

Insistent Dryland Narratives: Portraits of Knowledge about Human-Environmental Interactions in Sahelian Environment Policy Documents

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Abstract

The drylands in the West African Sahel region have, since the catastrophic drought event in the 1970s, been a focal point of interest in the cross field between environmental research, knowledge systems and policy intervention strategies. Major international institutions, agencies and conventions have played an important role in shaping national planning efforts aimed at reducing environmental degradation in tropical drylands and at limiting their vulnerability to external stressors such as economic globalization, climate variation, and demographic pressure. The paper summarizes how significant, internationally initiated policy documents, such as National Environmental Action Plans (from the 1980s), National Adaptation Plan of Action (from the 2000s), or the Great Green Wall Initiative (signed in 2010), refer to and explain the state, complexity, and change processes in the human-environmental systems that they aim at guiding towards sustainability. It specifically looks at characterizations of land use changes and their relation to multiple driving forces. The paper asks if apparent discrepancies between contemporary scientific advancements and dominant narratives in policy documents can, in part, be interpreted as persistence of environmental myths caused by the repetition of the keywords, which turns theories into blueprints for action.

Introduction

Tropical drylands are home to a large number of the poorest people in the world, who are known to rely on a fragile environment with limited natural resources. It is estimated that more than one third of the global population (in 2000) lives in dryland regions, which account for approximately two fifths of the global land surface (Safriel & Adeel, 2005). It has been claimed that most of the global poverty occur in drylands (Safriel & Adeel, 2008), and that the population growth rates are high in these regions.

Since the adoption in 1994 of the United Nations Convention to Combat Desertification (UNCCD), the direction of research and development efforts concerning drylands in the Global South has been influenced by this global environmental

convention, which is often understood to cover developing countries' concerns in the global environmental agenda. The convention has been decisive for consolidating the concept of desertification - in the sense of "Land degradation in arid, semiarid and sub-humid areas resulting from various factors, including climatic variations and human activities" (UNCCD, 1993) - as a prominent issue, building on the land degradation narrative emerging from a wide range of research endeavours since the 1970s. The notion of the 'moving desert' or 'desertification' caught the imagination of the public and became a persistent 'narrative', partly because it "bankrolled decades of development interventions, research and international debate in drylands around the world" (Batterbury & Warren, 2001; Swift, 1996).

Considerable efforts have been aimed at documenting and understanding the degradation process and the vicious circles of causal factors that fuel the perceived development trajectories towards irreversible degradation of the natural resource base for local livelihoods (Mortimore, 2009). This well-established, neo-Malthusian ‘deserti-fication narrative’ has, however, been contested by scientific communities since the 1990s (e.g. Rasmussen *et al.*, 2001; Reynolds *et al.*, 2007). In line with this turn in the scientific literature, increasing attention has since been devoted to the so-called ‘counter-paradigm’ (Safriel & Adeel, 2005), which proposes that facing the challenges of harsh environments ‘induces an inherent ingenuity of land users, which generates adaptations and innovations that keep them ahead of desertification’ (Safriel & Adeel 2008, 119; Batterbury and Warren, 2001; Mortimore & Turner, 2005). In a longer time perspective, however, the counter paradigm is proposed with the important caveat that land users’ adaptive ability needs to be directed towards reduced dependence on land resources because land resources are finite while the population that needs to be supported continues to increase.

The paper aims at discussing the extent the novel perspectives on the dynamics of human-environment interaction in drylands have informed seminal policy documents and national visions for sustainable land management strategies in the Sahelian drylands. First, it will provide a brief introduction to the population-degradation discourse in the Sahel. Secondly, it will look at a couple of important, internationally promoted environmental action plans and policies – the National Environmental Action Plans (from the 1980s), the National

Adaptation Plans of Action (from the 2000s), and the Great Green Wall for the Sahara and the Sahel Initiative (from 2010). Attention will be given to assess how the basic problems related to the pressure on the land resources are described. Specifically, focus is on the status of the ‘degradation narrative’ and the possible discrepancies between recent scientific advancements, and apparent, and dominant narratives in policy documents.

