

Spiral of contradictions between financialised capitalism and rural smallholdings in South and Mesoamerica

Irreversible destruction of the Earth's soil food webs leads to drought and collapse of global food security

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Overview

Climate collapse is being felt on Earth without the leaders of developed countries having met the mitigation targets they set themselves. This is an unpayable ecological-environmental and economic debt to the countries of the Global South, as they are the main dispossessed of their well-being. The centuries-old denial of the natural right to dispose of their natural wealth for the benefit of the quality of life standards (unlimited consumption) of the Global North. The spectre of climatic events, anticipated for decades since the last century, are no longer science fiction but realities that no one can hide in any of the continents.



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In the Asia Pacific region, countries are devastated by floods, droughts and cyclones, damaging precarious collective infrastructures, housing, and crops, leaving a host of diseases in vulnerable populations. Similar events occur in South America and Mesoamerica. Increasing water scarcity and droughts with heat waves above 40°C and precarious food availability exacerbate stress and confrontations between peoples within the same country and across international borders. For example, governments have been unable to agree on the Renaissance Dam in Ethiopia, and Egypt fears losing access to part of the Nile River water resource. The massive proliferation of forest fires contrasts with declining harvests in Central Europe, Poland and Hungary. It is believed to be the worst suffered since the 16th century. Seventeen per cent of the land remains in a severe state of alert, i.e. soil, plants, and crops are drying out. The Rhine River is becoming more impassable for transporting diesel and coal. France is experiencing the worst drought since 1959 in 80% of its territory. These are just a few examples of the severity of climate collapse.

The war in Ukraine has put humanity in check. After the US/NATO onslaught of threats, accusations, fake news, intimidating approaches and the incorporation of countries bordering the European Union into the conflict with the Russian Federation, the US delegation added an aggressive advance with Pelosi's¹ visit to Taiwan that broke the 1979 agreement with China. The US recognised one China after Taiwan's expulsion from the United Nations and the replacement of official visits by international officials to the island with private meetings. The US is sending the message that Washington wants to change the rules. It is no longer satisfied with the current global architecture. It is rethinking the game beyond the consensuses that gave the world relative stability. According to López, Pelosi's move is defensive in the long term. The US aim is to block China's game in the face of its accelerated growth, which could overtake the US economy in a few years. This set of events reflects an economic decline not planned under necessary ecosocialist policies but ordered by a market regulated with deep inequalities and financial speculation by large energy-food corporations. After the scourge of the Covid-19 pandemic, the economic crisis in the EU is worsening under the West's economic and military harassment of Russia. According to Tanuro,² there is a growing tendency among experts to see little chance of reconciling the reduction of CO₂ emissions with an increase in GDP without a reduction in global energy consumption, which would inevitably reduce the production of goods and services. By this, we mean that the decisions of the West deviate from socially just degrowth since they are not aimed at implementing policies to improve the welfare conditions of the poorest 50% of the affected populations but at prolonging geopolitical conflicts arising from NATO/USA/EU sanctions on Russia because of the war in Ukraine.

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After the Covid-19 pandemic, climate crisis mitigation policies took a back seat, while another crisis emerged from fertiliser prices. This predated the military confrontation and was aggravated by unilateral sanctions, promoting a seismic shift in the world economy that backfired on the sanctioning countries themselves with an impact on the Global South. In particular, the corporate food market has depended on the current fossil energy model. Chomsky attributes 80% growth to the supply of oil, gas or coal in the context of the sanctions war against Russia and Belarus. It is worth remembering that Marion Hubbert foresaw Peak Oil in 1956, only delayed by discoveries of reserves since 1960. For Bordera and Turiel, energy decline is inexorable no matter how much investment, technology and innovation is expected. Indeed, the escalation of geopolitical conflicts is confronted by the limitations imposed by the depletion and rising cost of energy sources (oil, coal, natural gas and uranium). According to Pollan,³ for every calorie of food produced in the US, ten calories of fossil fuel energy are put into the system for this crop. So, the actual conflict arises from the loss of soil productivity with no mention of the cause that could lead to the search for solutions in the global arena.

¹ ➔ Ociel Alí López. “¿El fin de la globalización? Lo que se rompe con la visita de Pelosi a Taiwán y la arriesgada apuesta defensiva de EE.UU. contra China”. 5 de agosto de 2022.

² ➔ Daniel Tanuro, “Crisis climática. Crecimiento desigual o sólo decrecimiento: el IPCC ha abierto el debate”. 26 de diciembre de 2021.,

³ ➔ Melissa C. Lott. Scientific American. “10 calorías dentro, 1 caloría fuera - La energía que gastamos en alimentos”. Agosto 11 de 2011.

Moreover, gas prices quadrupled during 2021,⁴ while the price of a barrel of oil approached 130 dollars for the first time in eight years. This coincided with the announced end of the fracking boom/bubble. Spain's inflation reached 6.5% in 2021 in three decades. The European Council⁵ adopted a 15% voluntary reduction in gas demand for next winter (2022). This regulation looks more like a benchmark if confronted with the list of exceptions to the actual market conditions of member states. The initial rejection came from Greece, Portugal, Spain, Hungary and Poland. Paradoxically, EU member states agreed to hold Russia responsible for the 60 per cent reduction in gas flow due to the repair of a turbine that had been stranded in Canada due to the same sanctions.

In Bloomberg/Quint, Argentina extended the ban on beef exports until the end of 2023 as part of a price control measure to benefit local consumers. Although the problems are more acute in some countries than others, the crisis is widespread and large-scale.⁶ In particular, the World Bank recognises historically high global stocks of rice, wheat and maize, the world's three main food staples. Wheat is the commodity most affected by the war conflict, with stocks remaining well above levels during the 2007-2008 food price crisis. Estimates also suggest that around three-quarters of Russian and Ukrainian wheat exports had already been delivered before the war began, undermining the credibility of Western accusations against President Putin.⁷ In further evidence of fake news and politicisation of information in favour of Ukraine, Grain⁸ argues that: the crisis is of commodity prices, not food shortages, added to energy costs and rising global food prices. We find several causes, among them production specialisation, overproduction of the ingredients for junk food and the generation of massive waste in food industrialisation. We see these figures: About 60% of European wheat production goes to animal feed, and 40% of corn grown in the USA becomes fuel for cars. Globally, 80% of the world's soya crop is turned into animal feed, while 23% of the world's palm oil is turned into diesel. These figures include the use of huge areas around the globe to cultivate ingredients for junk food production. Ultimately, rising prices are the result of speculation by large corporations, as previously noted.

