Ecological Transition: What It Is and How to Do It

Community Technoscience and Green Democracy

Andrea Ghelfi
University of Nottingham

Dimitris Papadopoulos
University of Nottingham

Abstract: The paper examines different practices, imaginaries and programs of ecological transitions whose articulation points towards a more-than-local and less-than-global green eco-social transformation. Translocal ecological transitions bring together climate action politics, environmental justice, and the everyday ecologism of experimental community-led technoscience. Within transition projects we see the emergence of new more-than-human political constituencies, the making of broad eco-social coalitions, and the implementation of innovative forms of reparative governance. Ecological transitions foster a new political space, green democracy, as an alternative to both regressive nationalism and green globalism that dominate contemporary politics.

Keywords: Ecological transition; translocal infrastructure; more-than-human politics; green democracy; reparative justice.

Submitted: December 01, 2021 – **Accepted:** January 30, 2022

Corresponding author: Professor Dimitris Papadopoulos, Institute for Science and Society, School of Sociology and Social Policy, University of Nottingham, Nottingham NG7 2RD, UK. Email: dimitris.papadopoulos@nottingham.ac.uk

1. Transition and the Ecological Condition

The symptom Anthropocene testifies to the indelible traces of human presence on planet Earth and the dangerously unstable condition of the Earth-human relational systems (Bonneuil et al. 2016; Zalasiewicz et al. 2011). The sixth mass extinction, climate crisis, soil depletion, ocean acidification, human displacement, forest destruction–the traces of ecological conflict are everywhere. The unpredictable consequences of human impact on the chemical, biological and geophysical structure of the Earth are ungovernable. This is a new condition. What once was from the pespective of the colonisers a "terra nullius," land free for grabbing, "the

land of no one" (de la Cadena et al. 2018; Millner 2017; Svirsky 2010; Wynter 2003; Wolfe 2006) has now become an unknown and unrecognisable land, "terra incognita" (Crutzen 2002). But it was not only about land, it was not only about the proclaimed "land of no one," it was also about the "matter of no one": presumably inert, passive, unowned and unclaimed matter free to be appropriated; materials free to be excavated in the accelerated extraction of natural resources to satisfy a global demand for minerals and energy and to provide for economic growth. Now this supposedly inanimate and governable matter has become something unrecognisable whose destructive power puts us in the middle of a multitude of ecological troubles.

In this paper, we reflect upon different practices, imaginaries and programs of ecological transitions whose articulation can, perhaps, enable a proposal for a green democracy. The centre of gravity of transition politics is an understanding of the ecological that highlights the entanglement of ecosystems, technologies, institutions, and cultures through practice-based forms of activism and more-than-local and less-than-global accounts of material transformation. The emersion of climate protest movements, such as Fridays for Future, diverse climate strikes, indigenous mobilisations, and environmental protest movements such as Extinction Rebellion and a multiplicity of more localised environmental justice campaigns, espouse a new sense of being and relating to Earth, a new geo-internationalism that takes climate protest into a new direction towards a transition from below: everyday practices of ecological reparation with the support of different alternative forms of technoscience and multiple experimental processes of institutional reinvention.

Transition politics demands alliances and convergences amongst the everyday ecologism of community technoscience, protest politics and innovative forms of ecological governance. In this paper we develop the idea of green democracy, a third political space alternative to both regressive nationalism and green globalism as the political expression of ecological transitions. We glimpse the possibility for a green democracy inside the many entanglements and convergences amongst eco-social coalitions for a zero-carbon and ecologically sustainable society, the emersion of forms of reparative governance, and the accumulation of grassroots knowledge innovations. The constituent power[11] of green democracy, as we argue in this paper, is a composition of alternative forms of sociability and materiality, protest politics, and new institutional architectures.

Transition is a key word for contemporary eco-social movements. This term refers to the everyday collective capacity to take actions of ecological reparation by mobilising different actors and sets of practices starting from localised (not just local though, as we will discuss later) and specific issues. From community urbanism (Pickerill 2021; Bulkeley 2015; Calvário et al. 2016) to energy and food sovereignty (Shattuck et al. 2017; Angel 2017; Engel-Di Mauro 2022), from transformative environmental justice activism (Agyeman et al. 2016; Bullard et al. 2009) to indigenous

resurgence (Whyte 2018a; Mander and Tauli-Corpuz 2006), from alternative technological development and community led ecological change (Ottinger et al. 2011) to social economies, the environmental commons, and transition towns (Hopkins 2011; P2P Foundation 2015; Utting 2015), there is a plethora of movements and programmes that situate themselves within the larger field of discourses for civilizational and ecological transitions.

2. Experimental, Reparative, and Translocal Transitions

If we look at food sovereignty campaigns, for example, we see how alternative food production systems and agroecology are key elements of community transition within a multiplicity of movements and material regeneration practices. Food sovereignty campaigns entail the simultaneous responsibility of participants to be food growers and consumers, which means being involved in the processes of food production and distribution by inventing alternatives to the large supply chains that currently dominate the existing agrifood system. But food sovereignty is something more than the consumers and growers' right to choose what to consume and what to grow and how. Food communities are first of all about creating alternative ways for dealing with the ecological interactions and interdependencies involved in the processes of farming: the collective enterprise of creating an alternative lifeworld within the interactive dynamics that inhabit the soil and its inhabitants (Bertoni 2013; Krzywoszynska 2020; Puig de la Bellacasa 2014; 2019; 2015). Starting from the end of the 1960s the so-called green revolution significantly transformed the ways through which agriculture has been developed on a global scale (Rosset and Altieri 2017; Shiva 2008; Altieri 2018; Altieri and Toledo 2011). The central role of mechanisation, the adoption of new technoscientific innovations, the selection of high-yielding varieties of cereals, and the extensive use of chemical fertilisers and agrochemicals are the main features of current "industrial" agriculture. These technologies of food production have wide-ranging eco-social implications on biodiversity and climate change, and they entail a relationship of strong dependency between farmers and the world's largest chemical producers.

Agroecology (Rosset and Altieri 2017; Altieri 2018) appears as one of the main alternatives for overcoming the shortcomings and damage that the "green revolution" has caused. Agroecology is a response to the question of how to transform and repair our food system and the rural life starting from a transformation of the ecological practices of peasants and farmers, artisanal fishers, pastoralists, indigenous cultivation methods, urban food producers etc (for different approaches and cases see García López et al. 2019; Lanka et al. 2017; Rosset et al. 2019; Altieri et al. 2011). In this sense, food sovereignty movements and agroecological farming are creating an alternative politics of matter: by seeking different material cir-

culations and channels of involvement, they enact different ontologies by materialising alternative forms of human-soil-food relations. Permaculture, organic, biodynamic, regenerative agriculture, alternative food distribution[2]: these are some of the names given to practices by which movements of ecological agri-food transition are converging today in emphasizing a need to attend to the health of the soil and the broader ecologies in which we grow food (Altieri 2018).

The ecological dimension of transition highlights the interconnectedness of people, animals, plants and geophysical world, as well as the entanglement of ecosystems, histories, technologies, institutions, and cultures (Chakrabarty 2009; Kingsland 2005). While the environmental perspective focuses primarily on nonhuman nature, ecological thinking encompasses the complex web that binds together humans, nonhumans and planetary systems (Nash 2006; Puig de la Bellacasa 2017). Ecological thinking introduces the biggest paradigm shift in social science of the last 50 years, according to Latour (2017; 2018) – framing societies as embedded in interconnected multi-cultural and multi-natural worlds (Rozzi et al. 2015; Hamilton et al. 2015; Krebs 2016).

This ecological dimension differentiates ecological transitions from other forms of transition, in particular technological transitions such as for example the substitution of one type of fuel for another in energy transitions. The history of such technological transitions reveals that rather than reducing environmental impact they increase energy consumption and neglect their broader environmental and social implications (for different positions in energy history see Bonneuil and Fressoz 2016; Fouquet 2016; Fressoz 2014; Malm 2013; Podobnik 1999; Sovacool 2016)[3]. Ecological transitions reverse this reductionist social-environmental function of technological transitions and put transitions squarely back into the terrain of decentralised, bottom-up, and justice-driven practices that radically transform the socio-ecological organisation of the specific domains (such as energy, housing, food provision, farming, sustainable production, urban regeneration etc) in which they take place.

