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Review

Fertile ground? Options for a science–policy platform for land

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ABSTRACT

The United Nations Convention to Combat Desertification (UNCCD) remains the only 'Rio Convention' that is not well served by the scientific community and lacks the equivalent of an IPCC (Intergovernmental Panel on Climate Change) or the proposed IPBES (Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services). The mounting pressures on land (and water) that can drive its degradation include population growth and associated food security concerns, over use, creeping degradation, competition between agriculture and renewable energy production, carbon sequestration and land acquisition by foreign entities. These environmental and human pressures clearly require urgent policy attention. We report the results of a survey of the scientific community on the need and possible options for a science–policy platform that focuses on land. The paper then describes the remit and role of an independent platform, the benefits and possible modalities that are inclusive and build on existing institutional structures. Both short-term and longer term options are presented that can respond to immediate needs while establishing a mechanism that can handle the interacting and sometimes overlapping aspects of land covered by other Multilateral Environment Agreements (MEAs). Short-term options include establishing a platform via an *ad hoc* working group within the proposed IPBES that would feed its outputs into the UNCCD and other relevant MEAs. Long-term options include a more polycentric approach, establishing a network of networks that could evolve into a fully-fledged Independent Platform on Land Degradation given sufficient support, interest and leadership from the international and donor communities.

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1. Introduction

The need for global action to mitigate and adapt to the detrimental effects of climate change, loss of biodiversity and degradation of land and water resources is widely recognised (e.g., Ostrom et al., 2007; Stringer et al., 2009). These challenges have an impact on millions of livelihoods and on ecosystem services and functioning, presenting threats both at present and into the future. An improved scientific understanding of how human and ecological systems are reacting and how they will behave in future under these mounting pressures can help society to mitigate and adapt to these adverse changes (e.g., MEA, 2005; Reid et al., 2010; Pretty et al., 2010). Such evidence-based information has proven influential in helping to inform policy makers of, for example, future trends in the provision of services from ecosystems that humans depend on for their existence and the economic costs of taking or not taking preventive or remedial actions (Watson, 2005; Stern, 2006; IPCC, 2007; Parry et al., 2009; TEEB, 2010). The establishment of intergovernmental but scientifically independent bodies such as the IPCC and the plans to establish an IPBES (www.ipbes.net; UN-GA 65, 2010) are considered appropriate mechanisms to guide policymakers' considerations of scientific evidence that is credible, relevant and legitimate. Even so these and other advisory bodies are not without their problems (e.g., Watson, 2005; Koetz et al., 2008; Leemans, 2008; Nature, 2010).

Land and water are under enormous pressure from population growth and associated food security concerns, from over use, sealing, creeping land degradation and competition between food and biofuel production, land used for conservation, and increasing policy drives towards carbon sequestration in forests, among others (e.g., Blum, 2009; Cai et al., 2011). As much as 2 billion ha of agricultural land has already been degraded losing up to $40 billion worth of production annually from soil erosion alone (UNEP, 2010). Globally arable land per capita has decreased from around 0.5 ha in the 1960s to a predicted 0.15 ha per capita in 2050 (e.g., FAO, 2011). By 2030 about half of the world's population will be living with high water stress, with anywhere from 24 to 700 million people at risk of being displaced (WWAP, 2009). Drivers such as climate change will affect potential land use patterns especially in the more marginal rainfed areas where cropping is precarious and where poverty is already widespread (e.g., Jones and Thornton, 2008).

Protecting 17% of the world's land surface by 2020 was an agreed target at the UN Biodiversity meeting in Nagoya (CBD COP 10, 2010). This means that in the short to medium term, 83% of land worldwide will continue to be exposed to human influence and, thus prone to land degradation unless appropriate measures for sustainable land management (SLM) are introduced. Growing populations with their demand for food, fibre, raw materials and energy, will require some 6 million ha of land to be brought into production every year up to 2030 to meet their needs under current productivity levels (World Bank, 2010). This demand together with the current and 2007/08 leap in food prices has led emerging economy countries to search for ways to access land beyond their own borders in order to augment their food, water and other resource supplies including biofuels (e.g., Cotula et al., 2009).

Termed 'land and water grabbing' by some, these developments can bring both positive and negative impacts to those countries whose land is subject to foreign interest (Cotula et al., 2009). If the current unregulated situation continues, such acquisitions could result in the displacement of local populations and the undermining of their livelihood strategies, further aggravating their sovereignty in food and water. Subsequently there have been calls to establish a set of principles for responsible governance, enabling institutions and investments in land (e.g., FAO/IFAD/UNCTAD/World Bank, 2010). These issues call for a careful appraisal of land and water management in the context of supply and demand considerations, to ensure that land potential is not overstretched resulting in degradation that if severe enough, can be practically irreversible. In addition care has to be taken to ensure that the rights of current land users are respected during any change in land use and management (e.g., UN-GA-65, 2010).

The global scientific community has been active in determining the causes and extent of land degradation and in developing resource management, market and institutional options to combat it (Ruben et al., 2007; Winslow et al., 2011). Recent efforts have focused on the corollary to land degradation, sustainable land management (SLM) in order to halt and reverse land degradation and inform decision makers on options to ensure that land remains productive (WOCAT, 2007; Liniger et al., 2011). Increasing the focus on more sustainable land management and linking this to efforts to value ecosystem services is more likely to attract investors in land than an over emphasis on land degradation. However little effort has been made to date to determine '*what is the added economic value of better land management*' (UNCCD/GIZ, 2011, p. 8). Similarly, current investigations focus not only on the costs of actions that can mitigate land degradation, but also consider the costs of inaction (Requier-Desjardins et al., 2011).

Despite these developments and the existence of the United Nations Convention to Combat Desertification (UNCCD, 1994) with its focus predominantly on drylands, land continues to be used unsustainably. A lack of adequate channels to feed scientific information into this international policy arena has been suggested as one factor holding up progress towards SLM (Bauer and Stringer, 2009; Grainger, 2009).