It should also be noted that Putin said, concerning the transport of grain from the territory of Ukraine, that 800 million tonnes are produced in the world annually, while Kyiv now claims that it is ready to export 20 tonnes, (...) which is a tiny part of the world total. This is 5 tonnes of wheat and 7 tonnes of maize.⁹ According to the Kyiv Ministry of Agriculture: *Ukrainian traders managed to export up to 6 million tonnes of grain [a figure approximated by President Putin] per month before the start of the war. So far, in the 2021/22 July-June season, Ukraine has exported 46.51 million tonnes, up from 40.85 million tonnes in the previous season.* The ministry says 2021/22 export volumes included 18.54 million tonnes of wheat, 21.83 million tonnes of maize and 5.68 million tonnes of barley.¹⁰ Declines in the international food market are attributed to logistical obstacles resulting from the war, mines laid by Ukraine in the Black Sea and interference from sanctions. We can add the EU's silence on the exploitation of raw materials through ecological and environmental plunder of the world's grain production in the Global South. The points of no return are recognised from space, the Gran Chaco of Argentina, Paraguay and Bolivia, as well as in the Pan Amazon basin in bio-geographical

⁴ ↪ Antonio Turiel y Juan Bordera. [“Fertilizantes: ¿en la antesala de una gran crisis alimentaria?”](#) — La Alianza Global Jus Semper, marzo de 2022.

⁵ ↪ RT. [“La UE aprueba de forma definitiva la reducción en un 15 % de la demanda del gas para el próximo invierno”](#). 5 de agosto de 2022.

⁶ ↪ Patricio Gillespie. Bloomberg Quint. [Argentina extiende la prohibición de exportación de cortes populares de carne de res para domar los precios locales](#). 3 de enero de 2022.

⁷ ↪ Mari Elka Pangestu. “Cuatro caminos para responder a la crisis de precios de los alimentos”. [Cuatro caminos para responder a la crisis de precios de los alimentos \(worldbank.org\)](#). Marzo 25 de 2022

⁸ ↪ GRAIN. [“De crisis alimentaria en crisis alimentaria”](#). Julio 2022.

⁹ ↪ [Putin afirma que Occidente agravó la crisis alimentaria mundial y explica por qué “no existe el problema” de sacar los granos ucranianos](#). 3 de junio de 2022.

¹⁰ ↪ Natalia Zinets. Ministerio de Agricultura de Kiev. [Las exportaciones de granos ucranianos este mes son mucho más bajas que en mayo de 2021, según el ministerio | Reuters](#). Reuters. 19 de mayo de 2022.

regions already identified in Brazil, Colombia and Peru, extending to the countries of Central America.¹¹ It is the market for the monopolistic agriculture of soya, wheat and abundant maize. They are versatile commodities in energy markets to produce gasoline, fuel, and livestock feed. They are commodities sold on futures in Chicago and other markets with much speculation on their prices.¹²

Turning to the subjects of this paper, neoliberalism introduced to the inhabitants of the Region an incipient or non-existent environmental education entrenched in land degradation. During the 1970s, *the imperative of saving the earth for life was created and talked about more than in the entire course of human history. Forming an environmental consciousness that would induce people to care for and fight for its preservation remains a distant goal, a challenge to which there has been no moderately satisfactory social response.*¹³ In Europe,¹⁴ for example, poor land management practices have led to an estimated loss of 970 million tonnes of soil each year due to erosion. From this perspective, it has been proposed to develop more effective strategies for restoring degraded soils, to understand better the links between soil structure, the communities of organisms living in it and the way it decomposes organic matter.

Consequently, we expose the food insecurity in South America and Mesoamerica, shaped by the conversion of fertile land into monocultures of export cereals, which reduces the biological potential and regenerative capacity of arable land. We also discuss how the war in Ukraine has worsened access to the fertilisers needed to meet the needs of agricultural soils. In reference to the economic contradictions - the focus of this paper - we expose the conflicts between regional elites and corporations with rural farmers to the detriment of food sovereignty under the collapse of climate and geopolitical conflicts in the war in Ukraine. When referring to the agri-food model and soil depletion, we inevitably come to the dependence on hydrocarbons and the addiction of soils to chemical fertilisers, the contamination of groundwater and its effects on declining human health. In contrast, we present the political-organisational model of some integral agroecological systems resilient to the climate crisis as an alternative to deliberate economic degrowth in the wake of the Covid-19 pandemic in short value chains.

Economic contradictions between regional elites and corporations with rural farmers

Ethno-afro-peasant farmers (hereafter rural farmers), concerning agriculture 4.0 in South America and Mesoamerica,¹⁵ despite differences in the selection of variables, the volume of quantitative data and traditional dysfunctions in the face of land dispossession, retain the same essential characteristics:¹⁶ relations between small and medium-sized properties with territorial roots and economic stability in their sources of income. The size varies from less than one ha to 20-30 ha. The productivity of land quality is measured by the availability of water, access to inputs and the agroecological conditions of the area. According to FAO, 80% of current farms belong to rural economies and include more than 60 million farms (2014).¹⁷ These data are sensitive under the region's unstoppable land grabbing and rural resistance. Since

¹¹ ↪ Nubia Barrera Silva. [Water as the Pandora's Box of Ecological Debacle from South and Central America](#) — The Jus Semper Global Alliance, June 2021.

¹² ↪ CEPAL. Agricultura familiar y circuitos cortos. ISSN-1680 9033. Seminarios y Conferencias. 2 y 3 de septiembre de 2013. P. 31.

¹³ ↪ Rafael Valenzuela Fuenzalida. Pérdida y degradación de suelos en América Latina y el Caribe. Revista EURE (Vol. XXI, N° 58), pp. 61-72, Santiago de Chile, octubre 1993. Pp. 68-69

¹⁴ ↪ European Commission. [“Conocimientos que la red trófica puede aportar sobre los suelos”](#). <https://cordis.europa.eu/article/id/429359-what-the-food-web-can-teach-us-about-soils/es> – 22 de marzo de 2021.

¹⁵ ↪ Nubia Barrera Silva. [Ethnic-Peasant Resistance in South America and Mesoamerica to the 4.0 Agriculture of Catastrophe Capitalism](#) — The Jus Semper Global Alliance, January 2021.

¹⁶ ↪ Economía étnico-afro-campesina, Economía campesina, Agricultura familiar o Economías rurales.

¹⁷ ↪ Salomón Salcedo, Ana Paula De La O y Lya Guzmán. “El concepto de agricultura familiar en América Latina y el Caribe”. En *Agricultura Familiar en América Latina y el Caribe*. FAO. Editado por Salomón Salcedo y Lía Guzmán. 2014. Pp. 17-34.

the climate emergency, rural farmers in the Global South have been moving towards agricultural diversification through forestry, artisanal fishing and aquaculture since the middle of the last century. In addition, the incorporation of farming populations in mountain areas, food production in urban and peri-urban areas, and grazing is conditional on the size and ownership of the land (FAO). It should be noted that the incorporation of segments of urban populations is developing agroecological practices outside commercial markets.

In the peripheral countries, in addition to the dispossession of land ownership, there is the externalisation of the economic costs of raw materials taken from nature.