The environment-population-nexus in the Sahel

Among the global dryland regions, the Sahelian zone in West Africa has received significant attention, not least because of the extreme poverty and frequent serious drought incidents that this region has been exposed to since the major catastrophe in the early 1970s. Climatically, the Sahel is normally defined as the area between the 200 and 600 mm isohyets stretching from Mauritania to Chad (also called the Sahel’s vulnerable zone (OECD, 2009) but the expression ‘Sahel’ is also used in the wider geographical sense of the CILSS countries¹ in West Africa.

The population of the CILSS countries has grown from less than 20 million people in 1960 to around 50 million people in 2000. CILSS estimated that there will be 100 million people in the region by 2020 and 200 million by 2050, while the Sahel’s vulnerable zone is currently estimated to be home to 8 million people (OECD, 2009), of whom very few live in significant urban centres. Together with significant climatic variations, this accelerating demographic pressure

¹ The Permanent Interstate Committee for Drought Control in the Sahel (CILSS) was formed in 1973 by Burkina Faso, Cape Verde, Chad, Gambia, Guinea Bissaw, Mali and Senegal.

constitutes a challenge for sustainable livelihoods.

The Sahel, especially the desert fringe regions, is characterized by a fragile balance between limited natural resources and a rapidly growing population. Agriculture (including pastoral production) is the main source of sustenance for the predominantly rural population (Reenberg, 1998). The very high variability in climate, specifically the spatial and temporal variability in precipitation both within and between years is well documented and known to be a major challenge for local livelihood conditions (Dietz *et al.*, 2004).

A large body of research results has been presented in the literature as discussions of the processes of land degradation or desertification (Bolwig *et al.*, 2007; Raynaut, 1997; Marcussen & Reenberg, 1999; Ba *et al.*, 2000; Barbier, 2004). A number of narratives have become established truths beyond need for further documentation; for example, the notion of vicious circles of land degradation, prompted by population pressure and low rainfall that lead to excessive expansion of fields onto marginal land, which in turn leads to irreversible degradation of the natural resource base, lower productivity, and need for larger areas to sustain the population. Other such narratives deal with the pastoral production systems and their role in the environmental change process (Batterbury & Warren, 2001; Boyd & Slaymeker, 2000).

Recent literature, however, calls for critical reflection on received wisdom in order to avoid misinterpretation of the processes of change and their likely future directions (Leach & Mearns, 1996; Mortimore, 2005). Scattered empirical evidence from recent rapid assessments

(Reenberg, 2009; Bolwig *et al.*, 2007) suggests that land use development in the agricultural frontline across the drier part of the Sahel may not correspond well with the simplistic notion of more people/less rain => more need for land => field expansion on marginal land => soil degradation => even more need for land, etc. Likewise, it seems to be important to acknowledge the shifting and opportunistic role of livestock (and other income generating activities) in the full land use system portfolio, in order to understand the dynamic pathways of change (Reenberg, 2009). Hence, the discussion of causal relations between population pressure and natural resource degradation has been revitalized.

After several decades' indisputable documentation of declining rainfall and dwindling food production in the Sahel, reports presenting a different narrative have started to appear. Several independent research groups have analyzed temporal sequences of satellite data over two decades since the early 1980s and showed a remarkable increasing trend in vegetation greenness (Anyambaa & Tucker, 2005; Herrmann *et al.*, 2005; Hickler & Eklundh, 2005; Herrmann & Hutchinson, 2005; Olsson *et al.*, 2005; Rasmussen *et al.*, 2001). While increasing greenness may not necessarily mean a recovery of vegetation quality, such findings challenge the classic irreversible degradation narratives.

There is also evidence of other positive developments in long-term environmental and agricultural studies in the region that may support a new narrative (Niemeijer & Mazzucato, 2002; Osbahr & Allan, 2003; Ouedraogo & Zombre, 2001; Reij & Thiombiano, 2003). If such observations can be extrapolated to more generally validated

documentation, they will have important implications for the understanding of the dynamics of the land use systems, and, in turn, for how best to ensure that future land use strategies are anchored in local realities, and effectively contribute to creating resilient livelihoods for local people (faced with the triple exposure to climatic variability, population pressure, and globalization).