Transition is a multiscale process of ecological reparation that involves technological experimentation, institutional invention, and local spatial diffusion. Reparation here is about reclaiming places that have been appropriated or damaged, and then inventing alternative collectives, experimental practices and mundane interventions: transitions are reparative and practice based (Brown et al. 2012; Pickerill 2021; Papadopoulos et al. 2022). Transition is not a single process; different practices make different realities. With Escobar (2015) we can say that the aim of transition consists in changing existing socio-ecological configurations making alternative worlds as part of ontological struggles for reappropriating, reimagining, and re-inventing forms of living beyond existing socio-economic organisation in the specific domains they take place.

Research from within Science and Technology Studies and related fields reminds us that technological "reality is not destiny" (Law 2004)

and that there is always a multiplicity of alternative and diverging ontological configurations in the making (Braun et al. 2010; Papadopoulos 2018; Holbraad et al. 2014). Different realities are enacted through different practices: the practices of transition are making fragments of alternative worlds in the present. Through practices of material reparation, ecological transitions can be seen as ontological transitions, in which what is at stake is reappropriating and reinventing what living otherwise in a damaged planet (Tsing 2015) could mean. Ecological transitions drive social transformation through multilevel, practice-based experimentation with alternative ways of relating between humans, animals and plants, objects, and technologies (Papadopoulos 2012, 2014). There are good reasons for framing transition movements as local movements. Each transition enterprise defines its boundaries of immediate efficacy, local alliances, and the specific pragmatics of day-to-day transformation. Transition needs a concrete space to exist. Nevertheless, the local offers a very limited perspective for addressing the more-than-local circulation of materials, chemicals, living matter, symbols, imaginaries, and narratives; the proliferation of translocal infrastructures for knowledge and technological transfer; the transnational composition of experiences, tools and tacit knowledges that crisscross each and every local experiment.

At the same time, ecological transitions are less-than-global: practices are always situated, actions are always grounded, and trajectories never extend in the same way endlessly. If the global has been the universalist matrix through which the liberal governance evacuates ecology in the name of economic growth (Leonardi 2017; de la Cadena et al. 2018), nationalism – which (re)introduces an understanding of the local marked by reactionary belongings and identities – has been the illusory refuge in times of economic and geopolitical crises (Latour 2018). As we will see in the next section, both represent key obstacles for more-than-local and less-then-global processes of ecological transition. Rather than universalism and localism, the model of ecological transition relies on the abundance of many different contingent practices: ecological transitions imply that practices do different things in different local ecologies and yet they are intensive flows between them: translocalism (Ghelfi and Papadopoulos 2022).

3. Technofix and the Ecological Impasse: Regressive Nationalism and Green Globalism

Such more-than-local and less-than-global ecological transitions are contested on two fronts. On the one hand, current forms of nationalism that attempt to appropriate and redefine the local in exclusionary, primarily racial terms, and to assert ownership of a dominant "us" that is permitted free access to local resources and materials negating its ecologi-

cal embeddedness. On the other hand, we see attempts to unleash the green economy into a global scale and create a universalist approach to green economic growth that, again as with nationalism, negate the ecological embeddedness of its economic model and its limits.

Current expressions of nationalism condense common nationalist tropes – such as protectionist localism, corporate libertarianism, ultraconservatism, reactionary militarism, and the hate for the cultural left – with the violent disregard for antiracist, trans-feminist and ecological movements (Stanley 2018; Giroux 2018; Teo 2021). Regressive nationalism relies on widely common features of nationalism (Paxton 1998; Sternhell 2010) but does that in a moment of a widespread liberal hegemonic crisis and the ascent of postliberalism: the annulment of accepted liberal-democratic rights and liberal-democratic patterns of governance without the justification of entering into a distinct state of exception that would, even if only nominally, justify such illiberal policies (Tsianos et al. 2012; Papadopoulos et al. 2008; Hayden 2021; Plattner 2019). In the core of these postliberal moves and the renvigoration of nationalism resides the implicit, and sometimes explicit, possibility of regression to fascism. This threat of a "second coming of fascism" (Harootunian 2007) that propagates authoritarianism and the rise of racism came as a response to a wide range of antiracist, anti-austerity and radical democratic and environmental movements that crisscrossed the globe in the past decade. "Our way of life is not negotiable": this is the slogan that dominates much of the political expressions of regressive nationalism that refuses to recognise that we all share, live, and rely on the same planet (Collomb 2014; Malm et al. 2021).

Climate negationism is one of these dimensions of regressive nationalism cultivating pride in a form of secession from the Earth in which ecological claims are dismissed in the name of national economic interests, blunt anthropocentrism, and naïve humanism (Malm et al. 2021). This fictional secession from the Earth implies not only the refusal to take action in order to mitigate the climate and ecological crisis but also an acceleration of the practices of extractivism and environmental irresponsibility: from deforestation to deregulated fracking, unchecked agribusiness, mining, and fossil fuel reliance are seen as key vectors of economic development and geopolitical dominance. Regressive national-ism's authoritarian realignment of state institutions and the incitement of social polarisation along lines of race, gender, and migration (Negri 2010; Traverso 2017) erases the space for any ecological claims.

If regressive nationalism has declared a war on Earth through assuming the proud belonging and uncontrolled exploitation of a locality, the hesitant policies of green liberal governance constitute the other strategic obstacle for ecological transition. Green globalism is promoted by leading multilateral organisations and is assumed in national and interna-tional policy (Aykut and Dahan 2015). It rests on the assumption that a decoupling of GDP growth from resource use and carbon emissions at a rate

sufficient to prevent dangerous climate change and other dimensions of ecological breakdown is possible (Gupta 2014). Green globalism promotes an aggressive agenda for globalising the green economy which relies on a conception of technology and innovation completely disconnected from its socio-ecological premises and consequences (Pellizzoni 2015). The World Bank defines it as "economic growth that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing physical disasters" (The World Bank 2012). Despite the wider circulation of the term green economy within significant global governance organisations, green economy initiatives made their presence in the world more as object of political discourses than in a substantial green conversion of production. Fossil fuel economies are still leading features of our societies, and a significant green transition is yet to be materialised. The underlying assumption of green economic globalism is that environmental limits and "planetary boundaries" (Rockström et al. 2009) should not be perceived as constraints to development but as unprecedent business opportunities towards green financialization and as engines of growth that lay the foundations for a new cycle of accumulation (Nelson 2015; Braun 2015)[4].

Despite their open antagonism, regressive nationalism and green globalism co-exist and both severely limit the possibility of ecological transition today. Market driven green economic globalism is failing to tackle emission reductions and has weakened many attempts to deploy widespread ecological transformation. This failure is reinforced by the real threat for relapsing into far-right authoritarian politics that regressive nationalism poses. The threat of a second coming of fascism has effectively blocked ecological change not only when regressive nationalism is in power[5] but also when regressive nationalism acts as an oppositional pressure group to the liberal or-der of power and the project of green globalism. Regressive nationalism blocks change when it is in power and it also blocks change when in op-position through the threat of a fascist turn.

Paradoxically, what unites these two political strategies is their humanist conviction that strong political will and the implementation of technological innovation can prevent climate and ecological danger (Boehnert 2018; Huesemann and Huesemann 2011; Hopwood et al. 2005; Castree 2008). The lure of the technofix is not only dominant in the eco-modernist discourse of green globalism but appears as a core political strategy for appeasing the political unrest that regressive nationalism spawns. Claims that the solutions to current environmental problems and to the lifestyle changes that many in the Global North need to undertake will be delivered through technological innovation and technoscientific progress serve as the liberal answer to the postliberal challenge that the second coming of fascism poses.