Some aspects of land use and management are covered by the UNCCD's sister conventions, the United Nations Framework Convention on Climate Change (UNFCCC) and more recently by the push to link biodiversity with the provision of ecosystem services under the Convention on Biological Diversity (CBD). However more land is under agriculture than forestry and while agriculture can make a contribution to mitigation of greenhouse gas emissions (Negra and Wollenberg, 2011) it remains a relatively neglected and problematic aspect in discussions of the UNFCCC (UK Government Office for Science, 2011). Assessments of the global water crisis and solutions have also appeared (e.g., Comprehensive Assessment of Water Management in Agriculture, 2007; World Water Assessment Programme 2009; Water Resources Group, 2009). Each of these agreements and assessments are underpinned by state-of-the-art scientific knowledge. However, as indicated above, land remains a subsidiary rather than a central concern.

Care of the land is fundamental to human existence both now and into the future and is intimately linked to growing food,

Table 1 – Results of an electronic forum.

Question	Response (% of total answers)
1. What is the current impact of scientific research on LD on policies in your country?	Weak (58%)
2. What is the impact of scientific research on LD on policy at the global level?	Weak (55%)
3. How strong is the need for better information on LD as a contribution to better environmental management?	Very strong (62%)
4. In your opinion can scientific activities in the field of LD lead to increased awareness of the issues in environmental policy?	Very strong (39%); strong (42%)
5. What scientific objectives do you foresee a platform on LD addressing?	Land degradation and development (23%); land management options and expected benefits (19%), economic assessments (17%)
6. What scientific scope should such a mechanism have?	Land degradation in drylands (37%); broader land issues (47%)
7. What key scientific activities should a platform support at the local, national, regional or global scales?	Regular assessments and summaries for policy makers (19%), knowledge management (18%)
8. What is your opinion about the establishment of a platform?	Essential (66%)
9. In your opinion such a mechanism: would require (a) an intergovernmental panel, (b) Should operate within existing frameworks, (c) Could function informally, (d) Could be done under a UN organization, (e) Should become part of a new UN environmental organization, (f) Other option	Would require a specific intergovernmental panel (31%)

water and energy insecurity and livelihood issues that have been factors in recent civil unrest particularly in developing countries (Bob, 2010; Bora et al., 2011). A strong voice in international agenda setting that can take land issues forward and bring the necessary policy attention at the country and more local level is nevertheless lacking. While a variety of supra-national agreements on land and soil exist (e.g., Council of Europe, 1972; World Bank-FAO, 1996; IUCN, 2001 and others cited in Stringer, 2008), it is the UNCCD that has the most comprehensive international political backing. The UNCCD must, however, develop a broader geographical focus to encompass all ecosystems and climatic zones if it is to lose its perceived marginality through its focus on drylands (Stringer, 2008; Adeel et al., 2009).

These pressures on land suggest that there is an urgent need to focus on global land use and management in a broader context and to overcome the narrow attention paid to land in efforts to combat climate change and preserve biodiversity and beyond the limited dryland focus of the UNCCD. The scientific community then has a vital role to play in raising awareness, assessing the current situation and developing future scenarios to inform policy options based on state-of-the-art scientific assessments.

Despite this urgent need, models and options for a science–policy platform on land have not been elaborated within the scientific literature (e.g., Johnson et al., 2006). This paper presents the results of an electronic forum held in 2010 that canvassed the scientific community on their opinions on the need, usefulness and options for, an independent, international, interdisciplinary scientific advisory body on land issues. Based on these results we then outline the role and potential benefits of a scientific platform that would raise public awareness of the issues and provide independent policy advice on how the planet's land and water resources could be better stewarded and protected both now and in the future. We then draw on experiences from the IPCC and the proposed IPBES to outline key principles of operation that the platform could adopt. The role of scientific and policy actors in constituting and commissioning the platform and its services is also considered. The paper concludes by discussing potential options and structures for a platform that can promote land issues and considers how it can act as a vehicle to help channel scientific information into MEAs.

2. Methodology and statistics for the e-forum

An independent voluntary electronic consultation or e-forum was conducted during January–June 2010 to explore the need for, and role of, a scientific platform on land. In order to enable the global scientific community to participate, various existing channels of scientific networks and projects as well as international programmes were contacted. Scientific and technical correspondents of the UNCCD were invited to participate, as were experts from the IPCC and IPBES initiatives. Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs) were requested to participate via their networks. Access to the questionnaire was via a registration process in order to (1) avoid abuse of the system and (2) categorize the information provided by the participants on the basis of (a) UN Annex regions,[1] (b) country and (c) institutional affiliation so that the data was amenable to detailed statistical analyses (see Oldeland, 2010). According to the format of the nine questions (see Table 1), participants could either select one or multiple answers. Respondents could either selectively respond to some questions and exit or respond to all questions. Each question ended with an optional comment box, where participants could elaborate on their decision in their mother tongue and in unlimited length. The comment box was enthusiastically used and provided useful insights into the reasoning behind the selected answers. Although set up in English, elements of the e-forum (e.g., the introduction) were also provided in French and Spanish in order to support access by the global scientific community.

After termination, the questionnaire data were statistically analysed and visualized (Oldeland, 2010). Questionnaire text files were downloaded from the e-forum's website and transformed into Excel spreadsheets for statistical analysis. Participants to the e-forum were classified into UNCCD's Annex categories (see http://www.unccd.int/regional/menu.php) on

[1] UN Annexes; I Africa, II Asia, III Latin America and the Caribbean, IV Northern Mediterranean, V Central and Eastern Europe, http://www.unccd.int/regional/menu.php.

the basis of the geographical location of their institutional affiliation. Countries not listed in the Annex were treated as Not Affected (NA). Although the e-forum was principally addressing the international scientific community, other stakeholders also participated. Thus, the affiliation of each participant was classified and defined as one of the following: European Commission, Development Agencies, UN Agencies, No Affiliation, NGO/CSO, National Research Institute, International Research Institute, Ministry and University.

