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Green economy and carbon markets for conservation and development: a critical view

Kathleen McAfee[1]

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Abstract Green economy aims to use economic rationality and market mechanisms to mute the most ecologically damaging effects of globalized capitalism while reviving economic growth in the global North, fostering development in the South, and decoupling economic growth from environmental decline. An archetypal application of green economy is transnational trade in ecosystem services, including reduced emissions for deforestation and degradation (REDD+). By compensating developing countries for maintaining forests as carbon sinks, this approach is meant to transcend politics and circumvent conflicts over the responsibilities of industrialized and 'less-developed' countries that have stymied global climate policy. However, carbon-offset trading is unlikely to result in lower greenhouse gas emissions, much less combined conservation and development gains. The troubled record of payment for environmental services and other schemes or commodification of nature illustrates that living ecosocial systems do not fit the requirements of market contracts. Disputes over proto-REDD+ projects point to the dangers that REDD+ will disadvantage or dispossess rural communities and distract attention from underlying causes of forest and livelihood loss. Two decades of all-but-futile climate negotiations have shown that global warming cannot be managed by means of technocratic expertise nor dealt with separately from the politics of inequality and the paradox of economic growth. The deceptive promise of greening with growth can blind us to these realities. Counter-hegemonic discourses to growth-centered green economy under the headings of *buen vivir*, mainly in the global South, and *degrowth*, mainly in the global North, therefore merit attention.

Keywords Green economy · Development · Carbon markets · Ecosystem services · Degrowth · Buen vivir · REDD+

✉ Kathleen McAfee
kmcafee@sfsu.edu

[1] International Relations, San Francisco State University, 1600 Holloway Ave, San Francisco, CA 94132, USA

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While scientists and policymakers worldwide have come to acknowledge the likelihood of severe, even catastrophic consequences if concentrations of greenhouse gasses (GHGs) continue to rise, international policy action to reverse this trajectory has failed (IPBES/UNEP 2011; TEEB 2010; UNEP 2011a; World Bank 2012b). Negotiations toward implementation of the 1994 United Nations Framework Convention on Climate Change (UNFCCC) have yielded meager results, stalemated by disputes over which countries should be held accountable for past and future global warming, what actions they can be required to take, and whether limiting GHS emissions precludes economic growth. International carbon trading, in which the carbon-sequestration functions of ecosystems are bought and sold across borders, is a widely endorsed policy response to this impasse (Stephan and Lane 2014).

The monetary valuation and trading of ecosystem services—functions of nature that are useful to humans—is a lynchpin of green economy, the set of discourses and policies that increasingly frames climate and biodiversity negotiations and the environmental policies of governments. Green economy is a popularized version ecological modernization, by which environmental externalities—the unintentional costs or benefits of economic activities—are brought into the accounting of individuals, enterprises and states (Mol 2002). It calls for carefully calibrated intervention by governments in markets but does not challenge neoliberalism's core commitments to globalized 'free trade' and to private enterprise as the primary agent of progress (Brockington 2012).[1]

Instead, the general idea is to use mechanisms of 'the market' to save globalized, industrial capitalism from its most ecologically damaging effects (Jessop 2012; UNEP 2011a). Green-economy proponents hope that market-based environmental governance, guided by minimal but judicious regulation, will spur investments in low-carbon technologies and conservation projects. This, they hope, will help to revive lagging economic growth, foster development in the global South, and at the same time, decouple growth from environmental degradation (OECD 2011; World Bank 2012b).

In line with the conventional economic theory that informs most green-economy thinking, markets in carbon-sequestration and other ecosystem services are seen as an economically efficient means of mitigating climate change and conserving biological diversity without curtailing economic growth (McKinsey and Company 2010; Pagiola et al. 2002). Trade in credits for ecosystem services is meant to compensate for the continuing GHG emissions by the ultimate buyers of those credits. In the international context, advocates hope that markets in biodiversity and carbon offsets can help to surmount the tensions between seemingly contradictory goals: slowing global warming and promoting economic development (Le Blanc 2011).

This line of reasoning has led to the development of reduced emissions for deforestation and degradation (REDD+), the first multilateral initiative for global action on climate agreed to, at least in principle, since the adoption of the 1997 Kyoto Protocol. REDD+, or reduced emissions from deforestation and degradation, is aimed at maintaining and enlarging forests as 'sinks' for the storage of CO_2, primarily in the tropics. Advocates envision that REDD+ will benefit all parties: governments and land users in the global South, private investors, and humanity as a whole (Luttrell et al. 2013). By compensating developing countries for conserving and enhancing forests, REDD+ is expected to

[1] 'Green economy' is sometimes used in a broader sense to mean 'ecologically sustainable' economy. Here, I refer to the explicitly market-oriented conceptualization of green economy emphasized by multilateral agencies.

circumvent the conflicts over the responsibilities of highly industrialized and 'less-developed' countries that have stymied broader climate-policy agreements.

While REDD+ and the payments for ecological services (PES) programs on which it is largely modeled are quintessential applications of current green-economy logic, the use of market instruments for international environmental aims is not entirely new. Trade in ecosystem services has been taking place under the rubric of the Kyoto Protocol's clean development mechanism (CDM), in markets for climate-friendly export commodities such as shade-grown coffee, and in PES programs in Latin America, Asia, and Africa since the 1990s. However, case studies of PES projects in the global South provide reasons to doubt that this strategy can generate either climate-mitigation gains or significant poverty-reduction benefits (Corbera et al. 2007; Muradian et al. 2013; Pattanayak et al. 2010).

Scholars and indigenous peoples' organizations have also raised alarms about the effects of markets in nature on rural livelihoods and rights and about the potential of REDD+ to facilitate the recentralization of resource and territorial control by states (Phelps et al. 2010). Other critics of carbon-offset trading contend that the reasoning marshaled in support of market-based environmental governance is misleading and internally inconsistent (Böhm and Dabhi 2009; Lohmann 2009; McAfee 2012; Storm 2011). The near-collapse of carbon markets since 2011 casts additional doubt on their potential (Point Carbon 2014).

