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The implications of environmental trading mechanisms on a future Zero Net Land Degradation protocol

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ABSTRACT

Despite many important success stories around the planet, there is general disappointment at the overall impact of the United Nations Convention to Combat Desertification (hereinafter: UNCCD) during its first 20 years, with soil degradation still a challenge for land managers throughout much of the world's drylands. Calls for a new protocol under the UNCCD that will ensure "Zero Net Land Degradation" (ZNLD) have gained momentum since the tacit endorsement of the concept at the 2012 Rio + 20 summit. There is great conceptual appeal to a framework that implicitly allows for development by balancing associated soil fertility loss with commensurate gains resulting from restoration activities. Trading programs which seek to reach "zero net" degradation of other natural resources have been in place for many years now internationally and offer an important basis for assessing the practical and theoretical problems that are likely to arise under a ZNLD framework. This article summarizes the relevant experiences garnered in "offsetting" regulatory schemes in the areas of wetland preservation, biodiversity, forestry, greenhouse gas emissions mitigation, real estate zoning, and conventional air pollution control. While many of these initiatives take place in environments with completely different climatic conditions, they offer important lessons for ZNLD advocates. Pitfalls in offset programs are identified in the areas of: *reliability of trades*; *clear quantifiable units of measure*; *equivalence given land heterogeneity*; *and delayed benefits*. The article contains a series of recommendations for land degradation offsets based on this diverse international experience. Proven implementation strategies should inform any future ZNLD policies as part of national and regional regulatory programs to combat desertification and arid land soil degradation.

1. Introduction: Zero Net Land Degradation in the context of environmental offsetting policies

On July 27, 2012, the U.N. General Assembly approved the fifty-three page declaration, "The Future We Want," negotiated at the recent Rio+20 summit on global sustainability: (U.N. 2012). Buried in section 206 of the sweeping vision and prescriptions for a healthier planet, in the chapter addressing *Desertification, land degradation and drought*, is a single sentence that represents tacit international approval for an entirely new strategy to combat desertification. After some resistance, the merits of a Zero Net Land Degradation (ZNLD), a strategy advocated by the UNCCD Executive Secretary, was thus acknowledged: "We recognize the need for urgent action to reverse land degradation. In view of this, we will strive to achieve a land-degradation-neutral world in the context of sustainable development" (United The United Nations, 2012).

In so doing, the international community embraced a more pragmatic approach to the vexing conundrum of land degradation in the drylands. A ZNLD strategy implicitly recognizes the failure of existing programs to abate the massive global trends in land degradation. Today roughly one-quarter of all lands on earth (Bai et al., 2008) and some 40% of croplands are affected by soil erosion (Foley et al., 2005). The UNCCD was designed in the hope that countries could rely on voluntary programs that employed a "bottom-up" strategy that would be driven by international assistance from "non-affected" developed countries to "affected" countries that lacked the resources to implement a clear National Action Program. After twenty years, many reasons can be given as to why the UNCCD has failed to achieve meaningful progress at the global level among countries affected by desertification. On the one hand, affected countries have not provided the "top-down" guidance that land managers and farmers needed to prevent land degradation (Tal, Gordon, 2010). The UNCCD was not successful in facilitating the integration of its objectives into existing or new national development plans whose provisions may even exacerbate the problem of land degradation (Stringer, 2008). Financial

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mechanisms created by the convention and subsequently by its Secretariat and those initiated by the affiliated Global Mechanism program were never sufficient to fund the necessary investment in land restoration (Tal and Cohen, 2007). Finally, the overall strategy articulated by the UNCCD includes land restoration, but in fact, the convention creates little incentive for countries to focus resources and regulatory attention on the potential to renew degraded lands.

The ZNLD approach accepts the inevitability of additional desertification in the future that will be driven by the development that a growing population and economic expansion invariably produce. However, it addresses many of the shortcomings of existing UNCCD dynamics. To begin with, it creates a framework in which "development" and its implicit, associated economic benefits are linked to restoration commitments, presumably including financial commitments. There is an assumption that in order to reach an equilibrium state of degraded and restored lands, more prescriptive oversight will be required. Finally, the ZNLD's underlying orientation is also sanguine regarding the ability of restoration programs to rehabilitate soil integrity and improve land fertility (Tal, 2009; UNCCD, 2012).

For some time, the newer science of ecological restoration and the more traditional knowledge about rehabilitation and sustainable range management in arid and semi-arid regions have begun to inform land management strategies (Aronson et al., 1993). The results are impressive. For example, soil organic compounds typically increase by 35% as a result of reforestation and afforestation on cultivated lands in the drylands (Johnson, 1992). Accordingly, the ZNLD calls on countries to restore already degraded lands in order to ensure that the overall amount of degraded lands does not increase (UNCCD, 2011).