Statistical analyses were done on the basis of:

1. The total number of participants and countries for (i) the whole questionnaire and (ii) for each question.
2. The number of votes in absolute numbers and in percent, for each question in each of the following categories: (i) Annex, (ii) country and (iii) institutional affiliation.
3. Analyses of similarity in voting behaviour based on (i) Annex, (ii) country and (iii) institutional affiliation. A Yes/No (One-Zero) matrix was assembled for this step, showing which question the participants have answered with yes or no. A Principal Coordinate Analysis using a "Binary distance" metric was used for visualizing patterns (i.e., clustering of points) in the voting behaviour at the levels of (i) Annex regions, (ii) countries or (iii) institutional affiliations. An ANOSIM (Clarke, 1993), which is a multivariate analysis of similarity, was conducted using Annex, countries and institutional affiliations as grouping variables. Significant ANOSIM values larger than 0.5 indicate a grouping structure in the data. The results indicated that voting behaviour did not depend on any grouping. In a final step the data was visualized via graphs (Oldeland, 2010).

3. E-forum findings

3.1. *Exploring the possibilities for a scientific platform on land: results from an international e-consultation*

From a total of over 300 registrations, 172 participants responded from 52 countries (Fig. 1). Responses were received from a range of institutions including national research institutes, ministries, universities, non-governmental organizations, and development agencies. A multivariate rank-based analysis of variance showed that there were no differences in trends of the responses across UNCCD regions, countries or institutional affiliations.

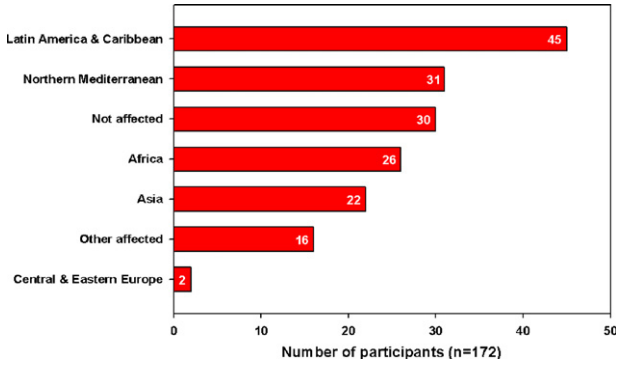

Fig. 1 – Total number of participants per UN Annex groups (Oldeland, 2010).

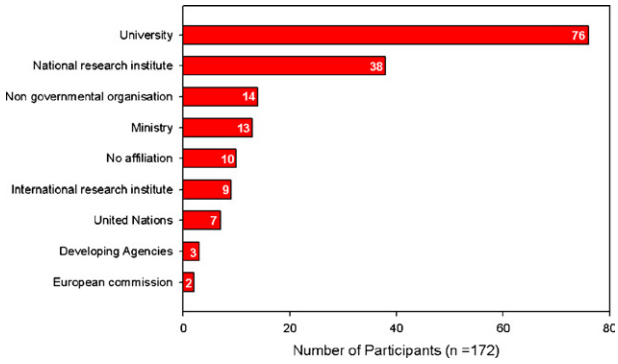

Fig. 2 – Number of participants per institutional affiliation (Oldeland, 2010).

Fig. 2 demonstrates that there was a clear bias towards participation from universities (44% of the total participants).

The questions posed and a summary of the replies are presented in Table 1. There was a strong perceived lack of impact of land degradation research at national and global policy level but a realisation that the potential impact was great and could be facilitated by the establishment of a scientific platform, improved communication and public awareness. A majority of respondents opined that efforts should be directed to land degradation globally and not confined to drylands (Table 1). The preparation of assessments and summaries for policy makers that can contribute towards improved knowledge management headed the responses to questions on the types of activities that such a platform could undertake. The establishment of a specific inter-governmental panel or platform received strong support but significantly no clear opinion emerged as to how a platform should be formulated, whether it should operate as a new entity or if it should be associated with other current scientific panels such as the IPCC and the proposed IPBES. For example, 31% stated that a specific intergovernmental panel on land was needed but 17% asserted that it could function informally with 14% responding that the panel should be established within existing frameworks. From a developed versus developing countries perspective, we noted that the order of preferences differed. Developed countries and countries with economies in transition had the following order of preferences: 31% – specific Intergovernmental Panel; 19% – within existing frameworks; 17% – informal; 13% – under an organization in the UN system; 11% – under a new UN Environmental Organization. Developing countries also preferred the Intergovernmental Panel option but were not as supportive of existing frameworks and were evenly split on the other options: 30% – specific Intergovernmental Panel; 18% – under an organization in the UN system; 18% – under a new UN Environmental Organization; 17% – informal; 10% – within existing frameworks. This further supports the case for a panel by demonstrating that in those areas where land challenges are most acute, existing frameworks are not seen to be an effective solution.

While Latin America was the region that indicated most support for the panel, comments in Spanish indicated that the function needs to be addressed before the form. There was no overwhelming preference among the Asian countries, except that they did not support the use of existing frameworks. The

African region was split between an Intergovernmental Panel and an informal system as their first choice. The Northern Mediterranean countries supported an informal system more than other options.

There are clear political considerations that would need to frame the operational side of the platform and these are discussed below with regard to questions such as how a platform could be resourced, commissioned, etc.