Less attention has been paid in this literature to the implications of green economy for development. As I elaborate below, green-economy strategy both promotes and depends upon economic growth. So does REDD+, at least insofar as it depends on market-based financing, as the World Bank and private-sector REDD+ advocates prefer (CMIA 2013). But questions about growth are being raised by a growing number of analysts in the global South and North alike: Is continued GDP growth worldwide is compatible with greening (Jackson 2011)? Is growth that would enable would-be developing countries to 'catch up' with the industrialized world even possible without devastating ecological consequences (Chomitz 2010)? Must formerly colonized countries sacrifice their aspirations so that industrial societies need not reduce their material standards of living (Khor 2012)?

In this context, counter-hegemonic discourses under the headings of *buen vivir*, mainly in the global South, and *degrowth*, mainly in the global North, are gaining attention (D'Alisa et al. 2014; Lang et al. 2013). These emerging schools of thought and action share the conviction that ecological sustainability and social justice are incompatible with 'free trade' and economic growth along present, fossil fuel-based trajectories, that limitless economic growth is not possible without immense ecological degradation, but also that-ever-more growth *is not desirable*, and that alternatives to economic growth and conventional versions of development offer a better chance of achieving well-being and fulfillment for the majority.

My aim here is to examine the lessons of PES and REDD+, not to assess all of their merits and failings, but to elucidate the implications of these applications of green economy for the interlinked dilemmas of greening, development, and economic growth. The first two sections below offer an overview of green-economy discourse in current debates about carbon markets and REDD+. I then draw upon existing studies PES and proto-REDD+ to illustrate how the premises and methods at the heart of green economy repeatedly run aground against the complexity of living ecosocial systems. Following that, I discuss the 'anti-politics' of green economy: How its advocates apply economic logic in an unsuccessful attempt to supersede the conflicts about international development and inequality that plagues climate negotiations. I then take a closer look at the reasoning behind concerns that REDD+ will deepen inequalities within the global South. The

penultimate section considers how the problems of green economy and development are tied to the paradox of growth. In conclusion, I suggest that this deep-rooted conundrum calls for more radical thinking that might benefit from the propositions of the new social movements for degrowth and buen vivir.

1 Green economy and carbon markets

The green-economy framework has been elaborated by multilateral agencies including the World Bank, the UN Environment Program (UNEP), the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and the Economics of Ecosystems and Biodiversity (TEEB) program, as well as by business and non-government organizations (GEC 2013; IPBES/UNEP 2011; TEEB 2010; UNEP 2011a; World Bank 2012b). In common, these green-economy manifestos call for scientific measurement and monetary pricing of environmental costs and benefits and for pubic policies that take these factors into account. With varying degrees of emphasis, they endorse markets in ecosystem services as a strategy for both conservation and development.

UNEP's 631-page *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication,* an influential version of these narratives, acknowledges the asymmetric causes and uneven effects of environmental degradation in different world regions (Brockington 2012). It notes 'widespread disillusionment with the prevailing economic paradigm' (UNEP 2011a, p. 14). Its 'new paradigm' retrofits the concepts and methods of neoclassical economics to incorporate the ecological and social costs of various technological and development pathways. UNEP's new paradigm is no less market-centric than its predecessors: It constructs environmental assets as 'natural capital' and attributes the causes of looming food and water shortages, as well as 'persistent social problems,' to a common feature: 'the gross misallocation of capital' (ibid.).

In theory, because it would make investments in conservation and low-carbon development profitable for private investors, market-based green-economy policy could largely pay for itself. The World Bank, in particular, envisions transnational markets in carbon-sequestration services and other GHG offsets as the key source of financing for conservation, through programs such as REDD+, and for the development and diffusion of low-carbon technologies (World Bank 2012a). Carbon markets thus appear to help solve the problem of finance for sustainable development, given the limited willingness of most governments to provide funds for this purpose. Some supporters of ecosystem services markets are further convinced that such arrangements can channel benefits to the rural poor and indigenous peoples, easing conflicts over land use and territorial rights (Wood 2011).

In carbon markets, responsibility for climate-warming GHG emissions becomes a commodity that can be bought and sold within national or regional jurisdictions, even between continents, in the form of carbon allowances or carbon-offset credits.[2] Some policy experts view this approach as vital to a successful UNFCCC (Stewart et al. 2009). Others have all but given up on that multilateral framework, placing more hope in compliance markets at national or regional levels, or apart from governments altogether, in 'voluntary carbon markets' (VCMs) (Forest Trends 2014; Kossoy 2014).

Compliance carbon markets, established by national or provincial governments or alliances of governments, are designed to raise the cost of polluting without stifling the

[2] Carbon credits are usually accounted for in units of metric tons of carbon dioxide equivalent (MTCO2es), a device for comparing the global warming impact of CO2, methane, nitrous oxides, ozone, or other GHGs.

profitability of regulated industries. Regulators set legal limits, or 'caps,' on the quantities of GHGs that may be emitted in the entire region and by particular enterprises or economic sectors and then give or sell emissions allowances to the entities under regulation. Allowances, or credits, are permits to continue emitting a specified quantity of CO_2 or other GHGs for a certain time period, after which the number of allowances is meant to be reduced. Enterprises that fail to lower their emissions to the regulatory maximum may remain in compliance with the law by purchasing allowances from a regulated firm that has not used all of its own allowances or from speculators in the secondary market, who buy credits in the hope of selling them at a higher price. This is the 'trade' part of cap-and-trade. In theory, as the supply of allowances is reduced by law, rising price of available credits will serve as an incentive for polluting businesses to invest in technological innovations and greener practices. In this way, advocates contend, cap-and-trade can foster a transition to more sustainable energy production without slowing economic growth (World Bank 2012b).