This threat of regressive nationalism and the fallacy of the technofix together with the failures of international governance (the fundamentally flawed Kyoto protocol, replaced by the non-binding commitments of Paris, and the very weak compromises of Glasgow[6]) have dwindled the hopes that the climate crisis could be tackled alone through top-down government-led initiatives. The eruption of new ecological mobilisations and climate disobedience actions seem to be an expression of a civil society no longer accepting the inactivity of governments. Greta Thunberg: "[…] people are dying. Entire ecosystems are collapsing. We are in the beginning of a mass extinction. And all you can talk about is money and fairy tales of eternal economic growth. How dare you!"[7].

On the 17th of November 2018 thousands of activists of Extinction Rebellion organised a civil disobedience action by blocking five bridges over the Thames in London. Similar actions have expanded with different intensity over the last two years across hundreds of cities globally. On the 20th of August 2018 Greta Thunberg decides to skip school in protest Swedish government's insufficient actions to reduce greenhouse gas emissions. Virally propagated in Europe, the United States and Australia, the Friday school strikes initiative, promoted by the Fridays for Future movement, continued into the following year and then diversified into a multiplicity of mobilisations and direct action campaigns. As the voices of the climate protest movements are intersecting with other campaigns for environmental and social justice, they reinforce a new sense of being and relating to Earth, a new geo-internationalism that promotes an ecological transition for below. In what follows we examine two evolving and interconnected dimensions of this geo-internationalism that might take the climate protest into the direction of ecological transitions: first, collective practices of ecological reinvention of everyday life through the mobilisation of communally accessible technoscientific knowledge and, second, the institutional reinvention of ecological governance.

4. Community Technoscience and the Making of Ecological Transitions

Collective practices of ecological reinvention turn everyday ecological existence to a terrain of material and political experimentation. Starting from situated practices, transition movements are constructing other ways of inhabiting our planet by practicing ecological transitions from below. The movements we refer to sit uneasily within the broader political category of social movements (see for example Tilly et al. 2009; Della Porta et al. 2006). Transition movements are more-than-social movements in the sense that their practices and aims are not primarily directed to challenge power relations or established institutions. To put it in a different way, they are doing more than that: by experimenting with other ways of en-

gaging with the materiality of life and making alternative socio-material interventions, more-than-social movements are constructing fragments of alternative common worlds beyond the dichotomy nature/society. Insisting on the more-than-social dimension of transition movements highlights their transformative power: their capacity to set up alternative material configurations and everyday practices that aim to materialise ecological transition in the human-nonhuman everyday continuum. From the perspective of more-than-social movements ecological transition is not only the field in which a multitude of revolts against institutional injustice are enacted, ecological transition is also the field for experimentation with everyday practices of socio-ecological regeneration and reparation. Transition movements always involve the entanglement between human and nonhuman others, between materiality and sociality, and, as we will see, between knowledge and practice.

Many of the ecological transitions and ecological initiatives described in this paper not only engage in the circulation of alternative knowledges but also in the production of knowledge itself through a multiplicity of activities and practices: citizen science, maker and hacker spaces, agroecology, co-production between instituted and amateur innovation, open science and technology. This is the distributed power of community technoscience to collaborate and invent technoscientific solutions necessary for materialising ecological transitions. The lure of the universal technofix that dominates green globalism and regressive nationalism as we de-scribed earlier is here reversed though situated practices of minor technoscientific inventions embedded within ecological transitions: kitchen science, DIY biology, the alternative experimentation with medical sub-stances, lay engineering projects, production of alternative forms of energy, community projects of environmental modernization, self-managed systems against environmental hazards, radical patient-based campaigns, permaculture regeneration, traditional systems of knowledge, craft, embodied technoscience, punk science, health movements, open source science, technology and agriculture, clandestine chemistry, the hackers culture, ecological justice initiatives, cross-species collaborations, bio-art, self-organised projects of scientific literacy, bio-dynamic principles of farming, inner city food gardens, cooperative production, organising against extractivism, creation of alternative seed banks, ecofeminist advocacy, production of alternative research, making of alternative knowledge collectives, setting up local systems of exchange – all examples of crafting alternative material-ecological transition projects through the creation of community technoscience.

Community technoscience is about the transition from a highly regulated relation to material and technological innovation that takes place within instituted technoscience, such as formal research labs and industrial R&D facilities, to a multiplicity of self-organised experimental spaces (Papadopoulos 2018). Community technoscience is not only about the generation of alternative scientific and technological innovation within di-

verse communities of practice and the wide distribution of this innovation across multiple places; it is also about the increase of traffic and exchange between instituted technoscience and community technoscience. This increase in the traffic of knowledge and the distributed invention power of community technoscience support the experimentalism of ecological transitions: reclaiming everyday materiality by actively recomposing and rearticulating it. Here, technoscience is done not only within its so-called core institutions but in multiple ways and in many different mundane environments: hackspaces, makerspaces, traditional and alternative knowledge systems, clandestine science, community labs, amateur science and technology, fab labs, indigenous knowledge, bio-art, activist knowledge, self-education projects, punk science, agroecology all gradually become a part of technoscience.

Following the example of agroecology mentioned earlier in this paper, we see how the multi-local experimentation with participatory programmes for genetic seed improvement has become a key dimension of how the agroecological mission for seed biodiversity[8] is redefining the relation between science and everyday farming practice. In order to develop on-farm seed conservation, genetic agrarian scientists, farming communities, ecological movements and consumer associations are co-creating inclusive spaces of technoscientific engagement: community biodiversity management practices involve a multitude of practitioners and a situated capacity of negotiating different needs and material engagements with seeds. The implementation of on-farm conservation projects, participatory research projects, seed banks, heritage seed libraries, open source seed catalogues, knowledge and material transfers are key ingredients for making participatory biodiversity management a significant technoscientific innovation in food transition practices and in agrobiodiversity farming. In this example we see how community technoscience can be continuous with parts of instituted technoscience and vice versa, a continuity that unfolds across disparate and fragmented research settings. This extended view on technoscience allows us to capture how every specific knowledge practice assembles around it a different social and material world, be it scientists, technologists, animals, materials, businesses, social policy makers, marketeers, tools, practitioners, consumers, enthusiasts, activists, community stakeholders. What we have here are large ecologies of multiple actors, landscapes, and information. An intense traffic of knowledges and relations crisscross instituted and community based technoscience, public policies and grassroots organising, everyday life ecologism and public protests. This mangle of interdependencies situates the constituent power of transition politics as discussed earlier in this paper within a wider field of alliances and ecological connections contributing to new forms of institutional imagination: green democracy.

5. The Demise of Progressive Democracy

Modern polity and especially political and social rights in our societies are closely linked to fossil fuels. Timothy Mitchell (2011) argues that since the nineteenth century workers in the Western world achieved political and social inclusion thanks to their crucial role as workers in the extraction, distribution and use of coal. ''Carbon democracy'' has been the terrain for the inclusion of working class struggles into modern polity (Mitchell 2009). But the miners' ability to stop production, to make alliances with railwaymen near their unloading grounds, to send their families demonstrating under their employers windows, to sabotage industrial production, all this disappeared with the global infrastructures of the oil economy starting from the late 1960s (Bonneuil et al. 2016; Latour 2018). The international energy transition from coal to oil constituted the material base of the demise of working-class organisation and the end of a cycle of social emancipatory struggles for more democratic rights (Mitchell 2011). As much carbon democracy was the terrain of a more inclusive polity in the Global North, with the oil turn of the economy it became eventually the terrain that constituted the defeat of progressive democracy and its vision that within capitalist development it is possible to strengthen social and political rights able to improve the economic conditions of an inclusive workforce. The turn to oil not only brought with it the marginalisation of the workers' movements within polity and the erosion of democratic rights but also amplified a collective form of life based on unlimited economic growth.