Large-scale environmental policy initiatives examples – policy-science interaction

Since the severe drought period in the Sahel in the start of the 1970s, a number of environment related policy documents have seen the light of the day, in conjunction with international development interventions aimed at supporting local communities in their ambition to create enabling conditions for sustainable management of natural resources, to counteract degradation of soils, or to minimize the vulnerability of local livelihoods to climate variability.

In general terms, scientists are known to play a crucial role in formulating international environmental agreements by identifying causes of a specific problem, estimating its importance, and proposing possible strategies for its solution. Grainger (2009) has, for example, scrutinized the use of scientific knowledge in formulating and implementing the Plan of Action to Combat Desertification and the UN Convention to Combat Desertification. He has, among a number of other issues, looked into how the scientific knowledge was produced and communicated to the policy domain. He explained how different scientific experts and consultants have succeeded in synthe-

sizing findings of national and local case studies to new global and interdisciplinary knowledge and, for example, created the powerful ‘boundary object’ of desertification, which carried the sense of disaster and required no explanation.

The few scientists involved in providing material for the policy documents were often not formally responsible to the wider community of arid lands science, Grainger (2009) stressed. They did, however, create a persistent and powerful ‘narrative’ (i.e. a “meaningful totality of past and future events” (Barton, 2000)). The salience of knowledge (i.e. the relevance to the stakeholders) was given priority over legitimacy (i.e. unbiased with respect to values) and credibility (i.e. based on adequate scientific evidence). The dialogue with scientists from other communities that challenged the causalities of land degradation and suggested ‘denial narratives’ (Adger *et al.*, 2003) was not established to such an extent that it subsequently led to modifications in the presentation of the specific issues.

When looking more closely at the narratives framing the development concerns and interventions in the Sahel, a range of nuances can be distinguished. In the 1970s, desertification was the key issue, represented by concerns about, e.g. whether and how fast the Sahara was expanding, as well as clarifying the root causes (biophysical or human explanations). In the 1980–90s, dryland degradation, in a broader sense of the term, was the main focus, with a high level of interest in the notions of sustainable natural resource management in land use systems. Most recently, in the 2000s, adaptation to climate has become the

headline in many of the research efforts, with themes such as coping strategies, resilience and vulnerability in the centre of research portfolio. Regardless of such modifications, simplistic notions of human-environment interactions seem to remain dominant and persistent feature in the policy documents that underpin environmental development interventions.

National Environmental Action Plans

National environmental action plans (NEAPs) were prepared and adopted by a large number of African countries from the mid-1980s, often with backing from major international institutions and agencies like IUCN, UNDP and the World Bank. The recognition of the need for improved management of natural resources and better land use practices was the underlying reason for promoting the plans. The NEAPs were usually developed through a series of steps, including screening of problems, priority setting, identification of underlying causes of problems, ranking of actions and policy proposals.

The value of the plans, in terms of their ability to help reduce environmental degradation in the countries concerned, has been discussed at length in a number of publications (e.g. Falloux & Talbot, 1993; Speirs & Marcussen, 1999; Marcussen, 1999). The details will not be repeated here, but a summary of some of the main messages can serve to illustrate how the plans are imbued with persistent narratives that do not always correspond to the complexities of explanations offered by the broader scientific literature.

It was anticipated by the promoters that the development of NEAPs would be a

holistic process, focussing on the underlying causes of degradation and environmental problems, which include a range of social, cultural and economic factors. Such ambitious goals should be seen against the very difficult task of planning for environmental sustainability, which encompasses multi-scale and complex interrelations between humans and nature. Despite the ambitious point of departure in an assessment of the environmental problems, many of the plans boiled down to shopping lists of projects to be presented to the donor community.

Speirs & Marcussen (1999) stress in their exploration of selected plans that 'although new theories and 'narratives' about a number of natural resource management issues emerged during the 1990s, these have not been readily taken into account in the official action plans, which tend to repeat assumptions about the extent of deforestation and desertification, the negative impact of population growth on the environment and the state of environmental awareness amongst resource users. The narratives used to describe the environment are frequently oversimplified and sometimes even misleading. It seems that the more people repeat the same key words as to the root causes of ecological degradation, the more cemented the narratives become.