Some cap-and-trade schemes include offsets: credits that are not obtained by reducing GHG emissions at their source but rather are generated by climate-mitigating actions at another site within the regulated territory or outside it. For example, under the cap-and-trade component of California's policy on global warming, companies may offset up to eight percentage of their annual GHG emissions quotas by paying for projects in California or elsewhere in the USA and Quebec that capture GHGs or prevent their production: activities that destroy ozone-depleting chemicals, support urban and rural tree planting or improved forest management, capture methane from pig and cattle manure, or under newer regulation, collect methane from rice fields or coal mines (CARB 2012).

When traded from one world region to another, offsets allow continued emissions of certain amounts GHGs, mainly in highly industrialized economies, in exchange for investments in greening, mainly in less-industrialized countries of the global South. Offsets may be based on investments in biofuel production, management of methane-emitting landfills, energy-saving manufacturing, cleaner energy production, e.g., hydropower instead of coal, or agricultural practices that produce fewer emissions of methane, carbon dioxide, or nitrous oxides. The most extensive offsetting scheme has been the CDM, the first internationally sponsored carbon market outside of the European Union, which has had its own cap-and-trade system since 2005. Proposals to allow California companies to offset part of their emissions by paying for forest management in Mexico, Brazil, and other sites outside North America have thus far not been adopted.

With or without offsets, the goals of the various cap-and-trade and carbon-tax schemes have been extremely modest in comparison with the amount of GHG reductions that most climate scientists agree are needed to avoid an increase in mean global temperatures of less than four degrees centigrade (IPCC 2014). Although governments, international agencies, and conservation NGOs have been trying to prop up carbon markets by means of subsidies and market interventions to boost the prices of credits, carbon markets have remained too weak to attract investors on the scale anticipated by their sponsors (Kossoy 2014). Consequently, the prices of tradable emissions allowances and offsets have been far too low to persuade most polluters to reduce their emissions substantially instead of buying inexpensive credits. Unless much stronger, global-scale compliance regime—a 'global cap'—emerges from FCCC negotiations or another international process, this is likely to remain the case.

Carbon markets are nevertheless lucrative for many. For-profit consulting firms and nonprofit conservation NGOs collect fees for identifying or setting up credit-earning projects and shepherding them through the process of qualifying for offsets under the CDM

or other regimes. Other players who may benefit from transnational carbon markets include banks, commodity trading firms, oil and power companies, energy speculators, and pension, hedge, and private-equity funds that invest in carbon credits, as well as firms established specifically to broker the new carbon commodity (Sullivan 2013). REDD-related projects, sales conferences, roundtables, guidelines, sub-ministries, and safeguard policies—not to mention theses and dissertations—proliferate.

2 Carbon offsets and REDD+

Buyers of forest carbon offsets typically pay for the preservation or expansion of tropical rainforests or other ecosystems that sequester carbon. Although the CDM offers some credits for forest investments, most forest-related credits are created and sold through VCMs that are regulated privately, if at all (Forest Trends 2013).[3] In the case of REDD+, revenue from the sale of offsets would pay governments to reduce deforestation and forest degradation by limiting logging, paying landholders to making forest-saving land-use decisions, or other means.

The main institutional sponsors of REDD+ are the United Nations, through UN-REDD, and the World Bank, through its Forest Carbon Partnership Fund (FCPF), and related Bank agencies. Country signatories to the UNFCCC have agreed in principle to general guidelines for REDD+, although some governments have expressed strong reservations (McAfee 2014). As of late 2014, 44 countries were pursuing REDD+ preparatory processes in conjunction with the FCPF and at least 50 countries were 'partners' with UN-REDD, although none of the REDD+ projects had reached the implementation stage. These preparatory activities are financed by grants and loans from governments, UN-REDD, the FCPF, and other World Bank funds which themselves are supported primarily by donations from global North governments, mainly Germany and Norway (World Bank 2014). Northern-based conservation organizations such as Environmental Defense Fund, The Nature Conservancy, Conservation International, and Worldwide Fund for Nature, alongside some developing-country conservation NGOs and governments, have been the most active developers of preparatory REDD+ projects. Other conservation NGOs, notably Friends of the Earth International, are vocal opponents of carbon offsetting and REDD+ (FOEI 2014).

Still other projects designated 'REDD' by their sponsors are independent initiatives by governments, NGOs, and private companies that participate in VCMs. There is yet no single, standardized architecture, set of criteria, or enforcement mechanism for REDD+, and the question of whether the program will be paid for mainly by public funds or private investments remains unresolved. All this makes REDD+ something of a wild frontier, populated by dedicated environmentalists trying to establish effective forest conservation policies and projects, alongside farm and forest communities trying to shape REDD+ rules to meet their own needs, and companies, consultants, and offset brokers pursuing publicity, profits, or both.

[3] VCMs are not linked to government legislation or international treaties but are self-policing schemes created by private-sector groups and companies that want to reduce their 'carbon footprints' or present a greener pubic image. For-profit and nonprofit organizations have been established to manage VCM projects or to ensure that the credits they generate are likely to retain their commercial and public-relations values (Forest Trends 2014).

