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WORLD MOVEMENTS FOR ENVIRONMENTAL JUSTICE

My work of 40 years has been on ecological economics, comparative and statistical political ecology, and environmental justice. The Balzan Prize will help to consolidate the Atlas of Environmental Justice (www.ejatlas.org), my main occupation for the last ten years. Among the Balzan prizes there are very well-known economic and social historians, Ernest Labrousse, Carlo Ginzburg, Carlo Cipolla and Eric Hobsbawm. I am very honored to be in their comfortable company, and also that of younger colleagues like Manuel Castells and Bina Agarwal.

After studying economics in Barcelona, and agricultural economics in Oxford and Stanford in the early 1960s, I went back to St. Antony's College of the University of Oxford for a decade-long research fellowship, until 1973. I wrote books on contemporary and historical agrarian issues in Andalusia, Cuba and Peru. After returning to Barcelona in 1975, my chair was in Economic History and Institutions at the Autonomous University of Barcelona. It was only in the early 1970s, influenced by economic anthropology, and mainly by Roy Rappaport's 1968 book *Pigs for the Ancestors* (on the economy and religion of the Tsembaga Maring in Papua New Guinea), that I understood that agriculture could be seen as a system of transformation of energy. I published with J.M. Naredo some articles on the history of energy accounting (focusing on what Vernadsky and Engels thought on Podolinsky's agricultural energetics of 1880). Despite being economists, we learnt to look at the economy from the point of view of the metabolic flows of energy and materials. We understood that the exosomatic use of energy (to use Lotka's term of 1911) had grown enormously in rich countries because of the use of the «bottled» photosynthesis of the fossil fuels and not because of current photosynthesis. This was not the language of

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economics or even of economic history. This was the language of human ecology and the new field of ecological economics.

My work on economic-ecological history was influenced by Georgescu-Roegen's book of 1971, *The Entropy Law and the Economic Process*. I was in personal contact with him after 1979 and this helped me to write the book *Ecological Economics: Energy, Environment and Society* (1987) (which was published in Italian by Garzanti in Milan). With Herman Daly, Bob Costanza, Ann-Mari Jansson and others we founded the International Society for Ecological Economics in 1990. We came from two sources: human ecologists interested in energetics, systems ecologists such as H.T. Odum; and dissident economists such as Georgescu-Roegen, Kenneth Boulding and K.W. Kapp. And before them, in the early 20th century, Frederic Soddy, Patrick Geddes, and Otto Neurath, the analytical philosopher from Vienna who started the «socialist calculation debate» of the 1920-30s emphasizing incommensurability of values.

From Ecological Economics to Political Ecology

The view of the economy as flows of energy and materials (common to ecological economics and industrial ecology) was known in Italy in the 1970s and 1980s. One representative was Giorgio Nebbia (1926-2019), professor of what in Italy was called *merceologia* and in German *Warenkunde*. This discipline was left aside by conventional economists and also by Marxist economists. The landmark critique by Piero Sraffa (1960) against neoclassical economics (economic values depend on distribution of revenue between capitalists and workers) was influential among economists of my generation. But it was still pure economic theory, not ecological economics. On reflection, the title of Sraffa's book, *Produzione di merci a mezzo di merci* («Production of commodities by means of commodities») had the metaphysical smell of economics of all kinds (neoclassical, Keynesian, or Ricardian-Marxist). Commodities are not produced by commodities but by physical processes, and they are extracted by human labor (slave, indentured, waged labor) and by machines.

We have supported the theory of unequal trade by adding ecological accounting to it (Hornborg 1998; Pérez-Rincon 2006, 2019, Infante-Amate *et al.* 2020). The actual commodities exported in an ecologically unequal trade from the «commodity extraction frontiers» (Moore 2000) like iron ore, soybeans, palm oil, copper, nickel, oil, gas, coal, gold, platinum, the new metals for solar electricity (lithium, cobalt), cotton and sugar of colonial America, the guano of Peru in 1840-80 and the silver from Potosi and Zacatecas since