In the peripheral countries, literature on the climate crisis makes few references to the dual status of the agricultural soils of rural communities based on their natural and historical vocation, adapted to the objectives of supply and storage of reserves from the perspective of food sovereignty and carbon sinks - second only to the oceans - in the sub-regions of the continent. In short, the mining-agro-industrial industry does not restore the soil or bear the costs of ecological fractures in lands adjacent to facilities surrounded by forests, fauna, flora and community subsistence resources. All of this, taken together, is followed by large amounts of carbon emissions that impact global emissions. In addition to the dispossession of land ownership, there is the externalisation of the economic costs of raw materials taken from nature, the social costs of the loss of work tools, household goods, home gardens, subsistence agriculture and minor species of the people settled in territories invaded and rendered invisible by rentier capitalism.

Marx in *Capital* (Volume I) states that *the contradiction between these two dramatically opposed modes of production and appropriation exists in a practical way* (p. 724), ongoing and aggravated by the grabbing of farmland and the trade in carbon programmes. The world's largest oil and food technology corporations lead this market for agriculture 4.0 and the financialisation of land.¹⁸ From Archete, the analogy established by Marx between wages and peasant labour power: *the law of value is not fulfilled in peasant production: the transactions of the small producer are not guided by a market price that equals the value or at least the price of production.*¹⁹ The cause is the differential rent established by the price of the worst land, converted into permanent surplus value, while the differentials of soil fertility or geographical location are preserved. In Colombia's biogeographical regions, we find the snapshot of the last two centuries: the regional elites

Digital green capitalism increases the dispossession of rural properties, the theft of seeds and the plundering of soil fertility.

have chosen to restrict access to land and markets for the rural population [...]. This policy has interfered with the progress of the peasant population, affected by micro-fertilisation, soil, water and biodiversity loss for the benefit of extensive latifundia farms,

which do not generate production or employment, forcing them to become itinerant labourers in circular markets (rural-urban).²⁰

Digital green capitalism increases the dispossession of rural properties, the theft of seeds and the plundering of soil fertility. The so-called development in capitalist agriculture is based on agro-toxic technologies in monocultures aimed at maximum economic yields, which plunder soil nutrients and exploit workers [in this case, the peasant landowner]. In Marx, the curse of the latifundia²¹ survives on the margins of deindustrialisation, demographic growth and ethnic-peasant plundering. In five centuries, they have reduced and marginalised the rural population due to the concentration of people in large industrial cities.

¹⁸ ↪ GREIN. [Del acaparamiento de tierras de cultivo al acaparamiento de suelos: la captura de carbono, un nuevo negocio.](#) - 3 de marzo de 2022.

¹⁹ ↪ A. V. Chayanov. *La organización de la unidad campesina*. Moscú: Nueva Visión. SAIC., 1974, p. 12

²⁰ ↪ Fajardo Montaña, Darío. "La agricultura colombiana en el entorno de la guerra". En: *Dominación, crisis y resistencias en el nuevo orden capitalista*. Coordinado por Jairo Estrada Álvarez. Pp-663-690. Bogotá. Universidad Nacional de Colombia. 2003. P. 677.

²¹ ↪ John Bellamy Foster. *La Ecología de Marx*. Ediciones de Intervención Cultural/El Viejo Topo. 2000. P. 241

Dialectics of transformation between the old and the new. Rights of Nature

In Marx, the integral worldview of nature underlies the practices of the natural economy. It is tied to the everydayness of simple styles of living well with direct participation of the producer's labour power in direct contradiction to the mechanistic view of nature. *By turning the machine [and technologies] into an object and a means of labour, man disappears from the direct production process concurrently with the disappearance of his earth's bonds.* What is more, the mechanical vision of industrial agriculture tends to exterminate traditional agriculture under disruptive practices of socio-ecological metabolism in fertile soils that had adapted to the establishment of polycultures. Thus, individualism is wrapped up in arrogant and anthropocentric attitudes, sinks into self-forgetfulness and distances itself from nature as an integral macro-system endowed with little-known life. The individual, reified by greed and the cult of technology, cannot grasp its true dimension.

The concept of Mother Earth, the central axis in the holistic conception of nature, is relatively well-known in developed countries. In agriculture, generational inheritance regulates seed banks on family farms. At each harvest, seeds are renewed, and sharing them strengthens alliances between family members, neighbours and community organisations. Food sovereignty is a right of ancestral origin inseparable from free selection and regenerative techniques that combine crops, plants, trees and the breeding of minor crop species, following the parameters of altitude, climate, availability of nutrients and water, as they are inseparable resources in soil fertility and optimal harvests. It is the dialectic of renewal between the old and the new, as Engels states when he analyses the matter movements.

In the renewal of new crops and harvests, it is inevitable to address the plundering of seeds. To begin with, free trade agreements impose criminal rules and penalties for the use of native seed banks themselves. Next, digital bio-patents

The plundering of capital reissues the form in which capital originated, described in Marx's original accumulation of small and medium-sized properties, subjected to expulsion, violence in the territories and the privatisation of patrimonial goods.

specialise in extracting DNA from seeds or plant scions without on-site displacement of the expropriator. Big Data platforms analyse the digital redesign of land use and occupation, focusing on individual properties.²² The purposes of agrarian digitalisation are to identify dispossession (land grabbed with false title deeds), to recover illegally appropriated public patrimony and to allocate land for corporate extraterritorial [counter] land reform.

So-called land registries actualise the legalisation of dispossession, a practice employed by local elites. Financialised capitalism has imposed another cycle of digital land grabbing on the last agricultural frontiers, those described as Latin America's differential rents.²³ Guillermo Ortega,²⁴ speaking on the dispossession of the Paraguayan Chaco, points out that, currently, the plundering of capital reissues the form in which capital originated, described in Marx's original accumulation of small and medium-sized properties, subjected to expulsion, violence in the territories and the privatisation of patrimonial goods (seeds, knowledge of natural medicine, culture), a reconversion of nature that reflects the over-accumulation of capital in the seventies of the last century, giving rise to the implementation of neoliberalism.

Let us look at other cases of agrarian counter-reform policies of governments and elites subordinated to financialised capitalism: In Colombia, face-to-face verification is replaced by capturing information from high-precision aerial and satellite photos in the multi-purpose land registry. Under this procedure, traditional elites and green digital capitalism

²² ↪ Nubia Barrera Silva. [Ethnic-Peasant Resistance in South America and Mesoamerica to the 4.0 Agriculture of Catastrophe Capitalism](#). — The Jus Semper Global Alliance, January 2021.

²³ ↪ Grain. Abril 13 de 2022. P. 2.

