based on market logic. Furthermore, the idea was that the pollution levels, as well as the extraction quotas, would be naturally achieved by consolidating the markets to deal with these issues, much like the proposed international CO_2 emission.

From this perspective, the national environmental institution's role was to secure investments that would foster a responsible attitude toward the ecosystem. The constant undertaking of sustainability measures in terms of pollution control management and rational resources exploitation has promoted only a very restricted understanding of environmental measures. To reverse the negative impact that regional extractive clusters have had on the environment and people, effective limits should be applied to industrial expansionism. As neither of these actions is currently implemented, industrial expansionism on a regional scale is responsible for the reemergence of ecological conflicts.

6 Conclusion: Overwhelming Confidence in Economic Sustainability

There is no all-inclusive definition of sustainability. The term has various meanings, which are often even contradictory. At least two interpretations of sustainability are relevant for this research and were therefore applied in this study:

economic and environmental sustainability in the process of ecological modernization. The Brundtland Report (1987)[38] coined the economic sustainability concept, which is focused on preventing situations of scarcity for the following generations. In this context, one might say that development, on its own, only restricts economic growth if it puts the future availability of resources at risk. However, this conceptualization does not consider the ability of specific ecosystems – with their natural and human dimensions – to support a constant form of "resources exploitation," or what could be referred to, in economic terms, as an overdemand of environmental services. Conversely, Gligo (2006) coined the concept "ecological sustainability," which is based on the preservation of ecosystems. In this context, and with references to the contribution of the Economic Commission for Latin America and the Caribbean (ECLAC) in the late 1970s, Gligo proposed that sustainability should be understood as the maintenance of constant levels of "matter and energy" in any ecological systems.[39]

An important difference between these two definitions is the implicit "limitations" and "orientation" of their social actions. In economic sustainability, social action is primarily oriented toward economic growth, which is the central goal of social actors. In the same context, environmental protection becomes a passive restriction of the socio-economic decision. In environmental sustainability, environmental protection in the form of ecosystem maintenance is the major socially defined goal, and, consequently, concrete actions are required and deployed to reintroduce the matter and energy that were extracted from all the ecosystems. The manner in which sustainability is socially defined has important repercussions for the "orientation and limitations" of social actions and territorial orientations. This argument formed the basis of our argumentation and allowed us to critically review the way in which sustainability is materialized through different social practices in a specific national context. We subsequently highlighted that many enterprises oriented toward economic sustainability – that is, they do not make compromises about their future needs in terms of the rational usage of natural resources or pollution control – have exerted strong pressure on ecosystems in terms of the natural and the human dimension. This has drastically changed these ecosystems' properties, often leading to their destruction, and, subsequently, reinforcing historical and/or latent socio-ecological conflicts.

This article tested this argument by examining Chile's mining industry empirically. We found that pressure on the environment and the reemergence of

[38] "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" World Commission on Environment and Development (1987, 43).

[39] "Ecological sustainability is achieved [...] where there is recomposed and/or introduced information, matter, and energy while the volumes (biomatter), the rate of change, and the circulation rhythms are kept constant, all of which characterize a constant system" (Gligo 2006, 18); translation by the author.

socio-ecological conflicts are the most common result of the environmental institutional reform in Latin America. Thereafter, to better account for the conclusion derived from the case study analyzed in this article, we incorporated a notion that we call *sustainability over-confidence*. Sustainability over-confidence is the social belief that it is possible to overcome the ecological crisis by merely restricting economic development environmentally in terms of (i) the rational exploitation of natural resources and (ii) the rational management of pollution by incorporating new green technologies. Here, two forms of criticism are raised to challenge rational management as an instrument with which to overcome the ecological crisis. First, as many authors have proposed, it is no longer possible to overcome the ecological crisis by refining the institutions that caused the problem in the first place. In other words, a new economic orientation is required that rejects the congruence between the devastating forms of production and consumption in Western societies. Second, socio-ecological conflicts are not merely a question of clean production; in many situations, such conflicts are the result of opposing visions of particular ecosystems' role with the orientation to convert them into a source of profit having to be weighed against preserving their natural state.[40]

The socio-ecological problems are broader and deeper than contamination control, clean production, green economy, and global warming issues, to mention just a few. Socio-ecological conflicts appear when two opposing orientations for action meet at the same places in a scenario, in which the element under pressure will (re)define the future living conditions in those regions. We argue that conflicts "meet at the same places" to emphasize a spatio-temporal coincidence, which is impossible to disentangle, because these conflicts are explicitly about ways of doing in a particular historical context/moments and territory. Simply put, in terms of sustainability, it is possible to summarize that over-confidence occurs when a society has confused the questions of *what* it wants to do in a territory with *how* it wants to achieve this goal. Economic sustainability only responds to the second question, suggesting that regardless of how the territory will be used, the resources should be used correctly, avoiding material and energy losses, and not compromising future reserves. Nevertheless, economic sustainability is incapable of building social consensus on the society-nature relationship with ecosystems and territories. Put differently, economic sustainability cannot collectively define the forms in