the 16th century, pepper brought to Europe by Vasco de Gama from the coast of Malabar, were and are not produced by other commodities. They were and are only in part produced by human work. They came and come straight from photosynthesis and the carbon cycle, or from other biochemical cycles and geo-chemical processes. The volume of this unequal trade has never been as large as today. There is no sign of «dematerialization» of the economy as we know from the accounts of Material Flows (now published by Eurostat and UNEP, after the pioneering work of many years at the Institute of Social Ecology in Vienna) (Fischer-Kowalski – Haberl 2015). Hence the calls for «sustainable economic degrowth» or for «prosperity without growth» (Kallis *et al.* 2010; Jackson 2016), and the research on the links between the small Degrowth movement in Europe and the world movement for environmental justice (Akbulut *et al.* 2020; Martinez-Alier 2012). The journal *Ecological Economics* was one of the main venues where research on the economy seen as social metabolism was published. I am proud of this as a founder and past-president (in 2006-07) of the International Society for Ecological Economics. Mainstream economics journals were not and still are not receptive to this type of research.

The new ecological economics of the 1970s and 1980s with its emphasis on energy and material flows, and my own background in the 1960s and 1970s in the study of agrarian conflicts (as in my first articles in the *Journal of Peasant Studies* in 1973), led me to study environmental conflicts. This started in the late 1980s. And it owes enormously to the contact with many environmental activists and groups, among them Acción Ecológica from Ecuador after 1994, when I spent one year teaching at the FLACSO in Quito, and ERA and Oilwatch in Nigeria. In 1997 Oilwatch launched the slogan «leave oil in the soil», both to avoid local damages as those caused by Chevron-Texaco and Shell in the Amazon of Ecuador and in the Niger Delta, and to prevent emissions of carbon dioxide. My work also owes much to travels to India and throughout Latin America, to the political ecology of Enrique Leff, Victor Toledo, Maristella Svampa, Gabriela Merlinsky, Héctor Alimonda, Arturo Escobar, Horacio Machado and so many others. I published articles and books in the 1990s on the «environmentalism of the poor», including *Varieties of Environmentalism* with Ramachandra Guha in 1997. In 2000 I published another book, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*, linking ecological economics and political ecology (the Italian version was published in Milan, Jaca Book, edited and improved by environmental historian Marco Armiero). I became intellectually indebted to James O'Connor's theory of the «second contradiction of capitalism» from the very beginning, since I met him in 1989 and started to edit the journal *Ecologia Política* in Barcelona in 1991.

Ecological Distribution Conflicts and the EJAtlas

Thirty years ago, I was moving from ecological economics to political ecology, or rather combining them. We knew that the human impact on the face of the Earth was increasing all the time. In the last 120 years, the human population has grown five times while the yearly inputs processed in the global economy (biomass, fossil fuels, building materials, metals) grew from 7.5 to 95 Gt (Haas *et al.* 2020). The economy is increasingly entropic. Energy from the photosynthesis of the distant past, the fossil fuels, is burnt and dissipated. Another reason for the lack of circularity is the expansion of stocks of building and infrastructure; once in place, a large input of materials and energy is needed for their maintenance and operation. Even without further economic growth the industrial economy would need new supplies of energy and materials extracted from «commodity frontiers», producing also more waste (including excessive amounts of greenhouse gases). Therefore, we see the reasons why new ecological distribution conflicts (EDC) arise all the time (Martinez-Alier – O'Connor 1996). This is not so much because of market failures or weak environmental governance. There are material reasons why ecological distribution conflicts arise. We gather them in the EJAtlas where by November 2020 we have collected over 3330 cases in data sheets of 5 or 6 pages. The EJAtlas (www.ejatlas.org) was started in 2012. It grew with Dr Leah Temper, Dr Daniela Del Bene, Dr Arnim Scheidel and many other collaborators, both academics and activists. There are also some country versions of the EJAtlas (Italian, Turkish…). Other groups (OCMAL in Latin America, FIOCRUZ in Brazil) had started similar maps before us and they inspired us, as also the inventories by the Center for Science and Environment (CSE) known as green files in India. The EJAtlas contributes and allows research and teaching in political ecology, and it also helps (we hope) the world movements for environmental justice by making more visible what remains rather invisible [Fig. I]. Making ecological distribution conflicts visible contributes to placing political ecology at the center of politics (Charbonnier 2019).