²⁴ ↪ Guillermo Ortega. "Extractivismo en el Chaco paraguayo". <http://biblioteca.clacso.edu.ar>. 2013, p. 43

have directly supplanted the digital management of land registers to include them on the map. Already 48% of the country's irregular titles have been legalised. In Paraguay, land registries have been validated with paid real estate titles without verifying whether they correspond to historical land grabbing and corruption processes. Under this system, peasant colonies risk disappearing in a process of agrarian counter-reform, as in Alto Paraná. In Brazil, around 30% of public forests (14 million hectares) are illegally registered as private property in the National System of Rural Environmental Registry up to the end of 2020.²⁵

Through self-declaration, land grabbing maps out supposed rural properties within forests. This constitutes a new onslaught of public land theft and the beginning of cycles of fires, reforestation and the introduction of new plots of land into corporate markets. In short, the strategy of state neglect throws rural families into the public credit and financial banking systems in the run-up to land seizures.²⁶ In this way, 70% to 80% of family farming is registered in digital systems worldwide, supported by the FAO, OAS and USAID, a fundamental instrument in scaling up financialised services in agriculture. Moreover, digital advances in the standardisation of financial flows, pricing and commoditisation challenge the diversity of size and soil types of properties with geographical and cultural indicators in South America and Mesoamerica. Thus *the intangible and common-use nature of environmental qualities (...) imposes obstacles to their appropriation and commercialisation like any other commodity.*²⁷

In contrast, in territories of financialised land accumulation with digital technologies, infrastructures, roads and bunker-like facilities are built. Technological packages (fertilisers and high-yield agro-toxic inputs) are buried in the ground and armoured with private and state security armies. The logic of peripheral capitalism slips through the cracks of economic growth without development, besieging technological research and the development of industrial capacities appropriate to the conceptions and interests of internal development. Thus, in the bio-geographical regions, the redistribution of the wealth extracted from the subsoil to hundreds of families dispossessed of their material goods is postponed without any date. Likewise, the loss of soil fertility is materialised in nutrient-poor harvests and the deterioration of human health, especially in the most impoverished populations, due to deliberate state neglect. Thus we have a direct correlation between the dispossession of land, the alienation of the rural workforce and the loss of food sovereignty.

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Food insecurity in South America and Mesoamerica

The countries of Brazil, Colombia, Mexico, Peru and Ecuador have gone from ecological mega-diversity to the degradation of their natural heritage. As the natural regenerative capacity has been transgressed by conversion to monocultures, soils have lost their regenerative capacity due to excessive mechanisation, standardisation, specialisation and intensive use of technological inputs. This process has gradually reduced the biological potential and altered the timing and rhythms of the agricultural calendar. At the same time, erosion, pollution and desertification have destroyed

²⁵ ↪ Grain. Digitalización agraria: más datos menos tierra. Op. Cit.: En el gobierno del presidente Iván Duque: "Land Matrix reports 25 large-scale land acquisition deals by international companies, especially in the Orinoquia region, such as the 25,000 hectares captured by Cargill and the 50,000 hectares of Ingenio Riopaila Castilla S.A., based in Luxembourg (a famous tax haven), far exceeding the legal maximum allowed of 1,300 hectares on average for the region. Deal #3107 in Colombia. June 2019. Available in: [Digitalización agraria](#) (...) p. 7.

²⁶ ↪ Grain. Ibid. P. 4

²⁷ ↪ Grain. Ibid. P. 12

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ecosystems and the survival of flora and fauna associated with their plant formations.²⁸ At the same time, the agriculture of rural communities, faithful to customary tradition, has survived with regenerative techniques, also known as productive soil rehabilitation and conservation, through forestry, reforestation, planting cover crops, polycultures, crop rotation, etc., according to the parameters of altitude, latitude, soil type and other variables.

The Western blockade of fertiliser exports has hindered food security with food sovereignty in Mesoamerica, Colombia, Ecuador and Argentina, already weakened enough by the plundering of rural lands and the loss of fertile soil layers under the intensive use of nitrogen fertilisers in export cereal monocultures. *The whole system depends on oil and gas, such as nitrogen fertilisers, transport, production and plastics.*²⁹ According to Nicolás Indelángelo: *"There is an extreme dependence on these inputs, which are dollarised, so the producer is at very high financial risk (...). In the Pampas, 50 per cent of the producers have disappeared in the last 30 or 40 years."*³⁰

The most vulnerable inhabitants suffer from hunger, runaway inflation and disproportionate rises of between 20% and 50% in food, fertilisers and fuels at record highs since the operation in Ukraine (African Development Bank, 2022). In Colombia, Gustavo Petro blamed Iván Duque for *leaving Colombian farmers without fertilisers [nitrogen, phosphorus and potassium] after he gave the company Monómeros to Juan Guaidó, and he plundered it*. This decision has forced the import of agricultural inputs from Russia, Belarus and Ukraine, leaving Colombia's agriculture on the verge of bankruptcy.³¹ After taking office (7 August 2022), he lifted the embargo, restricting operations among his first decisions. This is the beginning of the recovery of diplomatic relations with Venezuela, a turning point with the interventionist policy of the US.

Global agro-food model and soil depletion

The nexus between the depletion of productive soils and the saturation of chemical fertilisers is little publicised. The statistics on organic matter losses vary from continent to continent. In some countries, it is estimated at up to 50% of organic matter.³² Unsustainable agricultural practices pollute aquifers and increase the dependence of crops on chemical inputs with very harmful effects. *The biggest problem we face is groundwater contamination from nitrogen added in the form of nitrates*. These elements move quickly through the soil, and because they are soluble, they pass into the groundwater and can remain there for years with a cumulative effect over time. Next in importance is urea, another widely used fertiliser. In its decomposition process, some of it, when released into the atmosphere, contributes to acid rain and some of it pollutes groundwater.

²⁸ ↪ Rafael Valenzuela Fuenzalida. Soil loss and degradation in Latin America and the Caribbean. Revista EURE (Vol. XXI, No. 58), pp. 61-72, Santiago de Chile, October 1993: Overgrazing has reached alarming levels in large areas of the region [in Amazonia], particularly in the Andean highlands, in almost all of Mexico, in southern Patagonia, in the Orinoco plains, in the Secas polygon and in the arid and semi-arid Chaco. Livestock overgrazing leads to a situation where the rate of regeneration of the vegetation cover is greatly exceeded by the rate at which livestock graze, thus depriving the soil of the natural resistance to the degrading forces of climate that its protective vegetation cover provides. Contrary to what might be assumed, this form of soil overexploitation does not only occur in areas with water deficit, as shown by several studies on the occurrence of this phenomenon in the humid pampas of Argentina and the Pantanal of Mato Grosso. P. 64

²⁹ ↪ Javier Guzmán. Es el momento de salir del dogma neoliberal. [La crisis alimentaria. Es el momento de salir del dogma neoliberal \(nuevatribuna.es\)](https://nuevatribuna.es). Abril 16 de 2022.

³⁰ ↪ Maríaángeles Guerrero. [El aumento del precio de los fertilizantes confirma la dependencia del modelo agroquímico](https://nuevatribuna.es). 22 de junio de 2022.

