



Shedding light into the elephant: The case of the Chilean bread-wheat eco-agrifood system

Arrojando luces sobre el elefante:
Caso del sistema ecoagroalimentario del trigo panadero chileno

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Healthy diets: reality or dystopia?

There is a solid consensus on the non-sustainability of the global eco-agri-food system¹ (TEEB, 2018), given that it is responsible for 60% of biodiversity loss (Sukhdev *et al.*, 2016), and fails to feed well 50% of humanity (FAO, 2018). This situation is exacerbated in Chile, with 65% of the population being poorly nourished (PAHO-WHO, 2018).

Bread is the main source of calories and proteins for all socioeconomic classes in Chile (Crovetto *et al.*,

¹ According to TEEB (2018: 18), the eco-agri-food system is a "...term for the vast and interacting complex of ecosystems, agricultural lands, pastures, inland fisheries, labour, infrastructure, technology, policies, culture, traditions, and institutions (including markets), that are variously involved in growing, processing, distributing and consuming food."

2014). Under this scenario, it is at least ambitious to guarantee healthy lives to achieve the sustainable development goals². The visualisation of the most critical aspect of the current contingency of the Chilean bread-wheat within eco-agri-food system would facilitate the dialogue towards food sovereignty, while giving sustainability to the Chilean bread-wheat value chain.

Are we blind people touching an elephant?

The Indian parable of "the blind men and the elephant" exemplifies the human inability to represent the complexity of a problem as a whole, which has been recognised as the growing difficulty faced by experts to communicate with each other and the general public (Nature Neuroscience Editorial, 2000).

This parable could explain part of the contemporary crisis experienced by the global and Chilean eco-agri-food systems over the last decade, since multiple experts from different areas of knowledge propose different solutions. However, experts from different areas should agree on the following facts: i) the planetary boundaries for mankind safe operating space have been exceeded and agriculture is the main responsible for altering, among other factors, the biogeochemical cycles of C, N and P (Campbell *et al.*, 2017); and ii) 34%³ of humanity –a rising percentage since 1996- does not participate in the dynamics of capital accumulation in the current world economic model, being mostly excluded groups that live off agriculture -women and ethnic minorities- (The World Bank, 2008; ILOSTAT,

² The Sustainable Development Goals "...are a series of 17 internationally agreed, universally applicable goals that are recognized as indivisible and cover issues across the spectrum of development from poverty, food security and water security, through equity, health, access to decent work, peace and a stable natural environment." (TEEB, 2018: 20).

³ This statistic seems conservative because in countries like Chile the unemployment threshold is overcome when a person of working age receives an income equivalent to 1 hour of work per week (INE, 2018a).

2018). This population is called “surplus humanity” (Robinson, 2014), because all the preadaptations⁴ of the world economic system developed since 1996 are mainly based on the cornucopian⁵ paradigm, which in practice has subjected them into a sophisticated circuits of dispossession, exploitation and exclusion from the productive economy, moreover this inequality is accentuated by the elites’ use of mass violence, communication, and disinformation means. This phenomenon is particularly strong in Latin America, the most unequal region in the world regarding land tenure (von Bennewitz, 2017) and where social and political conflicts together with climate change reduces food access and production, increasing the prevalence of hunger and chronic untreatable diseases (FAO *et al.*, 2018).

Therefore, we consider that this crisis is also a moral problem (Sanford, 2014)⁶, because there is clear evidence that these global trends are manifesting locally under the following statistics of the bread-wheat value chain in Chile: i) Mera *et al.* (2015) point out that although southern Chile is known worldwide for its high-yielding environment for small grain cereals, the majority of ethnic groups in this territory practice agriculture on marginal lands; ii) Danty (2012), states that there are 45,358 wheat farms in Chile, of which 87% have a surface area of less than 50 ha and their national market share does not exceed 22%, showing also the yielding gap between the different farm profiles according to their size (3.27 Mg ha⁻¹ and 5.96 Mg ha⁻¹, for those with an area of less than 50 ha and greater than 500 ha, respectively); iii) on the one hand, since 2011 data from INE (2018b) and ODEPA (2018) show that 90.2% of the national production of bread-wheat was achieved in 90.1% of the cultivated area, concentrating in the Regions of La Araucanía, El Bío-Bío, El Maule and Los Ríos, Regions where the highest poverty rates prevail (MIDESO, 2017). It also seems that technological development and its adoption have not compensated farm wheat yields, because between 2010 and 2018 national wheat yield have stagnated ($r^2 = 0.26$, $p > 0.1$) despite the fact that season 2017-2018 registered an historic national yield record with 6.21 Mg ha⁻¹. On the other hand, v) Cotrisa (2018) suggests that there is an apparent unfair competition in the milling link, since six owners concentrate 50% of the national grain pro-

duction and replace national grain by imported grain at an annual rate of 3%. Therefore, small-scale farmers have little chance of participating in a truly free and competitive market as fragmented links, when it is clear that 60% of the mills account for 90% of the national milling capacity (Cotrisa, 2018) ; vi) since July 2009, there has been a sustained increase in the nominal prices of white bread (*hallulla*) with a volatility in the real prices, equivalent to a variation coefficient of 4.56% (ODEPA, 2018), and vii) since August 2014, there is a decrease in the real prices linked closely to the drop in international oil prices recorded by EIA (2018), which recently rose again.

Final thoughts

The search for the sustainability of bread-wheat in Chilean eco-agri-food system is far from simple. A tangible challenge is related to the asymmetry existing in the links of the value chain, particularly the “bottleneck” of the grain transformer link and the dissociation generated by the price-forming mechanism, which leaves all risks to farmers and outsources the responsibility of the transformation, distribution and marketing links to the consumer. Apparently this is not isolated, since Nestle (2016) and citations within it report a similar phenomenon in the behaviour of US agribusiness agents who, in their legitimate search for maximization of individual profits, influence the agri-food policy, damaging public health and its corporate image. This would suggest that the efficiency of a value chain can not be explained only from the aggregate efficiency of its participants (Mozeris and Martínez, 2014).

Therefore, it is suggested that further studies are needed in order to rethink a space for institutional innovation and appropriate technologies that reconfigure the structure of vertical integration of Chilean bread-wheat business model. The latter could be evaluated using action-oriented research methods, documented in agroecological practices (Méndez *et al.*, 2015) and human scale development⁷ (Guillén-Royo, 2016).

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⁴ According to Kauffman (2008), preadaptation is a transitory purpose of an open system, whose long-term performance is unpredictable due to the presence of transitory interrelations between their components.

⁵ The “cornucopian paradigm” indicates that prosperity arrives unexpectedly and without undesirable side effects, it assumes that the artificial capital has a perfect substitution with natural and social capital, and *viceversa*.

⁶ Sanford (2014) argues that the food crisis is fundamentally a crisis of conscience, and that part of the solution involves reconfiguring the human relationship with nature, through new paradigms that assess economic, social, and environmental food concerns with holistic frameworks, that for example faith-based perspectives can provide.

⁷ Human scale development is a proposal located within the critiques of development under the paradigm of progress and modernity (Gudynas, 2011), its central axiom argues that development is about people, not about objects, and presents a systemic theory of human needs for sustainability that highlights a clear conceptual distinction between *needs* and *satisfiers* of those needs (Max-Neef *et al.*, 1991).

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