Such ecological distribution conflicts are also «valuation contests». In such conflicts, plural values are manifested (ecological values, livelihood values, economic valuations, sacredness, indigenous rights). They are not commensurate; they cannot be reduced to one another. Conventional economists try to reduce so-called externalities to money prizes. Ecological economists operate instead with plural values. Technically we use some of methods of multi-criteria evaluation, but even then, who has the power to exclude some criteria, to choose use particular decision methods, the

participant stakeholders, the time horizons (Munda 2008). Political science studies power. This is why political ecology, that studies such «ecological distribution conflicts», is called political ecology.

The Industrial Economy Is Not Circular, It Is Entropic

At a time when despite all the evidence to the contrary, there is much enthusiasm about the possibilities of an industrial circular economy, it is necessary to explain the two senses in which authors write about the «circular economy». They could be teachers of introductory microeconomics, or more recently they could be chemical engineers and industrial ecologists.

Introductory microeconomics is often taught in terms of what Georgescu-Rogen called «the merry-go-round between consumers and producers», a circular scheme in which producers put goods and services in the market at prices which consumers pay; meanwhile, consumers (as providers of work, land or other inputs or «factors of production») get money from producers in the form of salaries, rents etc. and they buy, as consumers, the products or services that have been produced. The «merry-go-round» needs energy for running (energy which gets dissipated), and it produces material waste which is not recycled. For instance, coal and oil are not really produced (contrary to textbook economics), they are merely extracted, and its energy is dissipated by burning which causes excessive amounts of carbon dioxide. This is left aside in introductory mainstream economics, or maybe it is introduced much later in doubtful analyses of the «intergenerational allocation of exhaustible resources» and in the treatment of externalities which are «internalized into the price system».

As ecological economists critics of mainstream economics since the 1970s, we though that we were convincing the public if not the professional economists that the «merry-go-round» representation of the economy was wrong. The economy is embedded in physical realities. However, to our surprise, the recent novelty is that, from industrial ecology and not only from economics, a circular vision of the economy is also preached. The geologically produced energy and the materials entering the economy are here taken into account, and the waste is very much present, but it is assumed that technical change may close the circle. The waste becomes inputs. The energy (dissipated, of course, because of the Second Law of Thermodynamics) is not a problem because it will come from current sun energy (not fossil fuels, which are exhaustible stocks of photosynthesis from the past). The circular supply chain is supposed to come rule physically in the economy. We know however that the actual degree of the circu-

larity of the industrial economy is very low (Haas *et al.* 2015, Giampietro – Funtowicz 2020), and it is probably decreasing as formerly biomass-based economies complete their transition to an industrial economy based on fossil fuels in India (Roy – Schaffartzik 2021) and Africa causing new local conflicts and contributing to world climate change.

Relevance of The EJAtlas for Business Economics and Management

We are unexpectedly finding out that the EJAtlas is also useful in studies of business economics and management, and not only in the environmental social sciences such as ecological economics, political ecology, and environmental history. There are publications using the EJAtlas for information relevant to investors such as pension funds keen on applying Corporate Social Responsibility (CSR) criteria to particular firms or business sectors. As Rajiv Maher writes in the Business and Human Rights Journal (2020) the EJAtlas documents and catalogues social conflicts around environmental issues aiming to make these instances of mobilization more visible, highlighting claims and testimonies, making the case for corporate and state accountability for the injustices inflicted sometimes through their activities. The materials collected and the research done with the EJAtlas are relevant, therefore, to the construction and criticism of indices and benchmarks meant to guide shareholders and other stakeholders, such as the Responsible Mining Index, the Business Human Rights Benchmark and others. High-ranking companies in the CHRB and RMI are demonstrably involved in multiple socio-environmental community conflicts mapped in the EJAtlas, perhaps even protagonists of Global Witness' narratives of deaths of environmental defenders. Similarly, there is much information in the EJAtlas on «social license to operate» (SLO), a term much used in the extractive industries (Prno – Slocombe 2012; Gehman *et al.* 2017) to indicate communities' approval or acceptance of ongoing projects. «Acceptance» may not be always equivalent to willingly granted social permission; quite often it is obtained by violence and fear.