³¹ ↪ In 2019 between Iván Duque (2018-2022) and Juan Guaidó "elected" by Ronald Trump "president of Venezuela", he has become an unrepresentable caricature, Duque's accomplice. Karla Ramírez. ["Petro acusa a Duque y Guaidó de dejar sin fertilizantes a Colombia tras robo de Monómeros Venezuela"](https://nuevatribuna.es). 24 de abril de 2022.

³² ↪ Maríaángeles Guerrero. Ibid.

Furthermore, nitrogen contamination of groundwater has severe and harmful effects on human health. *It is associated with gastric cancer, goitre, birth defects, hypertension and testicular cancer.* However, the best-known health effect is methaemoglobinaemia due to the consumption of nitrate-contaminated water. On the periphery, the covid-19 pandemic has revealed a deficit of research on toxics, public health and the environment in response to the challenges of obesity, malnutrition and chronic diseases promoted by the substitution of regional products by the consumption of cheap products derived from synthetic biology and prefabricated products of transgenic origin.³³ Phosphorus is next in order of importance for plant growth and its contribution to the absorption of other elements essential for plant development. The environmental problem of phosphates is that they pass from the soil to the aquifer, as in the case of N, producing the phenomenon of water eutrophication. The consequence of the concentration of phosphorus in surface waters is related to the exponential growth of algae, organisms that are highly dependent on phosphorus. The massive presence of algae consumes large quantities of oxygen and causes its deficit or absence in rivers, lakes and reservoirs, contributing to the creation of large dead zones.³⁴

Nitrogen is the most widely used element in manufacturing cereals for human consumption and feed for livestock fattening. According to estimates, one-third to one-half of food production is directly dependent on nitrogen fertilisers. Green revolution agriculture along the lines of standardised production deposits, synthetic fertilisers and fungicides are at the very antipodes of crop rotation practices, which are the closest to the natural cycles unveiled by earth science. Organic production practices for small and medium-sized producers regain importance when standardised agriculture reaches critical stages of productivity affected by a number of ecological fractures on a global scale. One feature of organic agriculture³⁵ is the use of manure in reconstructing organic carbon far below the soil surface without chemical fertilisers. The Food and Agriculture Organisation of the United Nations (FAO) estimates that, on organic farms, CO₂ emissions per hectare are between 48% and 66% lower than on conventional farms.

Resilient organic farming systems under the climate crisis

For the global agri-food sector and the Codex Alimentarius Commission (FAO), natural soil fertility *responds to an overall system of production management that promotes and enhances the health of agro-ecosystems, including biodiversity, natural cycles and soil biological activity [with this caveat] by applying, whenever possible, agronomic, biological and mechanical methods, as opposed to the use of synthetic materials, to perform any specific function within the system.*³⁶ For its part, the International Federation of Organic Agriculture Movements (IFOAM) assumes soil fertility without pesticides and fertilisers of chemical synthesis or transgenic seeds. It also promotes phytosanitary and production practices with natural or biological processes and controls. Promoting clean production improves nutritional quality and human health and preserves ecosystems and the environment.³⁷

Let us look at two systems of rural agriculture: (i) Mixed or hybrid cover crop production combines techniques with inputs from modern agriculture using phytosanitary products through bank loans brokered by governments and local companies aimed at soil recovery in marginal areas under hillside cornering or dispossession in conditions of marginalisation and poverty.³⁸ (ii) Organic agriculture restoration of ancestral origin is based on selective innovations

³³ ↪ Raúl Martínez. [Los peligros de los fertilizantes químicos](#). Febrero 21 de 2020.

³⁴ ↪ Raúl Martínez. Ibid.

³⁵ ↪ Agencia Europea del Medio Ambiente. <https://www.eea.europa.eu/es/senales/senales-2015/articulos/el-suelo-y-el-cambio-climatico>. 11 de mayo de 2021.

³⁶ ↪ Zabala Salazar, H. (2013). Mundo rural, tecnología y producción orgánica. *Cooperativismo & Desarrollo*. 21(103), 81-90. P. 88

³⁷ ↪ BIOECO. IFOAM: [El inicio de un movimiento orgánico coordinado a escala global](#). 9 de enero de 2016.

³⁸ ↪ Zabala Salazar, H.(2013). Mundo rural, tecnología y producción orgánica. *Cooperativismo & Desarrollo*. 21(103), 81-90. P. 87

Another component of obligatory reference in dispute with multinational corporations is plundering native seeds, real treasures under threat.

and preserves the principles of socio-cultural equity and biogeochemical elements of nature. It develops regenerative capacities in ecosystem functions and biodiversity by trying to fit in with the natural cycle of the land without significant environmental damage. An essential point of rural economic sustainability is based on the competitive management

of the local market with ecological and entrepreneurial fair price management strategies. Similarly, the efficient use of organic inputs and the restoration of ecosystems contributes to carbon sequestration in the atmosphere without renouncing productive sustainability and the conservation of the hydrological cycle and soil fertility.

Another component of obligatory reference in dispute with multinational corporations is plundering native seeds, real treasures under threat. Rural communities are struggling to preserve their agricultural and territorial autonomy to evade the control of large companies and the tyranny of capital. One of the dirty strategies denounced in GRAIN is issuing laws drafted in incomprehensible and contradictory ways that, furthermore, leave too much room for interpretation. In most cases, it passes through the legislative chambers in secret or through international agreements that cannot be debated at any national or local level. Thus, the body of law ignores *basic principles of justice and freedom and directly violates the Universal Declaration of Human Rights*³⁹ with the complicity of national authorities.

The agri-food companies of the Global North have sown in our countries the greedy policy of substituting our fields for

We have copied with little creativity a vision of the rural world centred on producing more money at the expense of the essential attributes and values of life in the countryside.

traditional crops for local use and commercialisation with food production to supply the food demands of the North and emerging countries, to the detriment of our well-being. This demand has introduced another false imperative in the medium-sized enterprise, *that of obtaining the maximum income per unit*

of surface area, [thus] we have copied with little creativity a vision of the rural world centred on producing more money at the expense of the essential attributes and values of life in the countryside. In the rural sector in the equatorial regions and the subtropics of the so-called *New World*, the promises of productivity and perpetual profitability of monoculture have not always been fulfilled in the short term, let alone sustained over time.⁴⁰

Agro-ecological potential of smallholder farmers after the Covid-19 pandemic in short value chains

Covid-19 and the climate crisis have consolidated and renewed traditional organic production systems, such as agroforestry: *a sustainable system of crop and land management that seeks to increase yields continuously, combining the production of (...) fruit and other tree crops with field or arable crops or animals, simultaneously or sequentially on the same unit of land.*⁴¹ Agroforestry responds to the needs of small-scale farmers with technologies that are affordable and highly resilient to climate change.

In Colombia, the Covid-19 pandemic prompted the development of renewed experiences of peasant family farming from the field to the table supported by agroecological systems through short value chains between producers and consumers close to the urban sector. Peasant organisations *with smallholder and community ownership profiles, family*

³⁹ ↪ GRAIN. [La criminalización de las semillas campesinas – resistencias y luchas](#). 8 de abril de 2015.