The new dependency on oil made progressive democracy vulnerable and the oil crises of 1973 and 1979 dismantled the fragile political knot that connected economic growth, working class struggles, and the widening of democratic institutions. Simultaneously, the political alternative offered by socialism was de facto limited to the redistribution of the economy's benefits eventually also relying on the same dominance of oil in the model of production (Charbonnier 2020). The collapse of socialism and the end of progressive democracy not only led to the dominance of financialised neoliberalism but also to the intensification of ecological breakdown. The term "Great Acceleration"[9] captures the other side of the ''Thirty Glorious Years'' – it is the dark side of the "Golden Age" of capitalism (Brenner 2006; Duménil and Lévy 2005a; Duménil and Lévy 2005b; Glyn 2006).

The term resonates with Karl Polanyi's ''Great Transformation'' (1944) that attempts to understand broader interconnected domains of social change and aims to grasp the comprehensive and interlinked nature of the post-1950s transformations sweeping across the socio-economic and biophysical spheres of the Earth: ecological breakdown is inseparable from economic growth. Despite the economic turbulences of the past two decades recent studies highlight that we are witnessing a second acceleration with even greater ecological and climate consequences (Steffen et al.

2015). This second acceleration, which started in the beginning of the 2000s, was not a short-term phenomenon and has continued for more than a decade. In the period 2002-2015 global material extraction increased by 53% in spite of the 2008 economic crisis (Krausmann et al. 2018). During this period alone over 1000 Gigatons of materials were extracted, that is, almost one third of the total extraction since 1900. Moreover, during the Covid-19 pandemic that started in 2020 the demand for raw materials continued despite the temporary decrease of the global GDP, the breakdown of supply chains and extensive labour shortages. We are witnessing a significant crisis of raw materials availability and this as a worldwide-spread phenomenon (Zanoletti et al. 2021).

The current social and ecological conjuncture characterised by the end of progressive democracy, the demise of political alternatives, the threat of regressive nationalism and implicitly fascism, and the unstoppable presence of ecological breakdown means that a new democratic transformation will be inevitably confronted with the very conditions of production itself. An ecological turn in the economy means disarticulating the relation between production and fossil fuels and at the same time abandoning the idea that progressive democracy is possible within this material mode of production. Social justice cannot be achieved in the current historical conjuncture without ecological transition. And ecological transition cannot be achieved within the top-down political strategy of green globalism.

6. The New Institutionalism of Green Democracy

We already highlighted how community technoscience is a key actor in ecological transitions. Here we want to focus on the wider fields of political, economic, social reinvention that can sustain and implement the ac-cumulation of knowledge innovations coming from grassroots movements and at the same time experiment with the governance of complex and articulated networks of socio-ecological transitions. It is of course too early to describe the key tenets of such an institutional reinvention. But as the alternative to both regressive nationalism and green globalism a third space of green democracy[10] gravitates around three political tendencies that already exist within collective enunciations and practices of ecological transitions: (1) assembling a more-than-human political constituency; (2) the making of broad eco-social coalitions for a zero-carbon society; (3) the emergence of reparative governance.

1) From food sovereignty movements to practices of solidarity for the right to health, from permaculture to occupied factories, from feminist and queer movements to indigenous resistance, from environmental justice campaigns to alternative autonomous subsistence movements, from grassroots climate urbanism to alternative making, mending, hacking and design practices, a central point of contemporary ecological movements

lies in the experimentation other ways of relating between humans, animals and plants, objects and technologies. Following the case of the Italian network of peasants, called Genuino Clandestino (Genuine Clandestine), we can see agroecology as a set of practices that is transforming the everyday doing of farming and as a process of reinvention of rural forms of life (Ghelfi 2022). Reclaiming rural forms of life, though, is not about the restoration of some nostalgic premodern social conditions. In the politics of Genuino Clandestino the farmers and activists who define themselves as "contadini" (peasants) reactivate the capacity to invent other modes of material existence. Becoming a peasant, as they call themselves, is an existential transition to a "practicability of life" (Bertell 2016), to a form of living in which self-subsistence and ecological care are inextricably intertwined starting from the reinvention of daily practices of socio-ecological repair. The desire of an embodied, everyday, material relationship with the land: this is the peasant return. Permaculture, organic, biodynamic, regenerative agriculture, the peasant return brings with itself a multitude of practices of care (Puig de la Bellacasa 2017) in which material engagement meets an obligation to make an ecology a liveable place for all its participants.

Projects of ecological transition such as Genuino Clandestino place politics in a very different terrain than the traditional politics of progressive democracy: politics unfolds in the material experimentation with land, in the forest, in the scientific laboratory, in the clinic, in the commune, in the field and the farm, in the hackerspace and in the many other places where humans are learning how to decolonise their relationship with the governance of earth and nonhuman others. A green democratic political constituency addresses, involves, and implicates increasingly a very different set of actors, human as well as nonhuman, in its material workings. Such a reconfiguration of the political constitution is of course from the perspective of regressive nationalism or liberal green globalism impossible to be conceived let alone practised through existing political institutions. In the sense of Rancière (1998), we could say that green democracy emerges as those nonhumans and more-than-social actors enter the political scene only to reorder it so that it can allow for them to act politically.

2) La Via Campesina is a global network of peasant organisations that are aiming to transform agriculture and food systems (Giunta 2021; Ajl 2021). Embracing 148 organisations from 79 countries, and representing millions of rural peoples in Asia, Europe, the Americas, and Africa, La Via Campesina is the most politically significant transnational agrarian movement existing today. Since its foundation, in April 1993, La Via Campesina began forming cross-sectoral and cross-cultural alliances with key urban and rural social movements, unions, parties, civ-il society organisations, NGOs, indigenous resistances, environmental movements. The global resonance of claims such as food sovereignty and agroecology is not understandable without this culture of alliance that made possible

the significant presence of La Via Campesina within the alter-globalisation movement, the World Women's March or the COP26 Coalition for Climate Justice.

La Via Campesina is a good example for thinking the role of eco-social coalitions in transition politics. Green democracy as a political condition and a transformational movement cannot develop without reassembling diverse eco-social demands coming from heterogenous intellectual, social and political positions (e.g. movements, trade unions, parties, progressive business associations, NGOs, artists, scientists, ecological movements) around the idea that in the current historical conjuncture social transformation is driven by ecological transformation[11]. This is happening through a programmatic convergence around the necessity of decelerating carbon intensive activities in sectors that do not contribute to socio-ecological well-being and at the same time accelerating the forms of public investments, private enterprise action and collective agencies that can build the social, cultural, material and ecological infrastructures of a zero carbon society. This involves a re-composition of the most ecologically progressive sectors of a transformative economy: policy driven green new deal with strong incentives for sustainability and circularity; municipal and regional institutions capable of inventing localised innovative ecological policies; and grassroots movements' ability to form political alliances around diverse issues such as zero emissions by 2030, high energy efficiency, renewable materials, the downscaling of production, food sovereignty, carbon emissions and wealth tax, and climate and ecological reparations. Green democracy is mobilised as a vision and as a political framework through the creation of novel alliances and material coalitions between diverse actors and segments that participate in or at least enable ecological transitions.

3) The reliance on top-down solutions has been shown to have limited effects on mobilising ecological transformations and to be exclusionary towards diverse communities as well as transition projects that do not fit within the green globalist agenda of the Global North. Ecological transitions interrupt existing centralised liberal governance and valorise projects and experiments of ecological reparation with novel models of interactive governance across different scales and geographies: alternative forms of agriculture and soil renewal, revegetation of urban spaces, indigenous ontologies, reclaiming of dispossessed land, experimentation with bio-fuels and green chemistry, recuperation of traditional and indigenous systems of land use and land care, water and biodiversity conservation, production of alternative forms of energy, participatory practices of urban and regional ecological planning, to name just a few examples.