Marcussen (1999) illustrates the problem by mentioning four prominent themes that are all well established in the NEAPs. One is the 'equilibrium notion', which supports the perception that an environmental equilibrium has existed in the past, when land users lived in harmony together and within the limits of a well-defined carrying capacity. Such notions disregard flexibility and

adaptability in land use systems in drylands documented by e.g. Mortimore & Adams (2001) and Reenberg (1998), and do not take into account new theoretical notions of 'disequilibrium' (e.g. Zimmerer, 1994). A second theme is the 'crisis narrative', a notion used to capture the fact that project documents often postulate (large) numbers of hectares that have been degraded over the past few decades, without having a valid set of data on which to base such assessments.

A third is the population-environment nexus that assumes that population pressure more or less automatically leads to the extension of land under cultivation or a reduction in fallow length, again without empirical substantiation and actually contrary to what can be observed in some empirical case studies. The fourth theme deals with the shortage of land resources, which leads to a vicious circle of overgrazing and uncontrolled cutting of vegetation for fuel wood. Again, there may be some truth to the causalities mentioned, but research has also seriously questioned orthodox views on overgrazing and degradation processes.

The NEAP process has tended to reinforce the creation of easily recognizable patterns of explanations accepted by influential actors in the development arena as both salient and credible, although supporting scientific knowledge was less unambiguous than it appeared to be. Furthermore, the narratives influence the priority setting for national research agendas, as Marcussen (1999) illustrated for Burkina Faso, and hamper the research communities' ability to escape traditional orthodoxies in the longer run.

National Adaptation Programmes of Action

The so-called National Adaptation Programmes of Action (NAPAs) are the most recent addition to the internationally initiated, but nationally anchored, documents that are meant to guide environmental policy intervention on the local level (Osman-Elasha & Downing, 2007).

The NAPAs are developed as a result of the guidance given in Article 4.9 of the United Nations Framework Convention on Climate Change in recognition of the specific needs and situation of the less developed countries (LDCs) (Box 1). The rationale of the NAPAs rests on the limited ability of least developed countries to assess their vulnerability and adapt to climate change. The overarching idea behind the process has been to develop a programme to support an implementation strategy for the NAPAs. The funding needed to assist developing countries and countries with economies in transition in the implementation process was ensured by support from the Convention's financial mechanism – the Global Environment Facility (GEF)² – its implementing agencies, and a host of other international organizations.

The NAPAs were presented as a new approach that would focus on enhancing adaptive capacity to climate variability, and,

² Established in 1991, the Global Environment Facility (GEF) unites 182 member governments in partnership with international institutions, nongovernmental organizations, and the private sector to address global environmental issues. GEF projects in climate change help developing countries and economies in transition to contribute to the overall objective of the UNFCCC. The GEF partnership encompasses 10 agencies, including the World Bank.

Box 1
NAPA goals

NAPAs provide the initial assessment of needs and priority areas for capacity building in less developed countries:

- (a) Strengthening existing and, where needed, establishing national climate change secretariat or focal points to enable the effective implementation of the Convention and effective participation in the Kyoto Protocol process, including preparation of national communications;*
- (b) Developing an integrated implementation programme which takes into account the role of research and training in capacity building;*
- (c) Developing and enhancing technical capacities and skills to carry out and effectively integrate vulnerability and adaptation assessment into sustainable development programmes and develop national adaptation programmes of action;*
- (d) Strengthening existing and, where needed, establishing national research and training institutions in order to ensure the sustainability of the capacity-building programmes;*
- (e) Strengthening the capacity of meteorological and hydrological services to collect, analyse, interpret and disseminate weather and climate information to support implementation of national adaptation programmes of action;*
- (f) Enhancing public awareness (level of understanding and human capacity development).*

Source: http://unfccc.int/cooperation_support/least_developed_countries_portal/lcd_work_programme_and_napa

in this way, address the adverse effects of climate change. NAPAs should take into account existing coping strategies, and build upon them to identify priority activities. Prominence is given to community-level input as an important source of information in recognition of the fact that grassroots communities are the main stakeholders. In other words, NAPAs are instruments that allow the LDCs to identify priority activities that respond to their immediately perceived needs with regard to adaptation to climate change. NAPAs are deliberately based on existing information and they are country-driven and flexible to national conditions.