⁴⁰ ↪ Enrique Murgueitio Restrepo. [Los árboles en la agricultura: una antigua amistad rescatada del olvido en América](#). LEISA. Revista de Agroecología. Junio de 2011.

⁴¹ ↪ Ibid. P. 5

participation in agricultural production, livestock, fisheries and artisanal food processing, as well as local relations for the social, cultural and economical maintenance of life. At the national level, they have marketed around 122 agricultural products on the cold thermal floor, 96 on the temperate floor and 56 on a warm floor. In summary: (i) 60% of the families have associated with others in the commercialisation of products. (ii) 69% of the producers travel less than 40 km to reach the market. (iii) 61% of the transformation activities are carried out by women within the household. (iv) Prioritisation of seasonal and local products with notable growth of local economies in the territories.⁴²

Experiences led by the Viñales National Park in Cuba have implemented agro-biodiversity programmes focused on tourism after planning the visiting season, countries of origin, food satisfies and tastes. Travel distances do not exceed eight kilometres; means of transport range from horse-drawn carts to motor vehicles. Other actors in the chain, the credit and service cooperatives, contract a percentage of the production and cover a small part of the producers' needs with inputs. The state system of urban agriculture also participates, which contracts the production of vegetables and fruit with some of the farms destined for social consumption in hospitals, children's circles, grandparents' homes, etc.⁴³

In Mexico, the agroecological milpa project is the basis of family farming for hundreds of peasants with an alternative

Farmers grow diversified crops because they obtain a higher yield for each area of polyculture sown. Therefore, the strength of the milpa does not lie in the high productivity of a single crop but its integrated management.

economy to the industrial model. Mexico, one of the main buyers of maize despite having an extensive diversity of native maize varieties, has shifted from the exclusive cultivation of maize to a productivist logic. However, in Coyuca de Benítez, more than 80% of the farmers grow diversified crops because they obtain a higher yield for each area of polyculture sown.

Therefore, the strength of the milpa does not lie in the high productivity of a single crop but its integrated management. This project uses local, drought-tolerant varieties adapted to each area with organic and green fertilisers, bio-fertilisers, agroecological management of pests and diseases, diversification, crop association and rotation, soil conservation, seed selection and a series of techniques that make the system possible.⁴⁴

In conclusion, we have selected experiences from three countries in the region that may well represent the regions of South America and Mesoamerica, characterised by sustainable land management in adaptation to climate change. It

Agroecological systems are inherent to ancestral agriculture that has been hard hit by free trade agreements and government neglect.

constitutes an efficient alternative to de-globalisation for the benefit of food security with food sovereignty. Agroecological systems are inherent to ancestral agriculture that has been hard hit by free trade agreements and government neglect. However,

the resistance of rural farmers, despite the pressure of corporate capitalism, maintains the sowing of polycultures, from some time ago, towards integral agriculture, contributing to the conservation of agro-ecosystems, soils and biodiversity.

Agro-ecological experiences occupy the primary link in short marketing circuits built autonomously with contributions from external development programmes. Although they are part of the rural tradition, the confinement of the covid-19

⁴² ↪ Yúvisa Arredondo, Liza Quitán y Álvaro Acevedo. [Del campo a la mesa de los consumidores con solidaridad y compromiso](#). La Red Nacional de Agricultura Familiar en Colombia. Revista LEISA. Octubre 2020. Volumen 36, número 3. p. 7

⁴³ ↪ Ricardo Romero Miranda. Mario A. Sánchez. [Gestión de fincas agroecológicas a partir de cadenas de valor. Una mirada desde el Parque Nacional Viñales](#). Cuba. Revista LEISA. Octubre 2020. Volumen 36, número 3. pp. 9-12

⁴⁴ ↪ The experience of the Unión de Pueblos para el Desarrollo Sustentable del Oriente de Coyuca y Poniente de Acapulco (UP), the Red de Campesinos Guardianes del Maíz Nativo (Regmaiz) and other similar organisations in the municipality of Coyuca de Benítez. In Guerrero Marcos Cortez Bacilo. Alternatives for building local food sovereignty. [Agricultura Familiar campesina y circuitos cortos de comercialización: una experiencia en Guerrero, México](#). Revista LEISA. Octubre 2020. Volumen 36, número 3. Pp. 22-25

pandemic has modernised the short marketing chains. In all cases, they cover the needs of family self-consumption

The autonomy governs the axis of security with food sovereignty to choose products, forms of production, sale and exchange of seeds, differentiated by the plurality of the region's cultures.

extended to demand and diversified commercialisation. The autonomy governs the axis of security with food sovereignty to choose products, forms of production, sale and exchange of seeds, differentiated by the plurality of the region's cultures. *These proximity circuits or short chains are a trade based on directly selling fresh or seasonal products without intermediation (or reducing it to a minimum) between producers and*

consumers. It is also respectful of biodiversity, its cycles, balances and limits. It also highlights the importance of caring for native seeds, which represent the livelihood of families and are a vital part of achieving food sovereignty. In this way, not only food sovereignty is accomplished, but also labour sovereignty because, with the implementation of productive projects - which are becoming self-managed - direct and indirect jobs are generated with the constant and committed participation of each family or community group.⁴⁵

Insurmountable damage to the trophic network, hydrological and biogeochemical cycles of soils

The climate crisis is deepening, without science and experts being able to determine its true extent. Damage, alterations and insurmountable disruptions of the hydrological, air and essential biogeochemical cycles of nitrogen, phosphorus and potassium, among others, are spreading across the Earth, impacting the biosphere. Indeed, *the world's cultivated soils have lost between 50 and 70 per cent of their original carbon stocks, much of which has been oxidised on exposure to air to become CO₂.*⁴⁶ The climate crisis accelerates the effects of agro-toxic and extremely threatening technologies: it multiplies the productive yields of plants without taking into account the finite capacities of soils, without foreseeing alterations of their natural components, leading to dangerous decreases in the levels of carbon stocks in the forests of the Pan-Amazonian and Central American regions.

Plants (including trees) capture and store carbon. They are the main component of organic matter. Through their leaves,

Of all the estimated biomass in the Amazon region, 58% is in indigenous territories and protected areas, the main protectors of climate regulation and mitigation of global warming. Areas under indigenous occupation have the lowest deforestation and forest degradation rates and carbon losses over the years.

they capture energy from sunlight and, in the creation of photosynthesis, extract CO₂ from the air with water vapour and nutrients from the soil in the production of sugars, their primary food source. Part of the CO₂ is released back into the atmosphere through plant respiration. Herbivorous animals digest sugar molecules for energy, and during the respiration cycle, excretion and decomposition release some CO₂ into the atmosphere. Nowadays, deforestation and the mobility of agrochemicals in

soils and groundwater release stored carbon into the atmosphere and become direct sources of atmospheric carbon.⁴⁷

Among the soil typologies, peatlands are the most carbon-rich, the best known in Patagonia between Chile and Argentina, in northern Europe, the UK and Ireland, and the Eurasian region. Grassland soil stores a lot of carbon per hectare, while the soil in southern Europe's hotter and drier areas contains less carbon.⁴⁸ Soil GHG emissions are

⁴⁵ ↪ En Guerrero Marcos Cortez Bacilo. [Ibid.](#) P. 24

⁴⁶ ↪ Judith D. Schwartz. [El suelo como almacén de carbono: ¿nueva arma en la lucha contra el clima? - Yale E360](#) 4 de marzo de 2014.