4. Role of a platform on land

The call for better organization of scientific information on land more generally has been suggested previously (ICLD3, 2002; Vlek, 2005; WBGU, 2005; Grainger, 2009; UNU-INWEH/DSD/DNI, 2010; Akhtar-Schuster et al., 2011) and is currently being examined by the Committee for Science and Technology (CST) of the UNCCD (CST, 2010). Overall, the justification for a panel on land is similar to that proposed for biodiversity (e.g., Larigauderie and Mooney, 2010) and includes the need for:

1. better interdisciplinary scientific understanding of the complex interactions between ecosystems and human well being, especially agricultural ecosystems that dominate global land use (e.g., Swinton et al., 2007) and the links between land degradation and food security (Stringer, 2009);
2. better dialogue and information exchange between scientists, practitioners and policy makers for the achievement of sustainable land management;
3. examination of trends and future scenarios of land use to better assess risk and foster better land management;
4. bringing together the dispersed information and effort within the scientific community under an agreed set of well defined objectives for sustainable land management;
5. intergovernmental cooperation to ensure that scientific information responds to demands thereby increasing its legitimacy and increasing the likeliness of its use and to ensure it captures the full range of drivers and pressures on land and water resources;
6. a label or 'brand' for better public awareness;
7. a platform to help generate the required urgency of actions to address the pressing problem of land degradation;
8. fostering the up- and out-scaling of best practices and lessons learned;
9. facilitating the management of degraded systems to deliver ecosystem services (if not all of the original ones).
10. better understanding of the decision making and knowledge needs of land managers at the operational level and a better fit between these needs and scientific advice.

5. Potential benefits of a land platform

The benefits of such a land platform are not limited to the UNCCD but could be harnessed in the implementation of other MEAs that consider land as a subsidiary concern. For example the platform could contribute to the further understanding of the role of agriculture and land use change on greenhouse gas emissions (UNFCCC), the effects of land use change on biodiversity (UNCBD) and the conservation and sustainable use of wetland habitats (Convention on Wetlands of International Importance or Ramsar).

The platform would deliver benefits to scientific research through greater cooperation and to other stakeholders involved in land issues by facilitating multi-stakeholder dialogue. The types of benefits a land platform could deliver to MEAs are that it may:

- Serve as a clearing house for ongoing and periodic assessments of global land degradation, its impact on environmentally sustainable management of soils and water resources. Linked to this the panel could provide options to policymakers for regulatory management strategies.
- Assess and synthesize the global scientific, technical and socioeconomic information relevant for understanding the risk of human-induced soil and water quality change and show the pivotal role of soil, water and land use in ecosystem services at all scales.
- Holistically consider a range of land use and management issues, as related to environmentally sustainable development, food security, poverty alleviation and multilateral environmental agreements.
- Provide 'plural and conditional' advice to national, regional, and global decision makers in developing policies to assess, monitor, and mitigate negative impacts of land use.

Benefits for the scientific community include:

- Harmonization of approaches and methodologies for land degradation monitoring and assessment.
- More comprehensive collation of scientific studies improving the possibility to derive consensus on lessons to be learned from land degradation studies. This can then lead to the identification and prioritization of gaps in knowledge.
- Stimulation and encouragement of more interdisciplinary discussions on land degradation and water supplies.
- Establishment of a consensus on the types of integrated science that need to be done and the institutional arrangements that would be needed to support it (for example, in terms of research funding priorities, networking, etc.).
- Stimulation of improved knowledge management and the creation of knowledge management systems.
- Development of a unified independent, international and interdisciplinary voice for the submission of scientific advice on land degradation to stakeholder groups.
- Ensuring relevance, credibility and legitimacy of scientific advice on land degradation.
- Promoting synergies and complementarities between the scientific aspects covered by the different Panels and Scientific bodies of the 3 Rio Conventions and beyond.

Benefits for supporting multi-stakeholder dialogue within a platform mechanism are that it could:

- Increase public awareness of land and water degradation issues.
- Help to bridge science and policy and to promote advocacy for mainstreaming sustainable land management into government policy.

- Encourage the discussion and debate of scientific issues involving a broad range of stakeholders (scientists, civil society organizations, International organizations, policy makers).
- Help to identify synergies among the UN environmental conventions and inform the development of appropriate institutional infrastructure to enhance collaboration between them.
- Contribute towards the creation of a long-term and continued 'think tank' to interface with policy makers.

6. Establishing a new platform: some principles

Following the results of the e-forum we propose that the main objective of a scientific platform on land issues would be to inform the development of policy options on the sustainable use of land and water resources and the reduction of further land degradation. Policy options would be determined and achieved by providing internationally agreed, scientifically rigorous assessments of the available and accessible cutting-edge biophysical and socio-economic information on land and water to the UNCCD and other MEAs. This would be similar to the role played by the IPCC in meeting the aim of the UNFCCC to stabilize greenhouse gas concentrations in the atmosphere and the proposed IPBES' role in helping the UNCBD to achieve its aim of conserving biological diversity.

Just as the IPCC and proposed IPBES follow a similar logic of (1) research, (2) observation/monitoring, (3) assessment and (4) policy advice and formulation (e.g., Larigauderie and Mooney, 2010), the proposed land platform would focus on assessment and policy advice and would not undertake any new research or observation/monitoring. Its functions should however create a positive advocacy in science–policy dialogues on land, thus linking land issues with food and water security as well as improvement of human livelihoods in all lands affected by degradation and not just drylands as articulated by the UNCCD. Socio-economic, political and ecological links to and interactions between other biomes should be outlined and addressed because (1) the interconnections are evident (e.g., Nkonya et al., 2011), and (2) the discussion on the needs and options for a platform on land will require global commitment as developing countries, who are experiencing the brunt of land degradation, are unlikely to achieve this on their own. Improving the enabling environment for investments in land, strengthening value chains, and creating incentives to implement sustainable land use and management strategies at the local level should receive more attention (Akhtar-Schuster et al., 2011; Winslow et al., 2011). This can however only be achieved if the underpinning research needs are integrated and involve multiple stakeholders (Reed et al., 2011), and research funding agencies at the national level create incentives for multi-stakeholder interactions in the areas of research, development and implementation (Chasek et al., 2011). As one respondent stated such considerations would help reduce the risk of creating a 'group of scientists talking to themselves'.

The establishment of a platform should follow the principles drawn from IPCC/IPBES experiences as highlighted below:

6.1. *Independence*

The platform should be politically independent. It should involve the global scientific community that works on land degradation and SLM, drawing on all disciplines and ensuring a balance between biophysical and social, economic and policy sciences in order to develop integrated approaches (Reynolds et al., 2011).