In the market-based version of REDD+ preferred by the World Bank, proceeds from the sale of REDD+ credits to GHG-emitting enterprises or to carbon-market investors are to be channeled to governments that demonstrate that they are limiting deforestation (World Bank 2012a). Those governments might then use REDD+ funds to maintain protected areas, regulate logging and improve forest management, or slow the conversion of forests or carbon-rich peat lands for agriculture. Some REDD+ sponsors expect that allocation of REDD revenues can best be achieved by means of PES schemes that compensate landowners who promise not to fell forested tracts, or pay farmers to plant trees instead of crops, or reward communities that desist from cutting wood, grazing animals, or practicing swidden agriculture in targeted areas (CIFOR 2008).[4]

To meet the green-economy goal of market efficiency, payment amounts should be just high enough to persuade the recipients to make the more environmentally beneficial choice, but no higher, so that maximum conservation gains will be achieved at minimal cost (Wunder 2007). Also, in theory, the amount of carbon that will be stored or the amount of GHGs emissions from land conversions that will be prevented as a result of the payments will be equivalent, in terms of its effect on the atmosphere, to the amount of the GHGs that the ultimate buyers of the offsets will continue to release thanks to their possession of those offset credits. Thus, in the best case, payments for carbon-sequestration services would prevent increases in GHGs or loss of carbon-sequestration capacity at a particular place and time but would not, in themselves, result in any net reduction in GHG emissions.

Whatever may be agreed at the international level, the effectiveness of any climate policy depends on what happens at the local level of the factory, forest, ranch, or farm. The following section summarizes the practical obstacles, widely noted by both advocates and critics of green-economy models, in achieving both environmental objectives by means of market-based PES and market-based REDD+.

3 Problems of ecosystem services markets as a conservation strategy

PES projects have been in place since the early 1980s; the greatest number has been in Latin America.[5] Ecologists and economists are working to fine-tune methods of measuring carbon flows, while project designers and offset brokers attempt to distinguish and quantify the multiple 'services' provided by ecosystems—hydrological, species-sheltering, carbon-storing, etc.—so that each can be constructed as a separate capital asset offered for sale. However sophisticated these methods become, reasons to doubt the effectiveness of PES as a conservation and climate-change mitigation strategy arise, first, from scientific and technological issues:

- *Ecological complexity* and *scientific uncertainty* Human knowledge about the relationships between various land uses and species conservation, water supplies, and, especially, the sequestration of carbon in soils, peat lands, and vegetation is limited and much disputed, even among climate and forestry scientists (Norgaard 2010). Consequently, it is difficult to assess how much if any carbon is stored or

[4] The other major category of PES projects involve payments for carbon sequestration or for hydrological services financed at subregional and national scales. Biodiversity offsets and credits for wildlife conservation are also bought and sold internationally (Sullivan 2013).

[5] I have discussed elsewhere the diverse literature that documents these projects and debates the pros and cons of PES (McAfee 2012a; McAfee and Shapiro 2010).

released, or water conserved or consumed, as the result of activities paid for through PES programs. It is all but impossible to devise formulae for applying such estimates over different timescales and across ecosystems, which are always unique.

Additional problems stemming from the various socioeconomic and institutional contexts of PES and CDM projects, widely recognized by advocates of PES, are likely to apply to carbon-offset credits generated under REDD+ (Angelsen et al. 2012).

- *Leakage* occurs when environmentally destructive activities, such as logging or farming for profit or for subsistence, are shifted from the places targeted for conservation to other sites. It is often impracticable to track, much less to prevent the relocation of destructive activity that is banned under the terms of PES contracts.
- *Non-additionality* refers to cases where payments are made for practices, such as abstaining from felling trees or constructing a coal-fired power plant, that would have occurred even if the PES, CDM, or REDD+ project did not exist. It is often impossible to know with certainty whether a credit-generating activity would have taken place in the absence of payments.
- *Impermanence* Where payments are the incentive that motivates landholders to conserve, what happens after payments cease, or when buyers find cheaper sources of credits, or when climate change transforms ecological relationships? Many PES contracts cover periods as short as three to 5 years. Some cover 25 years or more, or the time it takes some trees to reach harvestable size. In PES schemes where water users pay for watershed conservation, payments may continue as long as water users are able or compelled to pay for water. Longer-term funding is less common in schemes that depend upon state, multilateral, or NGO subsidies, as do most PES programs (McAfee and Shapiro 2010).
- *Perverse incentives* can arise when expectations of conservation payments prompt states or landholders to threaten to engage in more polluting production methods than they actually intend. Or, by overestimating past deforestation rates in order to demonstrate conservation progress, individual landowners or governments can claim to qualify for higher payments.
- *Rent-seeking* and/or other forms of *moral hazard* arise from conflicting priorities of officials, NGOs, or consultants in charge of monitoring, enforcing, or certifying compliance with project requirements, on the one hand, and ecosystem services buyers or project sponsors, on the other hand. Even when outright corruption is not a factor, more subtle conflicts of interest can create incentives to base project designs and claims of success on selected, favorable data or overly optimistic assumptions. For example, consultants may be tempted to certify the legitimacy of offset credits, regardless of spotty evidence, to boost their chances of obtaining future contract work.

As a result, estimates of net environmental losses or gains from PES or REDD projects necessarily rely on best-guess approximations, counterfactual scenarios, unsupported assumptions about future human decisions, and debatable claims about the commensurability and fungibility of ecosystems functions. These challenges have given rise to growth industry of careers and consultancies proffering expertise in carbon calculation and enrolling thousands of economists, business and legal experts, ecologists, and more rarely, social scientists.

But living nature resists vivisection, as many studies of 'neoliberal nature' in other contexts have reported (Bakker 2010; Heynen 2007). The more precisely the legal and financial experts try to disaggregate ecosystem functions in order to ascribe a market value

to each one, the more they are confounded by the dynamism, complexity, and interdependence of natural phenomena. Estimating the market values of nature does not suffice. As Robertson observes, '[I]t is the inability of capital to apprehend nature in commodifiable ways, not just capital's inattention to nature, which interferes with the conditions of production' (Robertson 2012, p. 388).