⁴⁷ ↪ "Administración Nacional de la Aeronáutica y el Espacio. [El ciclo del dióxido de carbono](#)".

⁴⁸ ↪ European Commission: [JOINT RESEARCH CENTRE – EUROPEAN SOIL DATA CENTRE \(ESDAC\)](#)

expected to increase in importance in the far north of Europe and Russia, where permafrost melting can release large amounts of methane, a greenhouse gas much more potent than carbon dioxide.⁴⁹ Of all the estimated biomass in the Amazon region (73 billion tonnes of carbon), 58% is in indigenous territories and protected areas, the main protectors of climate regulation and mitigation of global warming. Areas under indigenous occupation have the lowest deforestation and forest degradation rates and carbon losses over the years.⁵⁰

Consequently, all soils, including permafrost, react in complex ways to environmental changes by becoming both sources and sinks of CO₂. Carbon is transported from where it is captured to where it is stored in a safe place, often underground. Soil thus plays a crucial role in climate change mitigation.⁵¹ Nature relegates nothing; surplus plant growth and roots distribute it as food to soil micro-organisms.

Research into profit-accumulating technology ignores the ecological functions of the soil in terms of cycling and complex biogeochemical variables, many of which are undiscovered. Instead, scientific research has emphasised intensive uses of nitrogen fertilisers aimed at efficient plant expansion with minimal costs and high yields in large cereal

If favourable conditions are established for varied communities from different parts of the network to recolonise degraded soils, soil habitats can be restored. However, this is a Herculean task, and the planet does not have the time or the climatic conditions to restore the complex ecological web of millions of hectares degraded by fire and drought. Million tree planting programmes are multiplying the plundering of land in rural communities in the Global South.

monocultures. From the chemical composition of the soil, plants extract elements grouped into macronutrients such as nitrogen (N), phosphorus (P) and potassium (K). To a lesser extent, micronutrients are iron, zinc, molybdenum, boron, copper, manganese, chlorine, aluminium, sodium and cobalt. Science is just beginning to understand how the macronutrient complex interacts with micronutrients, microbial flora and bacteria. In this interplay, soil fungi conserve ecosystems and contribute to soil fertility and carbon

sequestration in interaction with hydrological cycles in connection with the soil and the biosphere from an ecological perspective.

It has been known for more than a century that plants and microorganisms establish symbiotic relationships linked to soil productivity. In recent years, the importance of the mycorrhizae and various groups of bacteria in plant nutrition has been discovered in their dual role: some as facilitators of phosphorus acquisition or nitrogen fixation, and others as active elements in protecting plants against microbial pathogens (citing Buée et al., 2009). This recognition relegates in soil productivity, the transcendental contribution of microorganisms in plant productivity, as the microbial community of the rhizosphere works in coordination with the activity of plant roots (Rodríguez Zaragoza citing Bluée et al., 2009). Finally, from an agroecological perspective, soils are 40% mineral. The lack of soil productivity is not due to a shortage of minerals but to the destruction of the food web by the effects of pesticides, artificial fertilisers, and agro-industrial agriculture mechanisation.

⁴⁹ ↪ Agencia Europea del Medio Ambiente. <https://www.eea.europa.eu/es/senales/senales-2015/articulos/el-suelo-y-el-cambio-climatico>. 11 de mayo de 2021.

⁵⁰ ↪ Red Amazónica de Información Socioambiental Georreferenciada (RAISG), in partnership with the Woods Hole Research Center (WHRC), Massachusetts, USA, and the Coordinadora de las Organizaciones Indígenas de la Cuenca Amazónica (COICA). RAISG is a consortium of eight non-governmental organisations from six countries in the Pan-Amazon region (Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela). Infoamazonia. [Nuevo estudio hace el balance de las reservas de carbono en la Amazonia](#). 6 de febrero de 2020.

⁵¹ ↪ Judith D. Schwartz. O. Cit.

We can affirm that microbiological research has transformed the vision of soil conservation by discovering some vital functions linked to the enormous complexity of the network of soil trophic chains that connect the macronutrients with the millions of microorganisms that live there. Until now, this unprecedented breakthrough in soil structure has been studied by looking at each group separately. For example, earthworms or fungi. By going beyond species—and area-specific research, scientists have discovered the potential interactive effects in natural soils, says Erktan: *if favourable conditions are established for varied communities from different parts of the network to recolonise degraded soils, soil habitats can be restored.*⁵² Nonetheless, this is a Herculean task, and the planet does not have the time or the climatic conditions to restore the complex ecological web of millions of hectares degraded by fire and drought. Million tree planting programmes are multiplying the plundering of land in rural communities in the Global South, exacerbating conflicts there.

Conclusions

In South America and Mesoamerica, we suffer from various catastrophes caused by hegemonies under imperial

In South America and Mesoamerica, we suffer from various catastrophes caused by hegemonies under imperial subjugation and the plundering of our natural resources.

subjugation and the plundering of our natural resources used for the industrial, agro-food and energy development of the North and emerging countries. The war in Ukraine accelerated a jigsaw of conflicts in the geopolitical sphere with an impact on the Global South, especially in terms of rising fertiliser prices and skyrocketing

inflation, increased food insecurity and multidimensional poverty. A constant since the outbreak of the Covid-19 pandemic is economic decline driven by the deregulation of markets, labour shortages and, in part, partial de-globalisation in the face of the dismantling of extensive global value chains. Added to this are fossil fuel shortages and speculation over the availability of fertilisers. All in all, the bundle of conflicts that have risen to the surface keeps the cause of the unrelenting soil degradation and devastating water shortages, barely visible in the recurrent droughts in the US and Europe, semi-hidden. Droughts are generally not decades old in African, Asian and US regions.

In contrast to the climate debacle, as if they lived on another planet, the energy oligopolies continue to hoard disproportionate increases in energy bills and the decline in quality in the provision of public services, especially for the most vulnerable families in the European Union. As a result, Europe's leaders missed an historic opportunity to innovate, from economic sanctions to more creative strategies for the benefit of their people. With de-globalisation underway, the nationalisation of public services is the only viable option in terms of price control, investment and coverage of all population sectors.

Droughts are preceded by another cause, the overuse of technologies in the manufacture of agrochemicals in the processing of inputs and the intensive use of transgenic seeds in agro-industrial production. The ends are well known. They have been used to maximise profits and saturate global markets with cheap, prefabricated products of poor food quality.