6.2. *Outputs*

The platform would produce authoritative reports and assessments via an open comprehensive and transparent process and act as a think tank on land degradation/SLM, framing and prioritizing research questions, and would be informed by policy needs at international, regional and national levels. The body would liaise with other major scientific bodies such as professional societies, unions and associations that deal with land degradation/SLM issues and thereby act as a node within a network of networks to ensure a comprehensive coverage of the topic, interests and perspectives of the various interested actors. The latter includes land owners and managers, policy makers, the scientific and development communities and the public at large. Policy relevant outputs would serve MEAs and conventions (such as UNFCCC, UNCCD, UNCBD and Ramsar). In this regard, the platform on land should be considered not as a subsidiary body of any one agreement or convention (this differs from, for example, the IPCC which is considered to serve the UNFCCC). Nevertheless for the platform to function in such a cross-cutting manner would require endorsement from a joint Convention committee and a stipulation that it should be responsive to the governance structures of the relevant MEAs and UN bodies into which its information feeds.

6.3. *Operation*

The scientific platform should operate in a task force manner by addressing specific questions in a time-bound approach in line with end user demands. For example the platform could contribute towards identification of low cost, harmonized methods of monitoring and assessing land degradation/SLM that are suited to the range of complex issues that cut across natural, socio-economic and political disciplines. Emerging proposals will then be appropriate for the different conditions across countries, taking into account considerations as to whether or not, for example, countries have their own satellite monitoring system, land classification and maps, etc.

In addition to fostering better communication and science–policy bridging the body would also stimulate cross disciplinary science by emphasising and guaranteeing an inter- and transdisciplinary approach to address options for sustainable human–environment interactions. The platform would thus foster not only science–policy dialogue but also scientist–scientist and scientist–practitioner dialogues. Policy makers and practitioners should be involved in the report preparations adding to the legitimacy, transparency and impacts of the outputs (e.g., Weichselgartner and Kasperson, 2010).

Lessons from the establishment of the IPCC and IPBES indicate that there must be strong international support for a

land platform that countries would perceive as necessary for their food security and development. Thus an initial step would be a review of existing structures and regional and international assessments such as the IAASTD, etc. (Chasek et al., 2011).

To ensure optimum and continuous connectivity with the complex and multi-faceted stakeholder community that deals with land and water issues or that is directly responsible for, and affected by, the state and health of land and water, new and multi-layered structures that go beyond those currently being used by other panels will be required. The need to create more ''polycentric'' structures (see also Koetz et al., 2008 and Ostrom, 2010) has been emphasised following the Copenhagen dilemma (UNFCCC's Fifteenth Session of the Conference of the Parties (CO15) in Copenhagen in 2009) which according to Ostrom showed that policy can no longer consider 'top down rules' as a sufficient means to implement solutions on environmental concerns (Spiegel Interview, 2009). 'All levels of human society' are needed to achieve long-lasting improvements at and between different geographic and temporal scales. Creating networks of groups and actors on land and water issues whose demands and interests are scientifically validated by a platform on land might enable (1) more flexibility in responses to local, regional and global needs and demands and (2) the building of trust/acceptance within the stakeholder community to mandate the recommendations developed by the platform by ensuring short and direct communication pathways to all stakeholders. Further elaborations on such innovative structures will however require extensive regional and multi-stakeholder consultations as the implications of 'land issues' should address national economics and other national priority issues in countries affected by land degradation to enable broad and long-lasting ownership of a platform. In this way a new platform would follow the 'collaborative model' suggested by Koetz et al. (2011) by its focus on multi-levels of governance and attention to problems at all scales.

6.4. *Membership*

Platform composition would necessarily include scientists from regional organizations including those with science–policy bridging and scenario setting experience, members of the NGO/CSO community, and leading world experts with experience in capturing local, national and regional knowledge and experience. As the problems of land are multifaceted and complex, members of the platform should be experienced in collaborative, inter-disciplinary and integrative approaches to problem solving with broad rather than narrow interests. To ensure compatibility and efficiency and to reduce competition and turf-protection in subsidiary bodies of UN Conventions, there could be some common membership of scientists or nodes of contact such as scientific unions and societies, to serve two or more conventions. Equally, the interests of national bodies need to be ensured.

6.5. *Governance*

A platform on land and its governance mechanism would need to be endorsed and/or commissioned by a higher authority such as the UN General Assembly and supported by international organizations including groups such as the G-8 and G-20. It would need to both clearly distinguish itself from other similar bodies that address some land use issues and work complementarily with them. Alternatively it could become a subsidiary body that specialises in, and brings synergy to, land use issues as related to providing advice to the UNFCCC, CBD and UNCCD.

The platform would need to carefully assess and represent the wide range of programmes and projects on land degradation/SLM that exist including but not limited to; Global Land Cover, Global Land Tool Network, the emerging Global Soil Partnership, Land Degradation Assessment in Drylands project (LADA), D-Survey and the Middle East and North Africa Desert Ecosystems and Livelihoods Program (MENA-DELP), etc.

7. Options for a platform on land

Given the results of the e-forum and considering the possible modalities and responsibilities of a platform discussed above, a number of options for a platform are presented below and indicated in Table 2. Their possible relation to IPCC and IPBES is indicated in Fig. 3.

7.1. *Platform under a new UN environmental agency*

If current discussions result in the upgrading of UNEP to a United Nations Environment Organization or other independent environmental agency (IISD, 2011) it would benefit from a science-based platform that would address land-based issues that could serve all MEAs. The disadvantages to this are that it would take several more years, perhaps even a decade for this to be established and as with all other UN bodies, may be viewed as being under the control of UN agencies rather than independent of them.