Zero net loss environmental strategies are no longer uncommon in myriad environmental policies adopted around the world. These programs implicitly embrace a flexible perspective that allows for the modest future losses of a natural resource to accommodate development as long as they can be "offset" by comparable or even greater restoration benefits. Programs exist on the state, regional and global level and are a sub-set of a growing number of ecological trading policies that have been called a "new economy of nature"(Daily and Ellison, 2002). These initiatives are alternatively called "mitigation programs" (U.S.) or "compensation programs" (EU).

The first country to adopt such an approach in addressing a conservation problem was the United States as it sought to address the steady disappearance of wetlands. By 1984, some 54% of U.S. wetlands had disappeared with considerable ecological ramifications (Robertson, 2000). Among the key ecosystem services provided by wetlands are flood control, filtration, nutrient reduction, wildlife habitat and recreation. In 1989, the U.S. federal government established a general policy through the enactment of amendments to Section 404 of the Clean Water Act (33 U.S.C. § 1344). While far from perfect, the system has contributed to stemming these negative trends and transforming large swaths of land into new or restored wetlands (National Research Council, 2001). The policy set out to balance any future loss with wetland mitigation and reclamation so that the total area of wetlands would either remain constant or increase. Even though 70% of wetlands are privately owned, in cases where damage to wetlands appears unavoidable due to infilling or draining, developers are required to "mitigate" the impact by enhancing alternative lands or replacing them (Zedler, 1996). While wetlands are characterized by a surfeit of water and stand in contrast to arid lands that face perennial water scarcity, the two ecosystems have similarities. Like dryland ecosystems, recreating wetlands or establishing new habitats, under a trading program with ecological integrity, is a long protracted process that may take many decades.

Since the inception of this initial offsetting program, additional "Zero Net Loss" frameworks have been employed in a range of environmental media. Forests are among the planet's most renewable resources with ecosystem services and natural grandeur restored after massive deforestation in America (Clawson, 1979), as well as in drylands across Israel (Tal, 2013). It is not surprising that forestry policies have also begun to apply no-net-loss methods: for instance, New Jersey requires replanting when trees are removed during development projects involving one-half acre or more; Maryland's *No Net Loss Reforestation Act* is based on a similar offsetting strategy (Maryland, 2009; New Jersey, 1993). Israel's forest agency has informally implemented a similar zero-net loss commitment.(KKL, 2013). Brazil has also adopted a "no net loss of habitat policy" which sets a minimum vegetative cover according to region (Brazil, 2001). Consequently, the Amazon Forest region has an eighty percent minimum cover standard, while the Amazon Savannah has only thirty-five percent (McKenney and Kiesecker, 2010). Clearly, the more arid the land, the more dispersed the tree cover should be in order to ensure sufficient water from reduced precipitation.

Fisheries are also given to "no-net-loss" frameworks. The Canadian Department of Fisheries and Oceans has enacted a long-term policy of requiring: "an overall net gain of the productive capacity of fish habitats" in its licensing program. Progress toward this objective is to be achieved through the active conservation of the current productive capacity of habitats, the restoration of damaged fish habitats alongside the development of habitats" (Canada Fisheries Act, 2012).

In the early 1980s, academics began to advocate the concept of "Transferable Development Rights (TDRs) as a market-based approach to land conservation (Carpenter and Heffley, 1981; Mills, 1980;). The models proposed that development rights be transferred from one property to another while establishing conservation easements (development restriction) as compensation on the former. Higher density and economically optimal real estate development is enhanced, relative to the outcomes in existing inflexible zoning regulations. These systems are conceptually and functionally similar to the ZNLD mechanisms envisioned – even as the context is completely different.

Offsets are typically attained under statutory frameworks through formal or informal permitting procedures that allow development that leads to clearance of natural ecosystems and habitats, contingent upon alternative habitat being preserved or created with a comparable conservation value. Germany was the first country to adopt an "offset program for biodiversity," implementing its Eingriffsregelung policy as early as 1976. Biodiversity impacts from development are assessed with regards to the entire affected ecosystem, estimating their capacity and the impact on natural scenery. The policy stipulates that any offsetting take place in two locations containing the same ecological habitats. In 2010, the program was expanded to allow for "habitat banking," even as voluntary banks had already been established. All sixteen of the Länders (German states) have already adopted local legislation which reflects different approaches to calculating damages and associated costs (Bakker, 2012). France and Sweden have also begun to integrate no-net-loss biodiversity programs into their national strategies (UK, 2011). A variety of regulatory programs have been established in the Australian jurisdictions, with a particular focus on offsetting any clearance of native vegetation (New South Wales, 2007). It is worth noting that the Australian programs are ambitious and typically go beyond replacement, calling for "net gains" in native vegetation (Victoria, 2002; Western Australia, 2006).

Globally, the Kyoto Protocol of the UN Framework Convention on Climate change contains several trading mechanisms. Perhaps the most prominent one is the "Clean Development Mechanism"