Reparative governance reinstates a postcolonial and decolonial perspective into the governance of ecological transitions. Unlike "romanticised reparations" (Cadieux et al. 2019, 649), contemporary

transition projects start from the assumption that there is no pure and original state to begin with: environmental destruction, colonial and racial injustices, and geopolitical inequalities are deeply intertwined with ecological degradation (Ferdinand 2019; Simpson 2021; Cairns 2003)[12]. Reparative governance relies on the framework of reparative justice that seeks to address the wrongs done to those who are suffering ecological damage rather than focusing solely on the punishment of the offenders (Walker 2010; Perez Murcia 2014; Macleod et al. 2017; White 2016; Almassi 2017). Du Bois (1964) provides the conceptual framework for reparative justice in the *Black Reconstruction in America* and Fanon (2004, 58-59) raises the question reparations as part of anticolonial action. Reparations have a long history in postcolonial thought and practice and are also a defining moment of indigenous politics for decolonising settler colonial lands (Clapperton et al. 2019; Bacon 2018; Whyte 2018b). Reparative governance involves reconsidering the geopolitical ambivalences of the green democratic project and its uneasy attachment to Global North politics. Green democracy cannot be a global project but only a transversal and translocal one that reinvents itself through the multiplicity of practices and demands of the diverse transitions and movements involved[13].

Include non-humans in your politics! Make broad social coalitions! Claim reparations and repair reclaimed lands! This is how current eco-social movements do ecological transitions. The constituent power of a myriad of ecological transitions that take place across so many different places and geographies right now is a process of political composition that entails alternative forms of sociability and materiality, transitional knowledge and community technoscience, more-than-social civil disobedience actions, new coalitions amongst a multiplicity of actors, and the call for the new institutionalism of green democracy.

Acknowledgments

Andrea Ghelfi would like to gratefully acknowledge the support of The Leverhulme Trust, UK (grant number ECF-2019-076) and Dimitris Papadopoulos would like to gratefully acknowledge the support of The Leverhulme Trust, UK (grant number RF-2018-338\4) as well as the Arts and Humanities Research Council (AHRC), UK (grant number AH/R013640/1).

References

Adler, D., Wargan, P. and Prakash, S. (2019) *Blueprint for Europe's just transition. The Green New Deal for Europe*, in https://report.gndforeurope.com (retrieved January 24, 2022).

Agyeman, J., Schlosberg, D., Craven L., and Matthews C. (2016) *Trends and Di-*

rections in Environmental Justice: From Inequity to Everyday Life, Community, and Just Sustainabilities, in "Annual Review of Environment and Resources" 41 (1), pp. 321-340.

Ajl, M. (2021) *A People's Green New Deal*, London, Pluto Press.

Almassi, B. (2017) *Climate Change and the Need for Intergenerational Reparative Justice*, in "Journal of Agricultural and Environmental Ethics", 30 (2), pp. 199-212.

Altieri, M.A. (2018) *Agroecology. The Science of Sustainable Agriculture*, Boca Raton, CRC Press.

Altieri, M.A. and Toledo, V.M. (2011) *The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants*, in "Journal of Peasant Studies", 38 (3), pp. 587-612.

Angel, J. (2017), *Towards an Energy Politics In-Against-and-Beyond the State: Berlin's Struggle for Energy Democracy,* in "Antipode", 49 (3), pp. 557-576.

Arora, N.K., and Mishra, I. (2021) *COP26: more challenges than achievements*, in "Environmental Sustainability" (4): 585-588.

Aykut, S. and Dahan, A. (2015) *Gouverner le climat? 20 ans de négociations internationals*, Paris, Presses de Sciences Po.

Bacon, J. M. (2018) *Settler colonialism as eco-social structure and the production of colonial ecological violence*, in "Environmental Sociology", 5 (1), pp. 59-69.

Beckert, J. and Aspers, P. (eds) (2011) *The worth of goods: Valuation and pricing in the economy*, Oxford, Oxford University Press.

Bertell, L., (2016) *Lavoro Ecoautonomo*, Milano, Elèuthera.

Bertoni, F. (2013) *Soil and Worm: On Eating as Relating*, in "Science as Culture", 22 (1), pp. 61-85.

Bioversity International (2017) *Mainstreaming agrobiodiversity in sustainable food systems: Scientific foundations for an agrobiodiversity index*, Rome, Bioversity International.

Birch, K. (2017) *Rethinking Value in the Bio-economy: Finance, Assetization, and the Management of Value*, in "Science Technology and Human Values", 42 (3), pp. 460-490.

Boehnert, J. (2018) *Design, ecology, politics. Towards the ecocene*, London, Bloomsbury Academic.

Bonneuil, C. and Fressoz, J.B. (2016) *The shock of the Anthropocene: The earth, history, and us*, London, Verso.

Brand, U. (2015) *Beyond Green Capitalism: Socio-Ecological Trasformation and Perspectives of a Global Green-Left*, in "Fudan Journal of the Humanities and Social Sciences" (9), pp. 91-105.

Braun, B. (2015) *New materialisms and neoliberal natures*, in "Antipode" 47 (1), pp. 1-14.

Braun, B. and Whatmore, S. (eds) (2010) *Political matter: technoscience, democracy, and public life*, Minneapolis, MN, University of Minnesota Press.

Brenner, R. (2006) *The economics of global turbulence: the advanced capitalist economies from long boom to long downturn, 1945-2005*, London, Verso.

Brown, G., Kraftl, P. and Pickerill, J. (2012) *Holding the future together: towards a theorisation of the spaces and times of transition*, in "Environment and Planning A: Economy and Space", 44 (7), pp. 1607-1623.

Bulkeley, H. (2015), *An urban politics of climate change. Experimentation and the governing of socio-technical transitions*, London, Routledge.

Bullard, R. D. and Wright, B. (2009) *Race, place, and environmental justice after Hurricane Katrina. Struggles to reclaim, rebuild, and revitalize New Orleans and the Gulf Coast*, Boulder, CO, Westview Press.

Cairns, J. (2003) *Reparations for environmental degradation and species extinction: a moral and ethical imperative for human society*, in "Ethics in Science and Environmental Politics", 3, pp. 25-32.

Calvário, R., Velegrakis, G. and Kaika, M. (2016) *The Political Ecology of Austerity: An Analysis of Socio-environmental Conflict under Crisis in Greece*, in "Capitalism Nature Socialism", 28 (3), pp. 69-87.

Castree, N. (2008) *Neoliberalising Nature: The Logics of Deregulation and Reregulation*, in "Environment and Planning A: Economy and Space", 40 (1), pp. 131-152.

Ceccarelli, S. and Grando, S. (2019) *Participatory plant breeding: Who did it, who does it and where?*, in "Experimental Agriculture", 56 (1), pp. 1-11.

Ceccarelli, S., Guimarães, E. P. and Weltzien E. (eds) (2009) *Plant breeding and farmer participation*. Rome, Food and Agriculture Organization of the United Nations.

Chakrabarty, D. (2009) *The climate of history: four theses*, in "Critical Inquiry", 35 (2), pp. 197-222.

Charbonnier, P. (2020) *Abondance et liberté. Une histoire environnementale des idées politiques*, Paris, La Découverte.

Chase, L. (2014) *Food, Farms and Community: Exploring Food Systems*, New Hampshire, University of New Hampshire Press.

Clapperton, J. and Piper, L. (2019) *Environmental Activism on the Ground: Small Green and Indigenous Organizing*, Calgary, University of Calgary Press.

Collomb, J-D. (2014) *The Ideology of Climate Change Denial in the United States*, in "European journal of American studies", 9 (1).

Crutzen, P. J. (2002) *Geology of mankind*, in "Nature", 415 (23), p. 23.

D'Alessandro, S., Cieplinski, A., Distefano, T., Dittmer, K., (2020), *Feasible alternatives to green growth*, in "Nature Sustainability" (3), pp. 329-335.

de la Cadena, M. and Blaser M. (2018) *A World of Many Worlds*, Durham, Duke

University Press.

Della Porta, D. and Diani, M. (2006) *Social movements. An introduction*, Malden, MA , Oxford, Blackwell.

Doherty, B. and de Geus, M. (1996) *Democracy and green political thought: Sustainability, rights, and citizenship: European political science series*, London, Routledge.

Du Bois, W.E.B. (1964) *Black reconstruction in America. An essay toward a history of the part which black folk played in the attempt to reconstruct democracy in America, 1860-1880*, Cleveland, Meridian Books.