7.2. *Linkage to a UN-Land Task Force*

A Task Force on land has been promoted by the UNCCD and the findings of a platform could inform this body. However this idea has resulted only in a limited temporary task force under the UN's Environment Management Group (EMG) that is currently developing a One UN publication on global drylands under an Issue Management Group (UNEP, 2011). It is likely that this will only result in a UN system-wide land framework for cooperation on drylands. The disadvantage of this option is that it would remain a temporary UN grouping with a more specific aim of aiding the implementation of the strategic plan of the UNCCD and that it would maintain too narrow a focus on drylands. This grouping may nevertheless provide synergies that could include deliberations on, and assessment of, the creation of an International Panel on Land and Soil with FAO and UNEP (UNEP, 2009). FAO has recently established a process to create such a panel focused on soil data. Thus this option could be seen as an intermediary step towards an independent panel.

7.3. *Linkage to any new body on food security*

Some observers view land issues as a national responsibility that would be difficult to align with an international body (e.g.,

Table 2 – Options for a science–policy platform on land.

Option	Description	Advantages	Disadvantages
Platform under a new UN agency on environment (See 1, Fig. 3)	An independent advisory platform to a specialised environment agency that would succeed UNEP (proposed by France)[1].	Would serve as a scientific platform for all global environmental problems thereby eliminating overlaps.	May dilute needed attention to land degradation. Would take years to establish and would be under the control of UN organizations rather than being independent of them.
Linkage to a UN-Land Task Force (see 1, Fig. 3)	A Task Force was proposed by the UNCCD on land issues. A limited Task Force on drylands has been established as under the UN's Issue Management Group.	Could harness the dispersed efforts on land throughout the UN system.	May not be seen as independent and would not obviously facilitate the broad-based inclusion of scientists operating outside the UN system. Would need to be commissioned by the UN GA
Linkage to any new independent strategic body on food security (see 1, Fig. 3)	A reformed Committee on World Food Security (CFS) as proposed by von Braun (2010).	Would help focus links between land and food and issues not covered by IPCC or IPBES. Currently examining land tenure and food security.	Currently linked to FAO and would need broader representation.
Linkage to the emerging IPBES (see 2, Fig. 3)	The proposed IPBES will be underpinning all 'land issues'. Land issues could be injected into this newly emerging intergovernmental science–policy panel by creating permanent temporary or permanent *ad hoc* technical working groups.	The urgency of land degradation requires immediate attention. IPBES would provide an immediate opportunity to inject land sciences into intergovernmental discussions. Scientific expertise on land would not be fragmented under different panels.	Scientific independence can diminish if policy priorities start influencing research agendas. Risk arises that land degradation including desertification might not be sufficiently visible to policy and to the general public, thus, hampering ample political will and general acceptance by the public for implementing measures or attracting investments in drylands on the medium to long term. A focus on drylands would be too restrictive. Prioritization of biodiversity and ecosystem services may cause the institutional/political dimensions in need of consideration in broader land issues to be neglected. There is a danger that ecological concerns may dominate.
Network of Networks of international scientific bodies (see 3, Fig. 3)	Creation of a polycentric, horizontal structure to facilitate networking of existing institutions at the local, national, regional and international level which would allow a multi-stakeholder community to access programmes and policies at the science–policy interface.	Solid foundations at the national and international level, allowing building upon existing structures at the local and regional level thus integrating relevant stakeholders. This would help create a wide acceptance/ownership among a wide range of stakeholders at all scales. This set-up could reduce the risk of duplication in structures and actions. An independent network of networks would foster independence in word and action of the scientific community. Such a structure would create easy open access for networks and advocacy groups and would address concerns over national sovereignty[2].	Decentralised institutions may have a lower visibility and less influence at the policy level, thus, reducing the power to influence intergovernmental decisions.
International platform on land degradation (see 4, Fig. 3)	Would receive inputs from networks of scientists, IPCC, IPBES, UN agencies, national and regional scientific bodies, civil society organizations[3].	Would have broad participation of interested parties with a focus solely on land issues as a cross-cutting concern.	Does not yet have a 'champion' agency at a high level nor widespread donor support. Would take considerable time and resources to establish.

[1]http://www.diplomatie.gouv.fr/en/france-priorities_1/environment-sustainable-development_1097/united-nations-environment-organization-uneo_1966/index.html.
[2]Larigauderie and Mooney (2010).
[3]Akhtar-Schuster et al. (2011).