The NAPA documents are formulated using a simple standard format, with the ambition of being easily understood both by policy-level decision-makers and by the public. In more precise terms, the

preparation of a NAPA includes synthesis of available information, participatory assessment of vulnerability to current climate variability and extreme events, identification of key adaptation measures as well as criteria for prioritizing activities, and a prioritized short list of activities. The NAPA also includes brief profiles of proposed activities. When completed, the NAPA is submitted to the UNFCCC secretariat, and posted on the website. When this is in place, the LDC Party becomes eligible to apply for funding for implementation of the NAPA under the LDC Fund, which is managed by the GEF.

Overarching narratives

Before turning to the concrete examples, a short account of the discourse of one of the major funders, the World Bank, can help to illustrate the prevailing narratives that

underpin the documents (WB, 2009). Under the section of land resources, a number of pressing issues are listed: Food provision to the growing populations is constrained by insufficient nutrient input, lack of erosion control and pressure from overgrazing. Increasing agricultural production has come about largely through the expansion of cropland into marginal areas. Inadequate land management has resulted in widespread land degradation across the continent, eroding the foundation of rural livelihoods.

Some estimates suggest that about 67% of the total area of Sub-Saharan Africa, about 16 million square kilometers, is affected by some form of land degradation. Prolonged dry spells and erratic climatic conditions may lead to short-term coping strategies such as deforestation to increase livelihoods. These may help mitigate the immediate impact of a climatic event, but will prove to be maladaptive in the long term by having adverse consequences for watersheds, biodiversity, and provision of important ecosystem services. Land cover changes can also lead to changes in local climate conditions due to altered surface reflectivity and water transpiration.

Narratives in Sahelian NAPA's

The NAPA from Niger (2006) starts by presenting the pressure on the environment in very general terms (e.g. deforestation, overgrazing, erosion, etc.). It then provides a quantitative description of the natural resource management, as well as of the biophysical conditions. The main adverse effects of climate variability are listed (e.g. decrease in crop production, fodder deficit, reduction of forest areas, decrease in biodiversity, etc.). The document contains,

however, remarkably few explanations of any causal relations or feedback between important factors; hence, the document does not present any explicit insight into how and why the human-environment interaction is enabled or constrained by various factors. Theories about change processes are virtually absent, except for implicit understandings contained in classic notions such as overgrazing, deforestation, etc.

Senegal's NAPA (2007) does not offer many details in terms of identification of the basic problems to be addressed. It provides basic characterizations of rainfall development and hydrology. In the agricultural section, the report refers to the one single source used for the characterization of the development of the agricultural potential (Tappan *et al.*, 2000), which strongly supports a degradation narrative, without relating this to later discussions of the dynamics of change.

Mali's NAPA (2007) provides a basic characterization of the development of biophysical factors, supplemented by figures of the accelerating population pressure. It also provides a characterization of the consequences of the increasing pressure on the environment. The authors subscribe to the 'field expansion narrative', and provide very concrete estimates/figures of the expansion of cultivated land into marginal zones or forest, and mention the reduction of fallow length as an issue of concern. They provide a specific section on the definition of the concept of vulnerability, explicitly underlining that vulnerability of the livelihood systems is closely linked to the socio-economic factors that enable and constrain the livelihood strategies. Hence, Mali's NAPA plan has a stronger, but

implicit, appreciation of the need to understand the complex dynamics of the system and their vulnerability *vis-à-vis* external stressors as a basis for strategic planning than the previously mentioned plans.

Burkina Faso's NAPA (2007) conveys a number of firm statements in support of the 'classic narratives'. "The permanent drought has accelerated deforestation and desertification". "The climate variability and the change of climate are some of the principal causes of the degradation of ecosystems, specifically the natural vegetation (pastures) which are severely affected by drought". "Pressure from human and animal populations accentuates desertification by overexploitation of the natural vegetation". "Between 1992 and 2002 the surface with natural vegetation has decreased by 108 141 ha to the benefit of cultivated land". "The consequences of the loss of natural vegetation are increased wind, recent increases in temperatures and decrease in precipitation". Compared to the other NAPAs, the document from Burkina Faso also contains, however, a more thorough overview of the adaptive characteristics of current resource management practices as a point of departure for the discussion of possible future interventions. Although multidisciplinary is mentioned as crucial, the document primarily presents simple, mono-disciplinary characterizations, and it does not refer to research results concerning the coupled nature of the human-environmental systems, e.g. it does not discuss the feedback mechanisms and change processes that are crucial to assess vulnerability and long-term sustainability.