Therefore, the use of the EJAtlas in professional advisory financial activities and in fields like eco-labelling, product certification and in general CSR (or Environmental Social Governance, ESG, as it is nowadays called) opens up opportunities for research in business management on the opposition between the objectives of «shareholder value» and «responsible management» (Laasch *et al.* 2020), on topics such as Corporate Social Irresponsibility (CSIR) (Antonetti – Marklan 2016, Riera – Iborra 2017, Alcadipani – Medeiros 2019, Saes *et al.* 2020), corporate accountability, corporate

impunity and lack of liability. How do corporations (and state organs) react to allegations of using «counter-insurgency methods» against environmental defenders? (Brock – Dunlap 2019). Corporations are supposed to practice disclosure of environmental, social and governance results.

Relevance of the EJAtlas for Relations Between Science and Activism (Post-Normal Science)

As Temper *et al.* (2015, 2018) explain, the EJAtlas holds promise for extending the praxis and the theory of environmental justice by: 1. integrating further activist and academic knowledge into analysis of EJ through new forms of knowledge co-production; 2. shedding light (through analysis of many cases) on the process called «activists mobilizing scientists» (Conde 2014) where unequal power relations are contested through the co-production of scientific and local knowledge. Lay citizens, communities and EJOs immersed in environmental conflicts sometimes engage with professional scientists to understand the potential or visible impacts that an extractive or polluting project will cause or is causing to their environment and themselves. 3. Applying a multi-scale framework that allows a wider geographical analysis of interconnections between actors, struggles, and metabolic flows (domestic extraction and also ecologically unequal trade and waste production). Rich regions have displaced and are increasing the displacement of environmental costs associated with material throughput to poorer regions of the world (Muradian – Martinez-Alier 2001, Hornborg – Martinez-Alier 2016). Such a framework of ecologically unequal exchanges or *Raubwirtschaft* helps discern the coalitions of power that produce and benefit from patterns of extraction, trade and consumption, and the social groups (ethnic groups, women, peasants…) that suffer the most, providing a departure point for constructing coalitions to support the protest by counter-movements of the most vulnerable groups. In Latin America, the historical and present awareness of ecologically unequal trade has produced an «anti-extractivist» geography with Alberto Acosta, Eduardo Gudynas, Maristella Svampa (Samaniego *et* al. 2017); 4. A perspective that through geo-location and cartographic data allows an interface between the natural and social sciences, revealing features of the territory and social, institutional and cultural processes. There are not only «political opportunity structures» favoring environmental activism but also «biological opportunity structures» (Scheidel *et al.* 2020).

The EJAtlas draws on activist knowledge flowing to journalists and academics and vice versa. The vocabulary of the movement for environmental

justice and its cultural expressions in mural art, banners, slogans, songs, theatre and films, is mostly born outside universities (Martinez-Alier *et al.* 2014). A key question within the process of co-production of knowledge in the EJAtlas is how to combine activist knowledge with scientific rigor. For instance, the Featured Maps on the Chevron, Vale and Pan American Silver companies, and the Blockadia Featured Map are «agit-prop» instruments derived from the EJAtlas for use of concerned activists but they have not yet been developed into peer-reviewed articles or chapters of books in business economics publications as they should. Another instance: with the many cases on the Shell company in the EJAtlas (from Nigeria and elsewhere) we could do a Featured Map and scholarly article contributing to the campaign «Shell must fall». The process of the design and creation of the EJAtlas is a collaborative, iterative process in participatory GIS that is still unfolding. We make visible events that were somewhat hidden although already known, and through this, the project endeavors to bring to the forefront alternative understandings of the real world, making them potential objects of policy and politics (Gibson-Graham 2008).

Thus, one of the variables in the section of impacts in the EJAtlas data sheets is the existence of «scientific uncertainty» regarding the risks of the project in question, giving as example low-level radiation in the use of nuclear energy, or the use of cyanide and/or mercury in a gold mine, glyphosate in a soybean plantation, DBCP or chlordécone in a banana plantation (Ferdinand 2019), the alleged risk of dioxide from an incinerator, the suspicion of excessive high lead blood levels in children next to an industry. Such cases appear often in the EJAtlas. Another variable in the EJAtlas, in the section on «protagonists» of the conflict, allows for the presence of «scientists and professionals» alongside indigenous peoples, international and local EJOs, farmers, neighbors and citizens, trade unions, women activists etc. We could also select cases in the EJAtlas with a third variable: is the EIA (environmental impact assessment) disputed, as a document purporting to turn the conflict into a technical, post-political issue? One could cross these three variables (scientific uncertainty, presence of scientists in the conflict, and disputes on the EIA) and get a large sample of cases in the EJAtlas which could be analyzed with the hypothesis that «extended peer review» is being applied (as described in «post-normal science» by Funtowicz and Ravetz, 1993) and examine how it is being applied.