Duménil, G., and Lévy, D. (2005a) *The profit rate: where and how much did it fall? Did it recover? (USA 1948–2000)*, in "Review of Radical Political Economics", 34 (4), pp. 437-461.

Duménil, G. and Lévy D. (2005b) *From propserity to neoliberalism. Europe before and after the structural crisis of the 1970s*, in http://www.jourdan.ens.fr/~levy/dle2002d.pdf (retrieved March 25, 2009).

Engel-Di Mauro, S. and Martin, G. (2022) *Urban Food Production for Ecosocialism. Cultivating the City*, London, Routledge.

Escobar, A. (2015) *Degrowth, postdevelopment, and transitions: a preliminary conversation*, in "Sustainability Science", 10 (3), pp. 451-462.

Fanon, F. (2004) *The wretched of the earth*, New York, Grove Press.

Fearnside, P. M. (2018) *Why Brazil's new president poses an unprecedented threat to the Amazon*, Yale Environment 360, in https://e360.yale.edu/features/why-brazils-new-president-poses-an-unprecedented-threat-to-the-amazon (retrieved October 22, 2021).

Feola, G. and Jaworska, S. (2019) *One transition, many transitions? A corpus-based study of societal sustainability transition discourses in four civil society's proposals*, in "Sustainability Science", 14, pp. 1643-1656.

Ferdinand, M. (2019) *Une écologie décoloniale. Penser l'écologie depuis le monde caribéen, anthropocène*, Paris, Édition du Seuil.

Fouquet, R., (2016) *Historical energy transitions: Speed, prices and system transformation*, in "Energy Research & Social Science", 22, pp. 7-12.

Fressoz, J., (2014), *Pour une histoire désorientée de l'énergie,* in "25èmes Journées Scientifiques de l'Environnement - L'économie verte en question", Créteil, France, https://hal.archives-ouvertes.fr/hal-00956441.

García López, V., Giraldo, O. F., Morales, H., Rosset, P. M. and Duarte, J.M. (2019) *Seed sovereignty and agroecological scaling: two cases of seed recovery, conservation, and defense in Colombia*, in "Agroecology and Sustainable Food Systems", 43 (7-8), pp. 827-847.

Ghelfi, A. (in press) *New Peasantries in Italy: Eco-commons, Agroecology and Food Communities*, in D. Papadopoulos, M. Puig de la Bellacasa and M. Tacchetti, *Ecological Reparation. Repair, Remediation and Resurgence in Social and Envi-*

ronmental Conflict, Bristol, Bristol University Press.

Ghelfi, A. and Papadopoulos, D. (2022), *Ungovernable Earth: Resurgence, translocal infrastructures, and more-than-social movements*, in "Environmental Values", pp. 1-19.

Giroux, H. A. (2018) *American Nightmare. Facing the Challenge of Fascism*, San Francisco, City Lights Books.

Giunta, I. (2021) *Via Campesina. Orizzonti per la sovranità alimentare*, Milano, Franco Angeli.

Glyn, A. (2006) *Capitalism Unleashed. Finance Globalization and Welfare*, New York, Oxford University Press.

Gupta, J. (2014) *The history of global climate governance*, Cambridge, Cambridge University Press.

Hamilton, C., Gemenne, F. and Bonneuil, C. (2015) *Anthropocene and the global environmental crisis. Rethinking modernity in a new epoch*, London, Routledge

Hardt, M. and Negri, A. (2000) *Empire*, Cambridge, MA, Harvard University Press.

Harootunian, H. (2007) *The Imperial Present and the Second Coming of Fascism*, in "boundary 2", 34(1), pp. 1-15.

Hayden, C. (2021) *Crowding the elements*, in D. Papadopoulos, M. Puig de la Bellacasa M. and N. Myers (eds), *Reactivating Elements. Chemistry, Ecology, Practice*, Durham NC, Duke University Press, pp. 176-195.

Heffron, R. J. and McCauley, D. (2018) *What is the 'Just Transition'?*, in "Geoforum", 88, pp. 74-77.

Hibbard, K.A., Crutzen, P.J., Lambin, E.F., Liverman, D.M., Mantua, N.J., McNeill, J.R., Messerli, B. and Steffen, W. (2006) *Decadal-scale interactions of humans and the environment*, in Costanza, R., L.J. Graumlich, and W. Steffen (eds), *Sustainability or Collapse? An Integrated History and Future of People on Earth*, Cambridge, Massachusetts, MIT Press, pp. 341-378.

Holbraad, M., Pedersen M.A. and Viveiros de Castro E. (2014) *The politics of ontology: anthropological positions*, in "Cultural Anthropology online", 13.

Holmgren, D. (2002) *Permaculture. Principles and Pathways Beyond Sustainability*, Victoria, Holmgren Design Services.

Hopkins, R. (2011) *The Transition Companion. Making your community more resilient in uncertain times*, Cambridge, Green Books.

Hopwood, B., Mellor, M. and O'Brien, G. (2005) *Sustainable development: mapping different approaches*, in "Sustainable Development", 13 (1), pp. 38-52.

Huesemann, M. and Huesemann, J. (2011), *Techno-fix: why technology won't save us or the environment,* Gabriola, New Society Publishers.

Huguenin, M.T., Leggett, C.G. and Paterson, R.W. (2006) *Economic valuation of*

soil fauna, in "European Journal of Soil Biology", 42, pp. 16-22.

Kimmerer, R.W. (2020) *Braiding Sweetgrass. Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants,* Minneapolis, Milkweed Editions.

Kingsland, S.E. (2005) *The evolution of American ecology, 1890-2000*, Baltimore, Maryland, Johns Hopkins University Press.

Kohl, E., M., Sullivan, M.M., Chambers, A., Cordner, C., Sellers, L., Fredrickson L. and Ohayon, J.L. (2021) *From 'marginal to marginal': environmental justice under Trump administration*, in "Environmental Sociology", pp. 1-12.

Krausmann, F., Lauk, C., Haas, W. and Wiedenhofer, D. (2018) *From resource extraction to outflows of wastes and emissions: The socioeconomic metabolism of the global economy, 1900-2015*, in "Global Environmental Change", 52, pp. 131-140.

Krebs, C.J. (2016) *Why ecology matters*, Chicago, IL, The University of Chicago Press.

Krzywoszynska, A. (2020) *Nonhuman Labor and the Making of Resources: Making Soils a Resource through Microbial Labor*, in "Environmental Humanities", 12(1), pp. 227-249.

Kutney, G. (2014) *Carbon Politics and the Failure of the Kyoto Protocol*, London, Routledge.

Lanka, S.V., Khadaroo, I. and Böhm, S. (2017), *Agroecology accounting: biodiversity and sustainable livelihoods from the margins*, in "Accounting, Auditing & Accountability Journal", 30 (7), pp. 1592-1613.

Latour, B. (2017) *Facing Gaia. Eight lectures on the new climatic regime*, Cambridge, Polity Press.

Latour, B. (2018) *Down to earth: Politics in the new climatic regime*, Cambridge, Polity Press.

Law, J. (2004) *After Method. Mess in social science research*, London, Routledge.

Leonardi, E. (2017) *Lavoro Natura Valore. Andrè Gorz tra marxismo e decrescita,* Nocera Inferiore (SA), Orthotes Editrice.

Lilley, S., and Papadopoulos, D. (2014) *Material returns: Cultures of valuation, biofinancialisation and the autonomy of politics*, in "Sociology" 48 (5), pp. 972-988.

MacKenzie D. (2011) *The credit crisis as a problem in the sociology of knowledge*, in "American Journal of Sociology", 116(6), pp. 1778-841.

Macleod, C. I., Beynon-Jones S. and Toerien, M. (2017) *Articulating reproductive justice through reparative justice: case studies of abortion in Great Britain and South Africa*, in "Culture, Health and Sexuality", 19 (5), pp. 601-615.

Malm, A. (2013) *The Origins of Fossil Capital: From Water to Steam in the British Cotton Industry*, in "Historical Materialism", 21 (1), pp. 15-68.