NAPA project priorities

The presented lists of prioritized project proposals (Table 1) support the impression of a lack of interest in vulnerability and adaptation as dynamic concepts. The suggested action items resemble more a shopping list of classic development projects, without focus on the necessary insight into change processes and the causal linkages across local-to-national-to-international scales or across time. This corresponds to some extent to what Kalame *et al.* (2011) conclude from their survey of the NAPA for Burkina Faso by stating that "the proposed priority projects were limited to the institutional and specialized fields of the experts who conducted the NAPA process". The composition of the team indicates that decision makers still perceive climate change as an environmental issue as dealt with by natural resource experts, with little or no attention to health, sociology, institutions, etc.

Great Green Wall

One of the potential measures to counteract the adverse development of the environment in the Sahel, while at the same time improving people's livelihood conditions, is the notion of a 'green belt to halt the desert encroachment'. It has been around for decades, originally proposed by Burkina Faso's marxist leader Thomas Sankara in the 1980s, and was revived by the Nigerian President Obasanjo in 2005 and approved by the African Union in 2006. The current version of the vision has been embraced by the Africa Union, which adopted a Plan of Action in January 2009. In June 2010, all 11 Sahel countries signed a convention in Ndjamena, Chad, to create the Great Green

TABLE 1
Overview of the prioritized activities in NAPAs for four selected sahelian countries

<i>Country</i>	<i>Proposed, priority of projects</i>
Niger	<ul style="list-style-type: none"> Introducing fodder crop species in pastoral areas Creating livestock food banks Restoring basins for crop irrigation Diversifying and intensifying crop irrigation Promoting peri-urban market gardening and livestock farming Promoting income-generating activities and developing mutual social benefit Exploitation of surface and ground water Producing and disseminating meteorological data Contributing to fight against climate related deceases Improving erosion control, water harvesting and conservation measures for agriculture, forestry and pastoral purposes Dissemination of animal and crop species that are most adapted to climate conditions Watershed protection and rehabilitation of ponds Building of material, technical and organizational capacities of rural procedures
Mali	<ul style="list-style-type: none"> Improved crop varieties adapted to climate conditions (millet, sorghum, maize, rice) Improved livestock species Promotion of income-generating activities and development of mutual assistance Aquaculture promotion Promotion of cereal stocks Promoting the use of meteorological information to improve agricultural production and contribute to food security Management of valleys Solar and wind power for wells Energy from <i>Thypha australis</i> Promotion of solar energy Restoration of lakes and watering points Promotion of protection of natural resources Management of bushfire Soil improvement measures Development of fodder crops Basic education in climate adaptation measures Fodder banks for livestock Promotion of jatropha Information system for climate change related deceases
Senegal	<ul style="list-style-type: none"> Agroforestry implementation Sustainable use of water Protection of the coastal region Awareness raising and education in climate change issues
Burkina Faso	<ul style="list-style-type: none"> Mitigating vulnerability to climate changes through the strengthening of a prevention and food crisis management system Promotion of supplementary irrigation

Restoration and management of Mare d'Oursi
 Fodder production and development of fodder stocks
 Rehabilitation, sustainable management of natural vegetation, and valorisation of Non-timber Forest Products
 Protection against sand encroachment and mud silting
 Optimization of water use in irrigation systems
 Protection of strategic pastures
 Promotion of soil improvement measures
 Management of fauna and habitats
 Establishment of protection zones around rivers, lakes etc
 Promotion of improved technology use of energy saving equipment and renewable energy-based technologies

Wall Agency, and nominate a secretary to further develop the initiative. It was (re-)launched as a backbone for an important part of the visions for a collaborative action by 11 Sahelian countries along the southern border of the Sahara at a meeting co-hosted by the United Nations Convention to Combat Desertification (UNCCD) and the Global Environment Facility (GEF).