Some REDD+ project designers and investors are crafting 'jurisdictional' REDD+ methods meant to strengthen accountability in REDD+ projects and link them at subnational and national scales (ROW 2013; VCS 2013). New carbon-market plans with forest offset components are emerging, sponsored by national governments and provinces, such as California in the USA and Acre in Brazil. These efforts, too, face the daunting technical and political challenges noted above, as well as politically laden decisions about how baselines for the measurement of 'improved forest management' are determined. At Rio+20 and other fora, some international indigenous peoples' organizations have cautiously endorsed REDD+; others have denounced carbon-offset trading and REDD+ altogether (Lang 2012; Tauli-Corpuz and Baer 2010). During the Rio+20 Summit and negotiating sessions of the Climate Change and Biodiversity treaties, activists from the global North and delegations of peasants and indigenous people of the global South have amassed in the streets and lobbied in the corridors in protest against carbon-offset markets and REDD+ (Kühne 2012).

To understand why carbon markets and REDD+ have nevertheless become leading responses to global warming, it is useful to examine some assumptions and methodological commitments of the green-economy discourse that supports markets in nature.

4 Green economy as anti-politics

Ample literature in human geography, science and technology studies, and political ecology has criticized the nature–society dualism that pervades most modernist discourse, including contemporary environmentalism (Haraway 1991; Smith 2008; Swyngedouw 2011). One implication is that all environmental projects are simultaneously political projects. In contrast, in the versions of green economy embraced by the World Bank, UNEP, and the OECD, 'environment,' 'economy,' and 'society' are assumed to be distinguishable. This makes it possible to treat the climate crisis as analytically and programmatically separate from wider political issues and power relations. The aim is to bring nature into 'the economy' alongside the other forms of capital—physical, financial, and human—that are supposed to comprise the economic universe, where it can be subjected to rational management (Serageldin 1996).

To this end, nature's assets are made subject to property rights, which allow them to be bought and sold, and to monetary valuation, which allows them be treated as commensurable from place to place. In keeping with conventional environmental economics and its neoclassical premises, land users, businesses, and consumers are assumed to behave as rational individuals who respond mainly to material incentives. Competition and market exchange among private actors are expected to achieve a maximally efficient allocation of land and resources for manufacturing, energy production, and agriculture with minimal state involvement (Coase 1960).

However, green-economy thinkers do not expect that the pricing, ownership, and trading of environmental goods and bads will occur spontaneously or will be adequate in themselves to mitigate climate change. In trade in environmental goods and bads, the

invisible hand of the market should be guided by scientific expertise (TEEB 2010). The new environmental markets must also be supported by government interventions such as taxes on fossil fuel extraction or use, fines or legal caps on GHG emissions and other pollution, tax reductions or other subsidies that increase the market values of non-renewable resources and ecosystem services, or all of the above (Stern 2009).

Governance of this market world calls for quantitative methods. As business leaders proclaimed during the Rio+20 summit, 'we can't manage what we can't measure' (Suarez 2013). Environmental economists, trained in the methodological individualism of neoclassical economics, may be occupationally inclined to imagine the natural world as the sum total of interchangeable parts amenable to calculation and modeling. In any case, market-oriented thinking in environmentalism reflects the broader trend of market-centric policymaking that has prevailed in much of the world since the 1980s.

A related reason why conventional economics seems 'naturally' fit for managing environmental problems has to do with ideas about scarcity. Neoclassical economics is essentially about the administration of scarcity: Markets are the means to manage human wants and desires, which are assumed to be unlimited, for goods and resources which are assumed to be in finite supply (Luks 2010; Mehta 2010). This set of assumptions resonates with the beliefs in resource shortages and population excesses that have long been overt or implicit in environmentalist discourse in the Anglophone global North (Barbier 2011; Hardin 1968; cf Latour 2008; Meadows et al. 1972). Concepts and metaphors such as 'tragedy of the commons,' 'spaceship earth,' 'carrying capacity,' 'peak oil,' 'overpopulation,' and the $I = PAT$ formula connote absolute ecological limits.[6] International environmental negotiations were influenced from the start by warnings about such limits and the consequent need for constraints on economic development (Meadows et al. 1972).

It was in this context that global South governments insisted that the first Earth Summit in 1992 addresses environment *and* development, not only conservation. Two decades later, such concerns persist. If there are supposed to be insufficient material resources and 'ecological space' for worldwide economic growth and development as it has been known, then political questions arise: Who shall pay the costs? Who shall be required to sacrifice? Which species, which landscapes, and by logical extension, which people can be considered redundant to the goal of sustainability (Dempsey 2015)?

Green-economy thinkers hope to answer these questions by means of economic rationality informed by cutting-edge ecological science: substituting hard facts and sophisticated computations for seemingly intractable political conflicts and difficult ethical choices. However, the implications of policy choices based on such putatively objective criteria are anything but neutral, and green-economy discourse has been unable to transcend North–South political tensions in environmental negotiations. Many leaders and citizens of global South states fear that their countries will be the losers in any global-scale climate regime, their own contributions to global warming notwithstanding (Raman 2012). Such views quickly surfaced when green economy was endorsed by the UN General Assembly as a leading theme for the 2012 Rio+20 Earth Summit, as I describe below.

At national and sub-national levels, too, the application of green-economy logic can be politically charged. In PES schemes where market-efficiency standards determine who should receive payments, the results often reward the better-off more than the poor (Angelsen et al. 2012; Landell-Mills and Porras 2002; Lansing 2014). This is one reason why some governments, such as Mexico's, have resisted the use of exclusively market-based

[6] $I = PAT$ is meant to show that total human impact on the environment (I) can be calculated by multiplying population (P) by quantities indicating level of affluence (A) and technology (T).

criteria in the implementation of PES, to the dismay PES advisors affiliated with the World Bank (McAfee and Shapiro 2010). Opposition is also emerging at state and national levels and against regional carbon trade pacts such as those signed by US state of California with Acre, Brazil, and Chiapas, Mexico (MIU et al. 2013; REDD Monitor 2013).