[40] As many authors suggest, this conflict demonstrates the struggle between an understanding of nature's "value of use" and "value of change," to use classical Marxist terms. Here the criticisms of environmental modernization rely on the pressure required to stabilize an understanding of nature in terms of the value of change, thus rejecting any reference to substantive and transcendent values. Many of this research project's interviewees stated that the Chilean ecological modernization stabilizes a form of abstract monetary compensation that is incapable of internalizing or reflecting all natural values – value of use – for the local and native populations, while, it is simultaneously also incapable of considering the total amount of environmental services that nature delivers.

which the society-nature relationship will be consolidated at specific historical moments. Weber's explanation of the modern confusion regarding the "means and ends" and the neutrality of science to state value judgments (Weber and Finch 2010), will be used to expound the main finding from an analysis of the environmental reform in Chile.

This article has shown how, in the mining industry, the question of sustainability has acted as an effective tool to maintain the level of copper exploitation and production in Chile, but that – although significant improvements have been made – it has been less successful at internalizing the effects of environmental pollution. However, when we observe the complete chain of productive inputs, the sector's state indicates a completely different performance. The monopolization of water resources and the redefinition of the energetic matrix are examples of the expansive orientation, which is a key characteristic of business orientation and not a mistake or side effect thereof as some analyses have suggested. This expansionist character continuously affects the living conditions in the Atacama Desert in different ways. For example, (i) it is impossible for rural communities to develop forms of agriculture due to the lack of an adequate supply of water, and (ii) the region's productive roles have been totally redefined due to the high wages paid by the mining industry, especially for permanent employees.

Taking a critical perspective of the sustainability orientation, this study discussed four interrelated levels of ecological modernization in Chile: (i) sustainability is viewed as a driver of place achievement, i.e. how economical sustainability constantly increases its influence in a territory and how this expansionist process aggravates socio-ecological conflicts; (ii) sustainability is considered a dispositive to define environmental territorial roles, i.e. how the pursuit of economical sustainability determines the uneven distribution of territorial benefits and burdens, which specifically prevents self-sustaining territorial dynamics and localizes undesirable activities in fragile ecosystems; (iii) sustainability is believed to motivate economic entrepreneurship by redefining environmental issues according to their spatio-temporal aspects by acting as a dispositive to legitimize and reinforce the increasing exploitation of mineral deposits; and (iv) a goal-oriented understanding of sustainability as fostering entrepreneurialism by restricting the definitions of ecological crisis and problems, and incorporates new and clean technologies as the most efficient solution. However, these new technologies are incorporated in order to support natural exploitation and, in turn, reinforce the socio-ecologic conflicts.

In this context, to ensure a development based on territorial sensibility, it has become necessary to redefine sustainability in social, political, and economic terms. This is the only way to control industrial expansionism and regional productive restructuring, which accompany other forms of global environmental concerns, such as global warming, technological transfer, and pollution control, in the global context. The four mechanisms discussed in this article have an inherent tendency to monopolize social resources. This exploitation can be limited if the everyday practices anchored at the local level regain relevance in the environmental discourse. To illustrate this, the article describes the great economic relevance of the

mining industry for Chile's GDP and for the industrial employees; nevertheless, the rest of the workforce, who are not connected to this sector, experience accelerated instability. At the regional level, the industrial cluster's expansion cannot be sustained without a massive monopolization of all productive inputs, especially water, energy, land, and workers. This regional productive restructuring is occurring across all the extractive industries – and some plantation industries – in Latin America. This exponential growth would not be possible without the paradoxical incorporation of sustainable measures into the processes. In order to gain deeper insights into this phenomenon, we propose studying how sustainability has been coopted by a speculative rationality, which constantly manages social actions in order to accelerate the extraction of ores.

This brief account of the Chilean mining industry has shown how particular territorial and action orientations have interacted in order to mobilize the national environmental institution as a central driver of the consolidation of perhaps the biggest and most profitable extractive cluster in Latin America. While this article is a first step toward restoring the role of social science in the analysis of one of the most successful and liberal forms of entrepreneurship on the continent, this can only be fully achieved with a real account of the socio-ecological results of two decades' incorporation of sustainability measures into the policy agenda. Focusing on sustainability's economic-natural or ecological-anthropogenic orientations should allow a more factual analysis of ecological modernization. This is the only way in which we can prove that socio-ecological conflicts should be considered the main concern of environmental institutional modernization in a context in which contradictory forms of global integration interact.

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