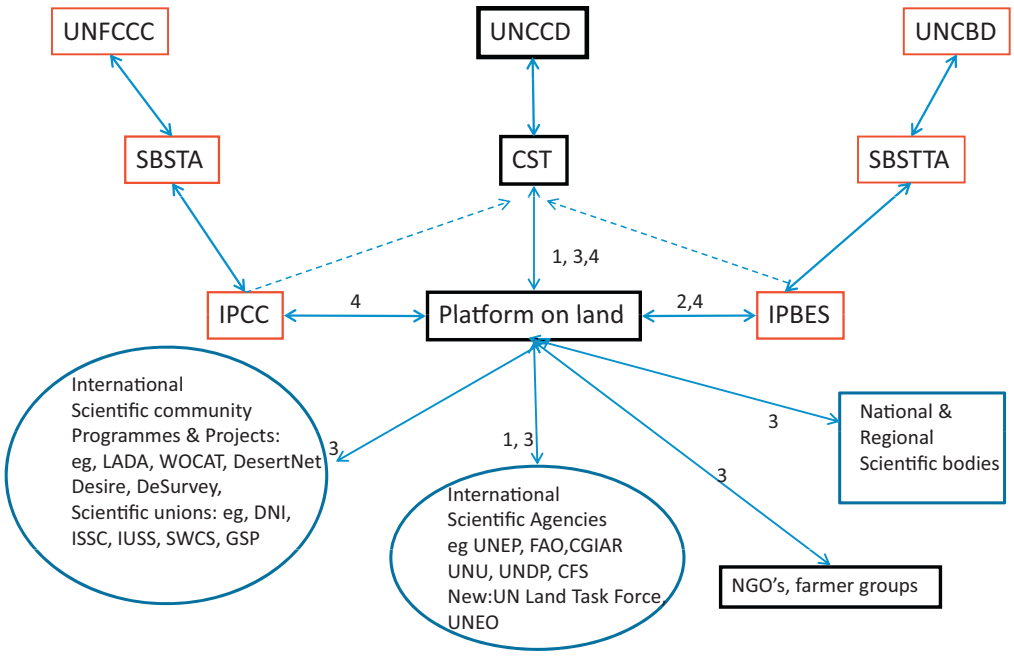

Fig. 3 – Possible arrangements of a platform for land in relation to other panels for climate change and biodiversity. Dashed lines represent direct channelling of information from IPCC or IPBES into the CST of the UNCCD. Numbers on arrows refer to the options listed in Table 2. Acronyms not used in text: CGIAR, Consultative Group for International Agricultural Research, GSP, Global Soil Partnership, DNI, DesertNet International; ISSC, FAO, Food and Agriculture Organization, International Society for Soil Conservation; IUSS, International Union of Soil Sciences; LADA, Land Degradation Assessment in Drylands, SWCS, Soil and Water Conservation Society.

DEFRA, 2011). However, despite this, calls have been made to address food security as an international issue (e.g., von Braun, 2010). As most food for humans is produced from land there is an obvious relation between ensuring food supplies and sustainable land management. For example land degradation has been cited as a 'direct threat to the right to food of rural populations by the United Nations General Assembly (UN-GA 2010). As land could be more clearly linked to food security issues as compared to climate change and biodiversity issues, for example, there may be sufficient interest in these linkages to establish a science-based platform for food production. This option may however dilute the focus on all land and water issues. Currently FAO's Committee for World Food Security (CFS) is studying the links between land tenure, food security and international investment in agriculture and a suggestion has been made to expand its role and to give it independence (von Braun, 2010).

7.4. *Linkage to the merging IPBES*

The IPBES is a newly emerging, intergovernmental panel that aims to underpin issues on ecosystem services. UNEP's Governing Council recently requested UNEP, in cooperation with UNESCO, FAO and UNDP, to convene a "plenary meeting" to determine modalities and institutional arrangements for IPBES in 2011 (www.iisd.ca/unepgc/26unepgc) (UN GA, 2011). The establishment of temporary or permanent *ad hoc* technical working groups on dryland and land degradation issues under the IPBES is therefore one option that would allow a relatively quick response to address urgent aspects of land management as requested by policy makers. We note however that this approach was unsuccessful under the UNCCD (Bauer and Stringer, 2009). Details of how IPBES will be organized or who will be its clients have yet to emerge. If the scope of IPBES were broad enough to include the interests on land from both UNFCC and UNCCD as well as other MEAs this could be a relatively quick step forward. However this option has the disadvantage of diluting the focus on land issues and in particular the role of agriculture in land use change, as well as issues of land grabbing and political/institutional risks particularly if an IPBES emphasises biodiversity.

7.5. *A network of networks of scientific bodies*

A well-equipped and fully operational global platform is costly and will also take years to develop. An alternative is to facilitate a network of existing networks that can be viewed as a 'polycentric approach' as advocated by Ostrom (2010). In her report on coping with climate change Ostrom discusses a 'polycentric approach'[2] versus a 'central authority' (a single unit) in order to achieve sustainable 'governance of natural resources', arguing that "*in*

[2] Vincent Ostrom (1999: 57, cited in Ostrom, 2009, p. 33) defined a polycentric order as "one where many elements are capable of making mutual adjustments for ordering their relationships with one another within a general system of rules where each element acts with independence of other elements."

addition to the problem of waiting too long, "global solutions" negotiated at a global level, if not backed up by a variety of efforts at national, regional and local levels, are not guaranteed to work well" (Ostrom, 2010, p. 550). Also, as there is no 'one-type-fits-all' or all–encompassing solution to a science–policy platform, a more polycentric order could also guarantee sufficient flexibility to evolve and to adjust to changing scientific, social, economic and political needs over time. 'Polycentric' implies different centres of activity that are relatively independent of each other with different responsibilities but that address common problems at different scales (Ostrom, 2010).

Furthermore, land issues are at the heart of national interest, and thus touch upon vital issues, including national sovereignty (Koetz et al., 2008). Thus the success of actions will depend heavily on the capabilities within science–policy interfaces on 'land issues' to consider local and national social, cultural, economic and political settings. Ensuring a voice for aspects that focus more at a local versus the global scale will prevent the risk that '*it is easy for global institutions of knowledge-making to become insensitive to a geographical sensibility*' (Hulme, 2010: p. 561). The coordinating network could have a mixed composition of scientists, practitioners and policy makers and serve as a 'boundary organization' or 'hybrid management' that mediates between science, policy and environmental governance (Guston, 2001; Miller, 2001). In addition to scientific societies and unions and CSO networks, the network could involve the participation of the regional bodies and programmes organized under the UNCCD to ensure geographical coverage.

We therefore argue that it is important to (1) thoroughly screen the structures that already exist to address land issues at sub-regional levels, (2) identify relevant stakeholder communities that could support processes for a multi-stakeholder-driven development of actions at various geographic scales and in different areas of society, and (3) identify incentives for the long-term commitment of all relevant actors and 'beneficiaries' at a science–policy interface. As noted by Ostrom, "*Building such a commitment, trusting that others are also taking responsibility, can be more effectively undertaken in small- to medium-scale governance units that are linked through diverse information networks*" (Ostrom, 2010, p. 556).

It is therefore worthwhile discussing options for a more regional fit to deal with science–policy interactions on 'land issues'. The creation of a network of networks could (1) support independence in word and action of the scientific community, (2) provide a solid integration of *existing* structures and stakeholders at the national, regional and international level, (3) provide an easily accessible platform for advocacy groups and newly emerging initiatives to join and (4) be flexible to be able to quickly adjust to changing needs and demands. All four aspects would promote greater ownership and facilitate the emergence of beneficial alliances among a wide range of stakeholders in all areas of society and at all geographic scales. This again would reduce risks of duplications in structures and actions.