Whatever the various motives of these state and civil-society critics, opposition to green economy and REDD+ should not be dismissed as mere political posturing or paranoia. The following two sections consider arguments and evidence from academic literature for the claims that carbon markets have the potential to deepen existing inequalities and that they are likely to be ineffective, or worse, against climate change.

5 Carbon markets, poverty, and inequality

Many analysts of carbon markets acknowledge that carbon trading, if not designed specifically to protect or reward the poor, can have inequitable consequences (Angelsen et al. 2012). Some contend that market-based REDD+ or any programs financed by offsets trading are inherently disadvantageous to those with little wealth or power.[7] Most businesses, brokers, and speculators will buy offset credits only insofar as such investments offer profit advantages over investments in other places or other activities. The profit opportunities that proponents hope will drive North–South carbon trading are derived from the fact that offsets can be obtained at less expense in poorer regions. In the language of orthodox economics, carbon credits in low-income countries are cheaper because opportunity costs—e.g., potential income lost if land is used for carbon sinks instead of crops or cattle—are smaller where prices of labor, land, and other factors of production are lower and life expectancies are shorter (Chomitz 2007; McAfee 2012). To its advocates, the market-based efficiency derived from this wealth difference is the great virtue of transnational carbon trade. To its critics, such trade merely shifts the costs of conservation from wealthier to poorer places and people.

Market-based allocation of conservation payments can reinforce inequalities at local and provincial levels, too. Market efficiency in the distribution of conservation funds, whether from public or private sources, requires that payments for carbon sequestration or other ecosystem services be made to those landholders whose decisions whether to conserve trees will be influenced by the payments. Project designers use estimates of opportunity costs to determine where to obtain ecosystem services, from whom, and how much to pay for them. Resource economists view opportunity cost as a neutral benchmark for determining the proper amounts and allocation of payments (de Janvry and Sadoulet 2006). However, the opportunity cost concept masks the power relations that determine *whose* opportunities are more or less costly and *whose* land-use choices shall prevail.

Moreover, whether funds for PES or REDD+ come from public grants, taxes, or carbon-market investments, it is more labor-intensive and therefore more costly to enroll many smallholders and monitor their compliance with project requirements than to pay a smaller number of larger-scale landholders. As institutional economists point out, there is an inverse relationship between the scale of a project and its transactions costs (World Bank 2011). It can also be more expensive to enroll less literate people, women who have multiple work obligations, and those who lack formal land-tenure credentials. In market-

[7] I have argued in more detail elsewhere that inequality is built into the framework and rationale for global carbon markets (McAfee 2012).

oriented PES or REDD+ projects, measures meant to facilitate participation of smallholders or the landless may therefore be ruled out on economic efficiency grounds. As one architect of World Bank PES policy has written, PES schemes 'cannot choose to promote particular land use practices solely on the basis of the poor being able to undertake them' (Pagiola 2007).

Middle-sector landholders, with more modest opportunities for profit but with the capacity and inclination to deforest, are seen as the most appropriate PES recipients (Wunder 2007, 2013). Payments to relatively wealthy 'stakeholders,' such as logging or mining operations or large-scale ranching or agricultural plantations, would typically be inefficient because the payments would need to be large enough to match the high opportunity costs of abstaining from such profitable activities. Yet these activities are major drivers of deforestation and wetlands loss (Kissinger et al. 2012). PES projects targeted to the very poor achieve relatively little in forest conservation gains: With or without payments, the poor usually lack the tenure rights, capital, or access to timber or agricultural markets that would enable them to engage in significant deforestation, so paying them would be economically inefficient (Chomitz 2007).

In the context of increased financialization of the global economy and rising prices of many food, fiber, and mineral commodities, forests and swamps are being reconceptualized as carbon sinks and peasant farm lands repurposed as biofuel and export-crop plantations (Akram-Lodhi 2012; Fairhead et al. 2012; Li 2010; Moore 2010). Along with anticipation of profits from carbon-market investments, this has accelerated the processes that critics call land grabbing—illegal or unjust acquisition of land by the economically powerful—and green grabbing: expulsions of forest dwellers and small-scale farmers for ostensible environmental goals (Fairhead et al. 2012). Projects carried out under the rubric of PES and REDD+ appear to be contributing to this trend (Beymer-Farris and Bassett 2012; Cavanagh and Benjaminsen 2014; RRI 2014; Rocheleau 2015). Even where land users are not evicted, they may face reduced access to sites of cultural significance, passageways, and sources of food, forage, medicines, and shelter materials.

Several multilateral organizations and NGOs have turned their attention to making REDD+ safer for the powerless and more beneficial to the poor. They are formulating 'social safeguards' to protect the human rights of peasant and indigenous communities, such as stronger criteria for certifying that people about to be affected by REDD+ have given their 'free, prior and informed consent' (Moss and Nussbaum 2011). But even if safeguards can be agreed and enforced, any version of REDD+ in which funds are raised by for-profit carbon trading and in which funds are allocated by market-efficiency criteria cannot prioritize payments to the poor. Conceivably, material aid and technical assistance through REDD+ could support sustainable farm and forest management practices and help to replicate them.[8] But to the extent that communities manage to obtain net social and environmental gains under such programs, it will be in spite of or instead of the market-efficiency model promoted by green-economy analysts.

Thus, markets in carbon have inevitable political implications at local, national and international levels, regardless of their intended scientific neutrality and regardless of whether their sponsors are guided by conservation efficiency or pro-poor goals.

[8] Whether these activities yield environmental benefits or social benefits may depend on the scale at which the question is posed and the circumstances under which such activities are carried out. For example, Shapiro-Garza (2011) reports that Mexico's national PES program has not led to dispossession in the areas studied and has benefited many participants, although not always in the ways envisioned by market-efficiency maximalists.