Relevance of the EJAtlas for Political Ecology and Social Movement Theory

The EJAtlas is becoming a recognized tool for comparative, statistical political ecology and for social movement theory (Drozdz 2020, Scheidel *et al.* 2020, Temper *et al.* 2015, 2018, 2020). There are several collective articles in preparation. Two have been published recently and are summarized here.

An activist website from the USA illustrated a summary of our recent *Global Environmental Change* academic article (Scheidel *et al.* 2020) with an iconic photo from Warren County, North Carolina, USA of 1982 (https://portside.org/2020-06-06/new-global-report-environmentalism-poor-and-indigenous). Warren County was the site of a protest against waste dumping where the US movement for environmental justice and against «environmental racism» has roots (Bullard 1990, 1993). This website abridged our article on statistical political ecology thus: «This is the Environmentalism of the Poor and the Indigenous. A new report presents the most complete analysis of environmental conflicts to date, focusing on 3,000 cases of grassroots activism worldwide, activism by the poor and indigenous that comes with a heavy cost of criminalization, violence, and murder. Quantitative analyses shed light on the characteristics of environmental conflicts and the environmental defenders involved, as well as on successful mobilization strategies. Environmental defenders are frequently members of vulnerable groups who employ largely non-violent protest forms. In 11% of cases globally, they contributed to halt environmentally destructive and socially conflictive projects, defending the environment and livelihoods. Combining strategies of preventive mobilization, protest diversification and litigation can increase this success rate significantly to up to 27%. However, defenders globally also face high rates of criminalization (20% of cases), physical violence (18%), and assassinations (13%), which significantly increase when Indigenous people are involved… bottom-up mobilizations for more sustainable and socially just uses of the environment occur worldwide across countries in all income groups, testifying to the existence of various forms of grassroots environmentalism as a promising force for sustainability».

Another very recent collective article based on the EJAtlas, led by Leah Temper (in *Environment Research Letters*, 2020), titled *Movements Shaping Climate Futures*, carries this Abstract. «A systematic mapping of 649 cases of resistance movements to both fossil fuel (FF) and low carbon energy (LCE) projects, providing the most comprehensive overview of such place-based

energy-related mobilizations to date. We find that (i) Place-based resistance movements are succeeding in curbing both fossil-fuel and low-carbon energy projects. Over a quarter of projects encountering social resistance have been cancelled, suspended or delayed. (ii) The evidence highlights that low carbon, renewable energy and mitigation projects are as conflictive as FF projects, and that both disproportionately impact vulnerable groups such as rural communities and Indigenous peoples. Amongst LCE projects, hydropower was found to have the highest number of conflicts with concerns over social and environmental damages. (iii) Repression and violence against protesters and land defenders was rife in almost all activities, with 10% of all cases analyzed involving assassination of activists. Violence was particularly common in relation to hydropower, biomass, pipelines and coal extraction. Wind, solar and other renewables were the least conflictive and entailed lower levels of repression than other projects. The results caution that decarbonization of the economy is by no means inherently environmentally innocuous or socially inclusive».

The last conclusion would be reinforced by systematic analysis of the grievances and claims in the conflicts on the extraction of old or new metals (copper, nickel, lithium, cobalt) of the electricity transition. Moreover, another article by the EJAtlas team already cautioned about the enthusiasm for hydropower as renewable energy (Del Bene *et al.* 2018) analyzing a database of 220 dam-related environmental conflicts, and based on knowledge co-production between academics and activists. They found that repression, criminalization, violent targeting of activists and assassinations were recurrent features of conflictive dams. Violent repression was particularly high when indigenous people are involved. Indirect forms of violence were also analyzed through socio-economic, environmental, and health impacts. The increasing repression of the opposition against unwanted energy infrastructures did not only serve to curb specific protest actions, but also aimed to delegitimize and undermine differing understanding of sustainability, energy sovereignty and world views.