They are cheap because of the externalisation of costs for the exploitation of nature, the plundering of the labour force, and the imperial subjugation of the countries of the Global South. As a result, we have ecological-environmental

⁵² ↪ European Commission. [Conocimientos que la red trófica puede aportar sobre los suelos.](#)

fractures, and the destruction of the hydrological and geomorphological cycles of the land in the Panamazonic Basin and the Gran Chaco in Argentina, Paraguay and Bolivia have grown exponentially.⁵³

Let us turn to the historical contradictions of capitalism established by Marx, re-edited by digital technologies turned into

The historical contradictions of capitalism established by Marx, [are] re-edited by digital technologies turned into lethal weapons against small and medium rural farmers in permanent resistance.

lethal weapons against small and medium rural farmers in permanent resistance. Under the imposition of transgenic seeds, they have undermined the free use of native seeds. For the local communities, this has turned into a position of non-negotiable claims posed to defend land ownership. These contradictions unfold in two opposites: agri-food agro-industry and traditional agriculture

with varied approaches to agroecological systems and commercialising products in short cycles in the localities. As we have said, the experiences presented derive from ancestral tradition, and agroecological proposals have developed adaptations to climate change, producer families' income and the soils' restoration.

In the arena of economic contradictions with rural landowners, capital defies nature through predatory technologies, removing nutrients from the soil previously adapted to times, spaces and rhythms following the laws of nature. As

In short, the greed of capital, the idolatry of toxic technology and the ignorance of history lead us to free fall towards the sixth planetary extinction.

capital's greed defies these laws, for example, when natural fires break out, the flip side manifests itself in droughts. Fires raging through the forests of the developed world and in the Global South destroy crops, harvests, and collective and family infrastructures, accelerating the extermination of soil food webs. Thus, Engels states:⁵⁴ *all processes of*

nature are two-sided since they rest on the relation between two acting parts, at least, action and reaction.

So, following Engels, we must not flatter ourselves too much about our human victories over nature. Nature takes revenge on us for every defeat we inflict on her. Here is another case, that of the Italians in the Alps: they destroyed on the southern slope the pine forests so well preserved on the northern slope. They did not know this was killing off the dairy industry in their valleys. Even less did they know that it deprived their mountain streams of water for most of the year. And, in the rainy season, they rushed over the plains, turning them into turbulent rivers.⁵⁵ In short, the greed of capital, the idolatry of toxic technology and the ignorance of history lead us to free fall towards the sixth planetary extinction.

In this regard, the findings of the Working Group 3 report on the volume of global emissions (59 GTCO eq in 2018) are higher than ever in human history. Cumulative net CO emissions remain the main driver of climate change, including

We are moving unchecked towards an apocalypse on Earth.

emissions from fossil fuel combustion. However, emissions of fluorinated gases (a group of gases hundreds to thousands of times more radioactive than CO, some of which can remain in the atmosphere for thousands of years) now play

an essential role in warming. Between 1980 and 2018, emissions of these fluorinated gases increased by 430%, while CO emissions increased by 66%. *In the second half of the 2020s, another 0.1C will be added due to increased solar irradiance.* Ultimately, the scenarios show little chance of staying below 1.5°. In the short term it will make climate

⁵³ ↪ Nubia Barrera Silva. [Water as the Pandora's Box of Ecological Debacle from South and Central America](#) — The Jus Semper Global Alliance, June 2021.

⁵⁴ ↪ Federico Engels. *Dialéctica de la naturaleza*. Editorial Grijalbo S.A. México. 1961. P. 59

⁵⁵ ↪ Federico Engels. *Dialéctica de la naturaleza*. Editorial Grijalbo S.A. México. 1961. P. 151

targets unattainable in the future.⁵⁶ In Byline's Times, the combined effect means there is no chance of keeping global warming below 1.5C.⁵⁷

Accordingly, we are moving unchecked towards an apocalypse on Earth. Political and governmental leaders in developed countries are conspicuous by their absence of innovative ideas, policies and strategies to deal with unexpected conflicts on all fronts, the economy, energy resources, food, political stability and so on, and all at the same time. Henry Kissinger summed it up by referring to the war in Ukraine: states need leaders, not administrators. These characters are passive, without goals and objectives of their own, under submission to the hegemonic interests of the US/ NATO, without initiatives or concrete buffer actions under unexpected climate events. Climate collapse is spreading unchecked in the population. We see it in the reduced effectiveness of pharmaceuticals for people with mental health problems. There are increased symptoms of generalised anxiety and reductions in thinking and reasoning abilities in people without mental health disorders. Drugs such as antipsychotics increase the risk of heat-related death, which can suppress thirst and cause dehydration in people. Research shows that areas of the brain responsible for framing and solving complex cognitive tasks are affected by heat stress. Overall, for every one °C increase in average monthly temperature, mental health-related deaths increase by 2.2%. Spikes in relative humidity also result in a higher occurrence of suicides.⁵⁸

In South America and Mesoamerica, organic agriculture is more than introducing some agroecological model adapted to food security and sovereignty demands with a territorial approach. It is an integrated system that encompasses a way of life that respects and accepts the limits of nature and reinforces social relations of self-sufficiency and reciprocal cooperation. Between farming communities, seeds and experiences are shared under the resilience of agroecological systems. The rural model is advancing at the pace of de-globalisation and the climate crisis and the conservation of the few water resources we have left as an alternative to hunger. On the other hand, it innately prioritises lifestyles based on satisfiers in harmony with the limits of nature in the prioritisation of autonomous forms of production and consumption. In other words, chosen by the people themselves, this is what we call food sovereignty. From this perspective, rural communities and sectors of the urban population with lifestyles based on respect for nature would be, per se, on the first rung of ecosocialist degrowth.

Ecosocialist degrowth demands that each country returns to itself with short value chains in the commercialisation of products. In other words, it will have to reinvent itself to solve essential needs and satisfiers of food, energy, water use and management with its resources. Agroecology is thus a political framework for food sovereignty. Experiences in South America and Mesoamerica, and even in small-scale agriculture in EU countries, offer us ample proposals to open paths for building more resilient urban-rural societies.

Ultimately, we cannot reverse the climate apocalypse. However, in the Global South, we must strengthen the integrated regional agri-food system as a socio-ecological and environmental buffer strategy in the face of collective hunger, knowing that it is worse than death.

⁵⁶ ↪ Daniel Tanuro. Informe del GT3 del IPCC: del rigor científico a la fábula social. Vientos del Sur. [Informe del GT3 del IPCC: del rigor científico a la fábula social - Viento Sur](#). P. 3.

⁵⁷ ↪ Nafeez Ahmed: [COP26 Pledges will have Catastrophic Consequences Says Ex-NASA Climate Chief](#), 16 February 2022

⁵⁸ ↪ Laurence Wainwright. Las olas de calor empeoran la salud mental. [coportal.net/paises/olas-de-calor-salud-mental/](#)

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