Malm, A. and Zetkin Collective (2021) *White skin, black fuel. On the danger of*

fossil fascism, London, Verso.

Mander, J. and Tauli-Corpuz, V. (eds) (2006) *Paradigm wars: indigenous peoples' resistance to globalization*, San Francisco, CA, Sierra Club.

Masters, N. (2019) *For the Love of Soil. Strategies to Regererate Our Food Production System*, New Zealand, Printable Reality.

Meyer, J.M. (2015) *Engaging the everyday: Environmental social criticism and the resonance dilemma*, Cambridge, MA, MIT Press.

Millner, N. (2017) *Terra plena: Revisiting contemporary agrarian struggles in Central America through a "full earth" perspective*, in M. Jackson (ed), *Coloniality, Ontology and the Question of the Posthuman*, London, Routledge, pp. 101-129.

Mitchell, T. (2009) *Carbon democracy*, in "Economy and Society" 38(3), pp. 399-432.

Mitchell, T. (2011) *Carbon Democracy. Political Power in the Age of Oil*, London, Verso.

Mollison, B. and Holmgren, D. (1978) *Permaculture One: A Perennial Agriculture for Human Settlements*, Stanley, Tagari Publications.

Nash, L.L. (2006) *Inescapable ecologies. A history of environment, disease, and knowledge*, Berkeley, University of California Press.

Nation, R. (2021), *The Red Deal: Indigenous Action to Save Our Earth*, Philadelphia, USA, Common Notions.

Negri, A. (1996) *Constituent Republic*, in P. Virno and M. Hardt (eds), *Radical Thought in Italy. A Potential Politics*, Minneapolis/London, University of Minnesota Press, pp. 213-224..

Negri, A. (1999) *Insurgencies: constituent power and the modern state. Theory out of bounds*. Minneapolis, University of Minnesota Press.

Negri, A. (2010) *Corruzione, nuova accumulazione, rifeudalizzazione*, in "Common. Resistenza indipendenza esodo", 0, pp. 6-11.

Nelson, S. (2015) *Beyond the limits to growth: ecology and the neoliberal conterrevolution*, in "Antipode", 47 (2), pp. 461-480.

O'Neill, D. W. (2020) *Beyond green growth*, in "Nature Sustainability" (3), pp. 260-261.

Ocasio-Cortez, A. et al. (2019) *H. Res. 109 Recongizing the duty of the Federal Government to Create a Green New Deal, 116th US Congress,* in https://www.congress.gov/bill/116th-congress/house-resolution/109/text (retrieved August 2021).

Ottinger, G. and Cohen B. R. (eds) (2011) *Technoscience and Environmental Justice. Expert Cultures in a Grassroots Movement*, Cambridge, MA, MIT Press.

P2P Foundation (2015) *Commons Transition. Policy Proposals for an Open Knowledge Commons Society*, Amsterdam, Foundation for Peer-to-Peer Al-

ternatives, in https://commonstransition.org/wp-content/uploads/2014/11/Commons-Transition_-Policy-Proposals-for-a-P2P-Foundation.pdf (retrieved August 2021)

Papadopoulos, D. (2012) *Worlding justice/Commoning matter*, in "Occasion: Interdisciplinary Studies in the Humanities", 3, pp. 1-25.

Papadopoulos D., (2014), *Politics of Matter: Justice and Organisation in Technoscience*, in "Social Epistemology: A Journal of Knowledge, Culture and Policy", 28 (1), pp. 70-85.

Papadopoulos D. (2018*) Experimental Practice. Technoscience, Alterontologies, and More-Than-Social Movements*, Durham, NC, Duke University Press.

Papadopoulos D., Puig de la Bellacasa, M. and Tacchetti, M., (eds) (2022) *Ecological Reparation. Repair, Remediation and Resurgence in Social and Environmental Conflict*, Bristol, Bristol University Press.

Papadopoulos D., Stephenson, N. and Tsianos, V. (2008) *Escape routes. Control and subversion in the 21st century*, London, Pluto Press.

Paull, J. (2006) *The Farm as Organism: The Foundational Idea of Organic Agriculture*, in "Journal of Bio-Dynamics Tasmania", 80, pp. 14-18.

Paxton, R. O. (1998) *The Five Stages of Fascism*, in "The Journal of Modern History", 70 (1), pp. 1-23.

Pellizzoni, L. (2015) *Ontological Politics in a Disposable World: The New Masterity of Nature*, Farnham, Ashgate Publishing Limited.

Perez Murcia, L. E (2013) *Social Policy or Reparative Justice? Challenges for Reparations in Contexts of Massive Displacement and Related Serious Human Rights Violations*, in "Journal of Refugee Studies", 27 (2), pp. 191-206.

Pfeiffer, E. (2004) *Soil Fertility. Renewal & Preservation: Bio-Dynamic Farming and Gardening*, East Gristead, UK, The Lanthorn Press.

Pickerill, J. (2020) *Making climate urbanism from the grassroots: Eco-communities, experiments and divergent temporalities*, in C. Broto, E. Robin and A While (eds), *Climate Urbanism. Towards a Critical Research Agenda,* Basingstoke, Palgrave Macmillan, pp. 227-242.

Pickering, J., Backstrand, K. and Schlosberg, D. (2020) *Between environmental and ecological democracy: theory and practice at the democracy-environment nexus*, in "Journal of Environmental Policy and Planning", 22 (1), pp. 1-15.

Plattner, M. F. (2019) *Illiberal Democracy and the Struggle on the Right,* in "Journal of Democracy", 30 (1), pp. 5-19.

Podobnik, B. (1999) *Toward a Sustainable Energy Regime: A Long-Wave Interpretation of Global Energy Shifts*, in "Technological Forecasting and Social Change", 62, pp. 155-172.

Polanyi, K. (2001)[1944] *The Great Transformation. The Political and Economic origins of Our Time*, Boston, Beacon Press.

Popovich, N., Albeck-Ripka, L. and Pierre-Louis, K. (2020) *The Trump Admin-*

istration Rolled Back More Than 100 Environmental Rules. Here's the Full List, in "New York Times" May 20, 2020.

Puig de la Bellacasa, M. (2014) *Encountering bioinfrastructure: ecological struggles and the sciences of soil*, in "Social Epistemology", 28 (1), pp. 26-40.

Puig de la Bellacasa, M. (2015) *Making time for soil: Technoscientific futurity and the pace of care*, in "Social Studies of Science", 45 (5), pp. 691-716.

Puig de la Bellacasa, M. (2017) *Matters of Care. Speculative Ethics in More Than Human Worlds*. Minneapolis, University of Minnesota Press.

Puig de la Bellacasa, M. (2019) *Re-animating soils: Transforming human–soil affections through science, culture and community*, in "The Sociological Review", 67 (2), pp. 391-407.

Rancière, J. (1998) *Disagreement: politics and philosophy*, Minneapolis, University of Minnesota Press.

Rivera Cusicanqui, S. (2010) *Ch'ixinakax utxiwa: una reflexiòn sobre pràcticas y discursos descolonizadores*, Buenos Aires, Tinta Limòn.

Robyn, E. (2020) *Ecological democracy and the rise and decline of liberal democracy: looking back, looking forward*, in "Environmental Politics", 29 (2), pp. 214-234.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F.S., Lambin, E., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J. and Nykvist, B. (2009) *Planetary boundaries: exploring the safe operating space for humanity*, in "Ecology and society", 14 (2), pp. 32-65.

Rose, D. Bird (2004) *Reports from a Wild Country. Ethics for Decolonisation*, Sydney, University of New South Wales Press.

Rosen, A.M. (2015) *The Wrong Solution at the Right Time: The Failure of the Kyoto Protocol on Climate Change*, in "Politics & Policy", 43 (1), pp. 30-58.

Rosset, P. and Altieri, M.A. (2017) *Agroecology: science and politics*, Black Point, Nova Scotia, Femwood Publishing.

Rosset, P., Val, V., Pinheiro Barbosa, L. and McCune N. (2019) *Agroecology and La Via Campesina II. Peasant agroecology schools and the formation of a socio-historical and political subject*, in "Agroecology and Sustainable Food Systems", 43 (7-8), pp. 895-914.