In general, through the EJAtlas, we can analyze the protagonists of the conflicts (on both sides), the grievances and claims against the visible or potential impacts of new investments, their forms of mobilization [Fig. II], the outcomes of the conflicts. We can compare countries (Saes – Bisht 2020) and subcontinents. And we do network analyses (Aydin *et al.* 2017) and different types of statistical analysis to derive our findings.

Violence against Environmental Defenders

Research based on the EJAtlas on the issue of violence against environmental defenders has produced some new results. Silence has been broken. The number and the circumstances of killings of environmental defenders has become a topic of interest. Researchers use the data base of the NGO Global Witness and also the EJAtlas (Lebillon – Lujala 2020). We in the EJAtlas team are publishing some articles on different forms of violence. One by Dalena Tran *et al.* focuses on women environmental activists killed. Despite the diversity of women environmental defenders and their movements around the world, there are near-universal patterns of violence threatening their survival. Research on this issue importantly contributes to discussions about environmental justice because women defenders make up a large proportion of those at the frontlines of ecological conflicts. This research (Tran *et al.* 2020) analyzes many cases from the EJAtlas in which one or more women were assassinated while fighting a diverse array of extractive and polluting projects. Although the stories showcase a breadth of places, conflicts, and circumstances among women defenders, most cases feature multinational large-scale extractive companies supported by governments violently targeting female leaders of grassroots resistance movements with impunity. There are hundreds of cases that deserve visibility. In 2016 the death of Berta Cáceres in Honduras became world news. While this article was being written, on 22 October 2020 Fikile Ntshangase was shot in her home in Mtubatuba, KwaZulu-Natal, South Africa. The Somkhele coal mine pollutes the area and displaced people. She was a leader of Mfolozi Community Environmental Justice Organisation (MCEJO) struggling against the expansion of this coal mine and defending human rights (Tran 2020).

Another article (by Navas *et al.* 2018) introduced a multidimensional approach to the study of violence in environmental conflicts. There is open, direct violence against women and men, but there are also more subtle forms of violence. Using data from 95 environmental conflicts in Central America, Navas *et al.* (2018) show how different forms of violence appear and overlap. They studied direct, structural, cultural, slow, and ecological forms of violence, defining each of them through cases recorded in the EJAtlas. We also show how these multiple forms of violence are present in the cases from India, the country with the most number of cases recorded in the EJAtlas (Roy – Martinez-Alier 2019). The common understanding of violence in environmental conflicts as a direct event in time and space is only the tip of the iceberg and violence can reach not only environmental defenders who are killed, wounded, displaced, frightened, but also entire communities, nature, and the sustainability of their relations.

Conclusion

The Balzan Prize will help to increase and improve the coverage of the EJAtlas and bring it to 4,000 entries. It will also support a number of small related research projects, as well as help me to finish a book based on the EJAtlas: *Land, Water, Air and Freedom – World Movements for Environmental Justice*. One can do comparative analyses on the social actors involved in the conflicts and their forms of mobilization, and also on the behavior and liabilities of private or public companies. Research may focus on countries or regions but also on cross-cultural topics such as gold and copper mining, sand mining, hydropower and dams, eucalyptus or oil palm plantations, incinerators and other methods of waste disposal, coal fired power plants, gas fracking, nuclear reactors, CAFOs (concentrated animal feeding operations) to name a few. Analyses can be done also on the iconography and other cross-cultural expressions (banners, slogans, murals, documentaries) of the conflicts gathered in the EJAtlas which are both rural and urban (Anguelovski – Martinez-Alier 2014). We shall show the variety of protagonists of such conflicts, their grievances and claims, their movements, the repression against them worldwide and across the many old and new frontiers of commodity extraction and waste disposal. This book will be one of my last major contributions.

I rely on Hickel's and Kallis' (2019) critique of «ecomodernism», which I called «the gospel of eco-efficiency» (Martinez-Alier 2002) because:

a) We are <u>not</u> moving to a dematerialized economy based on services. The services use materials and energy; and the money gained in the service sector goes to material consumption (through salaries, dividends for shareholders and their families). The material structures of the economies change, no doubt, but there is not yet «absolute dematerialization».

b) The world industrial economy is less and less «circular», relying more on cheap commodity extraction and waste disposal. «Green growth» is a mirage.

c) The sustainable development goals or Agenda 2030 are flawed because SDG n. 8 preaches economic growth (measured by GDP growth) everywhere in the world, not only in poor countries but also in rich countries (Menton *et al.* 2020).