We therefore underscore that even if at a later stage, a science–policy platform on 'land issues' should emerge, its authority and acceptance will heavily depend on its capacities to include existing networks. This can only be guaranteed if a network of networks is already in place and is accepted at the political level as a scientific instrument to support and continuously interact with the platform. The network of networks option is represented by groupings of the international scientific community including projects and programmes and scientific unions with international agencies, CSOs, and national and regional scientific bodies (see Fig. 1, linked by arrows with a number 3). Some of these bodies such as the International Union of Soil Scientists have already expressed interest and willingness to promote policies that support sustainable land management (e.g., Dumanski, 2006; Eswaran, 2006). Other networks exist that could be built upon such as the International Land Coalition that is an alliance of civil society and intergovernmental organizations (ILC, 2011). New initiatives such as FAO's Global Soil Partnership would promote soil information to develop sound policies for soils and improved decision making for soil protection. It will nevertheless remain important to include scientific bodies representing a range of relevant disciplines (not just soil science) in order to cover the variety of scientific and socio-economic expertise relevant to addressing land issues.

7.6. A new International Panel on Land Degradation (IPLD)

Ideally an IPLD would perform similar functions and be organizationally located in the same way as both the IPCC and the proposed IPBES are, i.e., as independent bodies that channel information and assessments into the respective subsidiary bodies of the UNFCC and UNCBD, namely the Subsidiary Body for Scientific and Technological Advice (SBSTA) and Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) (Fig. 1). For the UNCCD the corresponding body is the Committee for Science and Technology (CST). The information provided by these independent bodies (IPCC, IPBES) is then delivered to the respective Conference of the Parties (COPs) of the respective conventions via these subsidiary bodies (SBSTA, SBSTTA, and CST).

As pointed out by Akhtar-Schuster et al. (2011) the proposed IPLD would have a broader representation than the IPCC and its clients would also be multiple and would include CSOs and it would not be confined to a COP or convention's subsidiary body. However to achieve broad legitimacy in addition to ensuring that local knowledge and practices are considered for policy making using new modes of knowledge management (e.g., Reed et al., in press), there must be a step where information produced by an IPLD is reviewed by COPs and other parties interested in the interconnections among globally important environmental issues (Watson, 2005). This would also help to close the loop between science, policy and action, providing a channel for knowledge and information to flow from the IPLD to the COP to national policymakers to the local level.

A key disadvantage of this option is that it lacks a strong authoritative institutional 'champion' or leader such as a UN agency that could provide the necessary momentum to progress. A coalition of willing partners has yet to emerge even though piecemeal efforts to organize the scientific community abound, e.g., the first scientific style conference of the UNCCD (UNCCD, 2009) and a global initiative to measure the value of land (UNCCD/GIZ, 2011). Furthermore, scepticism exists within the donor community as to whether an IPLD is required (especially when other panels on other related issues are already functioning). Finally there would be a long time lag before an IPLD could be established given the long 'gestation' periods of the IPCC and IPBES.

8. Resourcing the platform

Intergovernmental bodies such as the IPCC and planned IPBES have annual budgets of the order of US $4.6 to 6.5 million (UNU-INWEH/DSD/DNI, 2010). The new IPBES expects to fund its assessments from both national governments and direct donors on something like a 50:50% basis. Under current financial conditions these amounts are likely to be severe constraints to the establishment of any new arrangement to address land issues. It is likely therefore that some sort of cost sharing arrangements would be necessary, either with IPBES, IPCC or other proposed vehicle on food security, environment or migration where these can be directly linked to land degradation and SLM concerns.

9. Conclusion

Land degradation and other land concerns require immediate policy attention informed by and underpinned with rigorous scientific knowledge. An e-forum consultation with the scientific community recognised this need. With regard to the existing challenges of population increases, decreasing land availability and quality, food security and the global water crisis, business as usual is not an acceptable option if the environment is to be preserved for future generations while supporting livelihoods. We therefore propose that a strong and flexible science–policy platform on 'land issues' should be discussed and promoted, based on further extensive regional, multi-stakeholder consultations. The basis of the establishment of a new science–policy platform should be premised on the identification of: (1) clear mandate and target(s), (2) benefits for the multi-stakeholder community, (3) required institutional set-up that includes national, regional and sub-regional representation, (4) appropriate resourcing for specific time-bound outputs, (5) quality control mechanisms and (6) a capacity to facilitate multi-stakeholder dialogue and active participation. Given the urgency and current economic climate we argue that priority should be given to emerging opportunities for land issues in general rather than lobbying for the insertion of just dryland issues into existing or new intergovernmental bodies. Raising the profile of land and ensuring its protection and continued supply of ecosystem services ideally should be closely linked to the UNCCD. However as pointed out previously (Stringer, 2008; Bowyer et al., 2009) the UNCCD would need to accept an expanded role that considers land degradation globally rather than only focusing on drylands. It is recognised that this strategy runs the risk of diluting current efforts to focus more attention in the political and public arenas on the urgency to invest in drylands (UNEP, 2011).[3] We propose that discussions are needed that go beyond the current plans for the IPBES and a possible role within it for a land platform and that such discussions should address the creation of a long-term architecture to ensure land issues become prominent in science–policy interactions. Building on the network of networks approach would be a step in this direction. Outputs of such discussions will help guide national policies for environmental sustainability, food production, trade needs and opportunities, and will support planning for sustained human health and nutrition and viable land-based livelihoods that help reduce migrations. A science–policy platform on land would provide existing institutions and MEAs with evidence-based information and knowledge that is continuously updated by the scientific community. In particular this would create an urgently needed channel of scientific information into the UNCCD thereby strengthening this convention.

[3] Discussion at a Side Event titled "Providing Inter-Disciplinary Scientific Advice to the UNCCD: A View from the Scientific Community", jointly organized by DesertNet International and UNU-INWEH on 17 February 2011 in Bonn, Germany at CST S-2 (16–18 February, 2011). Report accessible at http://www.europeandesertnet.org/docs/Official_Report_on_Outcomes_of_the_e_forum_Side_Event-20110303-FINAL.pdf.

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