Rozzi, R.F., Chapin III S., Baird Callicott J., Pickett, S.T.A., Power M.E., Armesto J. J. and May Jr. R.H. (eds) (2015) *Earth Stewardship. Linking Ecology and Ethics in Theory and Practice*, New York, Springer.

Schlosberg, D. and Coles R. (2016) *The new environmentalism of everyday life. Sustainability, material flows and movements*, in "Contemporary Political Theory", 15 (2), pp. 160-181.

Shattuck, A., Schiavoni C., and VanGelder Z. (2017) *The Politics of Food Sovereignty. Concept, Practice and Social Movements*, Oxon, Routledge.

Shiva, V. (2008) *Soil, Not Oil: Climate Change, Peak Oil and Food Insecurity*,

London, Zed Books.

Simpson, L.B. (2021) *As We Have Always Done. Indigenous Freedom through Radical Resistance*, Minneapolis, University of Minnesota Press.

Sovacool, B.K. (2016) *How long will it take? Conceptualizing the temporal dynamics of energy transitions*, in "Energy Research & Social Science", 13, pp. 202-215.

Spash, C.L. (2016) *This Changes Nothing: The Paris Agreement to Ignore Reality,* in "Globalizations", 13 (6), pp. 928-933.

Stanley, J. (2018) *How fascism works: the politics of us and them*, New York, Random House.

Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O. and Ludwig, C. (2015) *The trajectory of the Anthropocene: the great acceleration*, in "The Anthropocene Review", 2(1), pp.81-98.

Sternhell, Z. (2010) *Fascism: Reflections on the fate of ideas in twentieth century history*, in "Journal of Political Ideologies", 5 (2), pp. 139-162.

Svampa, M. (2015) *The 'Commodities Consensus' and Valuation Languages in Latin America*, in "Alternautas", 2 (1), pp. 45-59.

Svirsky, M. (2010) *The Production of Terra Nullius and the Zionist-Palestinian Conflict*, in S. Bignall and P. Patton (eds), *Deleuze and the postcolonial*, Edinburgh, Edinburgh University Press, pp. 220-250

Teo, T. (2021) *Essay on Fascist Subjectivity*, in I. Strasser and M. Dege (eds), *The Psychology of Global Crises and Crisis Politics*, Basingstoke, Palgrave, pp. 325-345.

The World Bank (2012) *Inclusive Green Growth. The Pathway to Sustainable Development,* Washington DC, The World Bank.

Tilly, C. and Wood L. J. (2009) *Social movements, 1768-2008*, Boulder, Paradigm Publishers.

Traverso, E. (2017) *I nuovi volti del fascismo*, Verona, Ombre Corte.

Tsianos, V. Papadopoulos, D. and Stephenson, N. (2012) *This is class war from above and they are winning it: what is to de done?,* in "Rethinking Marxism", 24 (3), pp. 448-457.

Tsing, A.L. (2015) *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, Princeton, Princeton University Press.

Utting, P. (2015) *Social and Solidarity Economy: Beyond the fringe*, London, Zed Books.

Walker, M.U. (2010) *What is Reparative Justice?*, Milwaukee, Marquette University Press.

White, D. (2019) *Just Transitions/ Design for Transitions: Preliminary Notes on a Design Politics for a Green new Deal*, in "Capitalism, Nature, Socialism", 31(2), pp. 20-39.

White, R. (2016) *Reparative justice, environmental crime and penalties for the powerful*, in "Crime, Law and Social Change", 67 (2), pp. 117-132.

Whyte, K. (2018a) *Critical Investigations of Resilience: A Brief Introduction to Indigenous Environmental Studies & Sciences*, in "Daedalus" 147 (2), pp. 136-147.

Whyte, K. (2018b) *Settler Colonialism, Ecology, and Environmental Injustice*, in "Environment and Society", 9 (1), pp. 125-144.

Wolfe, P., (2006) *Settler colonialism and the elimination of the native*, in "Journal of Genocide Research", 8 (4), pp. 387–409.

Wynter, S. (2003) *Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation. An Argument*, in "CR: The New Centennial Review", 3 (3), pp. 257-337.

Zalasiewicz, J., Williams, M., Haywood I. and Ellis M. (2011) *The Anthropocene: a new epoch of geological time?,* in "Philosophical Transactions of the Royal Society", 369 (1938), pp. 833-1112.

Zanoletti, A., Cornelio, A. and Bontempi, E. (2021) *A post-pandemic sustainable scenario: What actions can be pursued to increase the raw materials availability?,* in "Environmental Research", 202.

---

[1] The notion of constituent power introduces a processual idea of democracy as the "becoming of democracy" in the present, rather than normative promise of democracy that is eternally deferred to the future, see Negri (1999); Negri (1996); Hardt et al. (2000). Extending this view, a green democratic political constituency – see for example Doherty et al. (1996); Braun et al. (2010) – involves a very different set of actors, human as well as nonhuman, in its material workings in comparison to 20th century constituent politics discussed in Negri's work. This more-than-human approach resituates constituent power from humanist modernity to our new ecological more-than-human present.

[2] See, among others, Holmgren (2002); Mollisonand Holmgren (1978); Paull (2006); Pfeiffer (2004); Masters (2019); Chase (2014).

[3] For a broader discussion of the concept of transition see Feola and Jaworska (2019); Escobar (2015); Heffron and McCauley (2018).

[4] See for example different approaches to the valuation and financialization of ecosystems and natural environments in Beckert et al. (2011); Birch (2017); Huguenin et al. (2006); Lilley et al. (2014); MacKenzie (2011); Svampa (2015).

[5] For example, the Trump administration in the USA (2017-2021) not only opposed regulation for carbon emissions reductions but also rolled back over 100 environmental policies; recent developments in Russia, Brazil, and India show how the rise of regressive nationalism has supported aggressive climatic negationism, see Kohl et al. (2021); Fearnside (2018); Popovich et al. (2020).

[6] See Rosen (2015); Kutney (2014); Spash (2016); Arora and Mishra (2021).

[7] Greta Thunberg's speech at the U.N.'s Climate Action Summit in New York City, 23rd of September 2019.

[8] See Bioversity International (2017); Ceccarelli and Grando (2019); Ceccarelli et al. (2009).

[9] Invented by a working group at the 2005 Dahlem Conference (Berlin) on the history of the human–environment relationships (Hibbard et al. 2006).

[10] In recent years the democracy-environment nexus has been developed in the field of environmental politics under the label of ecological democracy. This notion crisscrossed various intellectual trajectories that are trying to stress the role of collective ecological actions in a politics of radical transformation: prefigurative, collective, and ecologically integrated practices give birth to new sustainable systems of production and circulation (Meyer 2015; Schlosberg and Coles 2016; D. White 2019; Pickering et al. 2020; Eckersley 2020; Doherty and De Gleus 1996). The ecological reorientation of the material practices of everyday life is at the centre of new materialist work that highlights the democratic role of local communities' action in shaping sustainable systems of food, water, and energy circulation. The notion of green democracy developed in this paper resonates strongly with ecological democracy that aims to create new alliances, convergencies and processes of political composition amongst everyday ecological transitions, the politics of environmental justice and environmental protest, and new forms of reparative governance.

[11] For example see D'Alessandro et al. (2020), O'Neill (2020), White (2019), Brand (2015), Adler (2019), Ocasio-Cortez et al. (2019).

[12] See also Rose (2004); Rivera Cusicanqui (2010); Simpson 2021; Kimmerer 2020.

[13] We are thinking, for example, of the world's indigenous movements which have put forth a multitude of proposals for reparative justice and ecological restoration, such as the Anchorage Declaration, the Karuk Climate Adaptation Plan, the Red Deal, Green New Deal for Appalachia (Nation 2021) or the agro-foresters of the Savanna Institute and of the African-inspired agro-ecologists of Soul Fire Farm proposals for experimenting with alternative food production in a decolonial perspective, (Ajl 2021).