In my own view, one favorable trend towards environmental sustainability is that the population growth curve is quickly flattening out. Population is likely to reach its peak by 2060 at 9.5 billion. It was 1.5 billion in 1900. A slow process, 120 years since the neo-Malthusian Feminists (Emma Goldman, Marie Huot, M. Pelletier, P. Robin…) advocated *la grève des ventres* at heavy political cost to themselves (Ronsin 1980), and since E. V. Ra-

maswamy Periyar in South India in the 1920s defended women's freedom, collectively conducive to a lower birth rate (Masjuan – Martinez-Alier 2004). We hear that economic growth is good for the people (SDG 8) and shall soon hear that population growth is good for the economy. I have sometimes been blamed for supporting «bottom-up feminist Neo-Malthusianism that raises the specter of population control» (e.g. Nirmal – Rocheleau 2019). Never mind. Present population trends will indeed open up a new important research field on Depopulation and Environment.

Other social and economic trends are still negative for environmental sustainability. Driven mostly by economic growth, the decrease of biodiversity continues as the HANPP increases (due to meat consumption and «biofuels») (Temper 2016), while the world input of materials to the economy (measured in tons) still goes up (until 2020) though it might soon reach a peak. Carbon dioxide in the atmosphere measured in the Keeling curve was 320 ppm in 1960, reaching 415 ppm by 2020 in its march to 450 ppm by 2050. I am skeptical about an ecological transition taking place soon. True, peak CO_2 emissions and also peak extraction of materials (including coal and oil but not natural gas) might be reached soon but descent from the high peaks will be slow. Moreover, even a non-growing industrial economy would require continuous new inputs of energy and materials from the commodity extraction frontiers because energy is not recycled and materials are recycled to a very small extent.

All this is shared by expert circles around the world. We are late comers compared, for instance, to Herman Daly in the USA or to the «resilience» school in Stockholm with Carl Folke. Canvassing the members of what some people have called a «Barcelona school of ecological economics and political ecology» (mostly housed at the ICTA UAB or having got their doctoral degrees at this institute), I tentatively conclude that, on top of our common views, we combines ecological economics and political ecology, and focus in particular on the links between the movements for Environmental Justice and for Degrowth. The following are the main characteristics of our group:

The study of socio-environmental conflicts not just for academic sake of studying them, but because we want to give voice to those involved and bring their own concepts and vocabularies to academia and politics (Martinez-Alier *et al.* 2014).

The thesis that environmentalists are those who are poor and have a small metabolism, and not the rich with their huge metabolisms; we have criticized Inglehart's «post-materialist» thesis (Inglehart 1995) on the social origins of environmentalism for many years (Martinez-Alier 1995).

The critique of industrial capitalism (and industrial Soviet economies) for their unquenchable metabolism, and their impacts at the frontiers of commodity extraction and waste disposal. But not only this: always engaging also with the potential and conditions for transformative alternatives (movements for environmental justice, Degrowth, alternative economies, commons, post-extractivism, etc.) (D'Alisa *et al.* 2014; Kothari *et al.* 2019; Kallis *et al.* 2020).

Theory must come after the empirical research, not be displayed for its own sake but to explain the contradictions between economic growth and the environment, the conflicts growing from such contradictions, and to empower social and political alternatives. We must behave as if we were social historians immersed libraries and archives trying to make sense of what they find in the documented evidence by appealing to different theories – in our case, ecological economics, social movement theory (Della Porta – Diani 2020), political ecology… We are eclectic about our favorite authors (Karl Polanyi, Georgescu-Roegen, K.W. Kapp, E.P. Thompson, Herman Daly, Marilyn Waring, Bina Agarwal, Jim Scott, Alfred Crosby, Ramachandra Guha, Arturo Escobar, Tim Jackson…).

Keywords of this Barcelona school are therefore, in my view: social metabolism, languages of valuation (incommensurability of values), ecological distribution conflicts, environmentalism of the poor and the indigenous, social movements; commodity frontiers, ecologically unequal trade, ecological debt; externalities as cost-shifting; agricultural energetics, MEFA indicators, HANPP; environmental justice, science-based activism, defense of the commons; ecological macroeconomics, Degrowth.

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