6 Green economy, development, and the paradox of growth

As noted in the beginning of this article, a central premise of green economy is that ecological degradation can be decoupled from economic growth. In the 1980s and 1990s, such hopes were bolstered by the idea that environmental Kuznets curves might spread from wealthy to becoming-wealthy societies, bringing greater material prosperity at lower ecological cost, while the rise of service-centered economies would result in some form of economic dematerialization (Lane 2014; UNEP 2011b).[9] The environmental Kuznets curve has turned out to be a mirage produced by blindness to the ways that apparent environmental gains in richer countries have been made possible by the 'outsourcing' of pollution and resource depletion to poorer world regions (Davis and Caldeira 2010). Energy intensity—the amount of energy used per unit of economic output and the material intensity of production—has declined substantially in advanced industrial countries over the past 30 years but without resulting in reduced GHG emissions, and even less so when 'embedded emissions' linked to goods imported from other regions are taken into account (Jackson 2011). Alongside increasing automobile transportation, much manufacturing, and the material use, waste and GHG emissions that manufacturing entails, has shifted to newer industrial regions (Dicken 2011).

In any case, because offsets are a form of permits to pollute, it is impossible for international carbon trading alone to reduce GHG emissions or even slow their rate of increases (Böhm and Dabhi 2009; Lohmann 2005). In any cap-and-trade system, it is the regulatory cap—what neoliberals might dub the 'command and control' part—that ultimately matters. The green-economy argument that carbon markets can mitigate global warming assumes that there will be enforceable limits on GHG emissions and that these limits will be lowered substantially. This would require a strong international regime adhered to by nearly all industrialized and industrializing countries. Some analysts of carbon markets hope that such a system can yet be established, or that perhaps even without it, the quest for offset credits will drive a virtuous cycle of investments in carbon sink conservation, alternative energy, and low-carbon industrialization (Newell and Paterson 2010). Some are convinced that green technological breakthroughs can be made lucrative enough to blunt opposition from politically influential petroleum, coal, auto, and other fossil fuel-dependent industries and their financiers (Funk 2014; Hamilton 2013).

But in a market-governed world economy, the profitability of such investments depends not only on incentive-creating regulations or subsidies but also on economic growth, without which market demand for new technologies will remain limited. The same applies to investments in carbon credits: In a context of less growth, GHG emissions would likely slow, as they did during the recent global recession, so that there would be less need to buy credits to offset them. But growth is not a problem for market-based green economy; the opposite is true. Not only does green economy depend on growth; it promises to revive stalled economic growth in Europe and worldwide (OECD 2009; WEF 2013; World Bank 2012b). Speaking in favor of a legally binding, market-oriented global climate agreement, European Commissioner for Climate Action Connie Hedegaard insisted that 'sustainability is at the heart of the EU's growth strategy' and that '[G]reen growth is THE way out of the economic crisis' (Hedegaard 2011).

[9] The environmental Kuznets curve idea predicts that economic development will be about greening. It applies a theory of economist Simon Kuznets, who proposed that industrialization results in decreased inequality after an initial period of increase.

This promise of greening for growth overlooks the implications of the Jevons paradox, or economic rebound effect. The Jevons hypothesis holds that in a market economy, increased efficiency in the use of energy and other production inputs will decrease costs of production, resulting in lower prices and more induced demand for what is produced, leading in turn to more rather than less use of energy and materials (Polimeni and Polimeni 2006; Sorrell 2009).[10] Given the myriad factors that affect rates of production and consumption, it is impossible definitively to prove or disprove the Jevons effect proposition. It is nevertheless reasonable to suppose that economic growth, even if spurred by efficiency-enhancing technological innovations, will entail substantially increased 'material throughput,' as advocates of 'steady-state' economics have argued for some time (Daly and Farley 2003).

Increased environmental damage linked to growth is all the more likely to the extent that decisions about what to produce, where, how, and by whom are determined overwhelmingly by the quest for profit, as they are today in most the world. This points to the inequality conundrum at the heart of green economy. Technological breakthroughs might make it possible, potentially, to meet more material needs with the same or less resource use, waste, and pollution. But this potential will be squandered in an highly unequal global economy where profit incentives channel investments toward increased production of goods—far beyond the levels necessary for comfortable, well-nourished survival—for those with purchasing power in the global economy, while the far greater number of people who lack that buying power are left wanting.

Meanwhile, the politics of global inequalities simmer below the surface of climate and biodiversity negotiations, boiling over when the interests of would-be developing regions seem to be at stake. At the Rio+20 summit, members of the G-77 negotiating bloc group voiced concerns that green economy would displace sustainable development as a global goal, saddle Southern states with new policy constraints, and erect additional barriers to Southern exports. Several Latin American delegations condemned the commodification of nature and decried green economy as 'environmental neocolonialism' (IISD Reporting Services 2012; UNCSD 2012). Yet the same governments refused to agree to proposed language in the Rio+20 declaration that noted the ecologically damaging effects of fossil fuels and called for reductions in their use (McAfee 2014). Even while they aim for modest social redistribution of wealth within their borders, the governments of Venezuela, Ecuador, Bolivia, and Brazil, among many others, pursue pathways of economic growth financed by ecologically unsustainable exports of primary agricultural and mineral commodities, including petroleum and natural gas (Grugel and Riggirozzi 2012; Yates and Bakker 2014).

In a global green-economy scenario, exports of ecosystem services would be added to the list of primary commodity exports on which the revenues of would-be developing countries have long depended. But earnings from commodity exports—from indigo, sugar, and cotton to rare earths, petroleum, and genetic resources—have yet to prove a viable basis for development that is ecologically sustainable and meets the needs of the majority (McMichael 2012). Instead, they have been the means by which the formerly colonized world regions have 'exported their sustainability' to wealthier, industrialized countries, giving rise to the myth of the environmental Kuznets phenomenon, in which greening appears to be the 'natural' outcome of market-based economic growth.

[10] The paradox is named after William Stanley Jevons, who argued in the 1865 that more efficient use of coal in the UK would not resolve worries about future coal scarcity.

7 Beyond green economy

Green economy aims to lift international climate policy above politics to a politically neutral realm where economic reasoning and ecological science hold sway (Swyngedouw 2011). Because carbon trading does not directly challenge existing patterns of consumption or the distribution of wealth and power among nations, it appears as if this approach can slow global warming without major 'lifestyle' sacrifices or confrontation with powerful vested interests. Daunting political choices can be set aside in favor of measures to bring 'natural capital' into the global marketplace. The linkage between environmental crisis and economic growth can be or ignored, or even interpreted as a net positive.

Advocates of international carbon markets, an archetypal application of green-economy logic, promise a 'triple-win' solution for business, nature, and humanity. However, while policies to cap, tax, and otherwise regulate GHG emissions are urgently needed, there are well-grounded reasons to doubt that transnational carbon-offset trading can achieve significant reductions in atmospheric GHGs, much less the combined conservation and development gains envisioned by many green-economy thinkers. The troubled record of PES in practice illustrates that living ecosocial systems, no matter how minutely measured and disaggregated into fungible financial assets, do not fit the requirements of market contracts. Recent case studies point to the danger that PES and REDD+ will be implemented at the expense of politically marginalized communities. Flagging carbon markets make it less likely that for-profit investment will be a major source of finance for programs such as REDD+.

The contradictions of market logic, practical problems of market-based conservation, and the paradox of economic growth point to the inability of green economy to cope with the multi-crisis of capitalism. If, as many green-economy skeptics believe, the causes of climate change are both deeply structural and ideological, in the sense that they arise from unfettered, market-driven growth and from the ideas and institutions that maintain vast global inequalities, then more radical responses are called for. It is in this context that counter-discourses to green economy are germane to the climate-change challenge and the broader debates about nature, economy, and development.

One of these streams of thought, arising mainly from Europe, is degrowth, or *decroissance*, *decrecimiento*, *decrescita*, *decreixement*, *Postwachstum*, etc. (D'Alisa et al. 2014; Latouche 2009; Martínez-Alier et al. 2010; Muraca 2012; Paech 2012). Drawing variously on earlier work of Gorz (1968) and Illich (1973), the ecological economics of Georgescu-Roegen (1971), and old and new feminist insights (Pérez Orozco 2014), its advocates dispute the conventional consensus that economic growth is the *sine qua non* of human progress and reject the foundational premise of neoclassical economics that consumption is the ultimate purpose of economy activity.[11] They call for 'a downscaling of production and consumption that increases human well-being and enhances ecological conditions and equity on the planet' (Research and Degrowth 2011). Degrowth as a political-intellectual project both influences and is influenced by anti-capitalist or 'post-capitalist' ideas and new social movements that have spread in the global North in the wake of the 2008 financial crisis (Gibson-Graham 2013).

From the global South, another critique of green economy and the growth imperative has emerged under the rubric of *buen vivir*: 'living appropriately' or 'living well together'

[11] As Adam Smith wrote, 'Consumption is the sole end and purpose of all production; and the interest of the producer ought to be attended to, only so far as it may be necessary for promoting that of the consumer.' (Smith 1910 [1776]).

(Acosta 2008; Gudynas 2011). First articulated by Latin American rural and indigenous social movements and their supporters in academia, buen vivir is linked to indigenous concepts such as *suma qamaña* (Aymara), *sumak kawsay* (Quechua), *ñandereco* (*Guarani*), and *lekil kuxlejal* (Tseltal and Tsotsil Mayan). Its proponents have emerged from or been inspired by struggles against dispossessions and threats to livelihoods from modernizing mega-development projects and top-down conservation agendas perceived as penalizing the poor. Movements espousing buen vivir reject export-driven development in favor of endogenous strategies aimed at ecosocial sustainability, greater reliance on domestic food production, and reduced dependence on mineral resource extraction and external sources of capital (Lang et al. 2013). Buen vivir now appears in the constitutions of Ecuador and Bolivia and is frequently invoked by their governments, albeit more in rhetoric than practice (Radcliffe 2012).

In common with discourses of *lok swaraj* or *aparigraha* in India, or *ubuntu* in South Africa, buen vivir stresses the practical value and moral validity of local and indigenous epistemologies and practices, plurality of ways of being and knowing (*diálogos de saberes*), and relational ontologies in which humans, other species, and the biophysical world are coequal and dynamically interdependent (Escobar 2010; Salleh 2011). 'Nature becomes part of the social world, and political communities could extend in some cases to the non-human.' (Gudynas 2011). Buen vivir connotes values and measures of well-being that are material as well as social but that cannot be reduced to monetary prices and may not be quantifiable or commensurable across places and cultures. It rejects the construction of ecological limits as absolute scarcity, even while recognizing the existence of biophysical limits to *how* people, communities, and countries can develop themselves.

Are degrowth and buen vivir two distinct visions for two separate worlds? Some critics contend that degrowth has little relevance for the South, where the 'right to development' must take precedence and where development requires economic growth. Some assert that buen vivir is a utopian dream that connotes a lost, pastoral past and cannot address the crises of urban, industrial societies. I argue that both approaches not only grasp the inherent destructiveness of limitless, market-driven growth but also raise vital questions about human–nature relations, the purpose of 'the economy,' and the sources of sustenance, value, and meaning in ecosocial systems anywhere. Two decades of all-but-futile climate negotiations have shown that global warming cannot be managed by means of technocratic expertise and commodification of nature, nor can it be dealt with separately from the problem of development and without confronting the paradox of growth. If this is so, then the critique of green economy and these new conceptualizations of 'the good life' merit our attention.

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