The overarching idea is to invest in an ambitious ecological buffer zone to help shield productive land from the degradation. Known as the 'Great Green Wall for the Sahara and Sahel Initiative (GGWSSI)', the vision is to employ a mosaic of approaches to manage natural resources over a 15-km wide and 7,775-km long stretch from Senegal, in the west, to Djibouti, in the east. It is presented as a 'visual concept', symbolizing a collective work to combat environmental degradation. The Global Environment Facility expressed interest in supporting the necessary investment (up to US\$115 million) through its various financing windows, including the Least Developed Countries Fund, and other resources within the GEF that are targeted at, e.g. biological diversity, sustainable land management or climate change. The concept is not presented

as an 'all-out tree planting drive' across the Sahelian region, but rather as a mosaic of land management and agroforestry approaches that have proven to be effective in improving the natural environment. In broad terms, the project may aim at strengthening the services provided by ecosystems, promoting sustainable soil and water management practices, or developing incentive systems to promote sustainable agriculture and livestock production (GEF, 2011).

The explicit ambition is to promote sustainable management of land, water and vegetation on up to 2 million hectares of croplands, rangelands, and dryland forest ecosystems per country to protect threatened dryland biodiversity, and to sequester 0.5–3.1 million tons of carbon per year. The GW concept has, however, faced local opposition despite its stated commitment to combating drought and desertification. The Global Forest Coalition has, for example, stressed that the vision is poorly conceived in terms of both ecological and socio-economic considerations, and may even cause harm to the environment. For example, inclusion of the future development of REDD projects (reducing emissions from deforestation and

forest degradation) as components of the GGW could result in the promotion of fast-growing foreign species of monoculture tree plantations and carbon sinks at the cost of land uses that support local livelihoods, and may lead to further depletion of scarce water sources.

The critique points to the perspective that the wall could be a useful tool to combat desertification only if “viewed as an exercise in adaptation, rather than as an opportunity for climate change mitigation and making money from CDM/REDD carbon offsets as presently envisioned” (IRIN, 2011). Furthermore, it is stressed that the GGW might interfere with migration patterns of pastoral communities and, instead, should incorporate ancestral systems of land management.

Although this initiative is still in the planning stage and, hence, difficult to assess, it seems that the concerns discussed above are relevant to mention again in this context. The mindset framing the intervention has not changed much since the 1980s. Simplistic narratives on degradation and desertification prevail, and project formulations are likely to be the responsibility of institutions that have been guided in their priority setting to elaborate on classical orthodoxies. There seem to be limited incentives to explore new models of explanations for the environmental change processes, and, hence, identify alternative pathways to sustainable livelihoods for local populations.

Conclusion

Vulnerability is ever present and takes many forms in regions like the Sahel, with limited natural resource endowments, huge distances to markets, high population growth

rates and fragile environments. Much research effort has been invested in the course of the past half century to understand the complex interactions between humans and the environment in tropical drylands, notably in the Sahel region. Hence, the scientific knowledge platform for supporting a sustainable management of resources has been hugely improved.

A range of environmental policies has, in the course of the last three to four decades, been concerned with sustainable development strategies for the land use and natural resource management systems. An overarching objective has been to find development pathways that can improve the quality of life for people in the face of the interacting pressures of globalization, urbanization, unsustainable production and consumption, and large-scale environmental changes. The most recent efforts have accentuated the action needed in response to expected climatic changes, the emerging global food shortage, and the accelerated competition for global land resources, as a result of the rapidly increasing market for biofuel.

Closer look at a few but seminal environmental policy initiatives are rather disappointing with regard to how the most recent scientific knowledge has been communicated to the policy domain. The NEAP process in the 1980s could be criticized for tending to reinforce the creation of easily recognizable patterns of explanations accepted by influential policy actors, even though new scientific knowledge was beginning to challenge the mainstream narratives that described how human-environmental systems were changing in response to different pressures.

Although much more knowledge has been

generated since then, recent policy documents, like the NAPAs and the GGWSII, seem to replicate many of the basic narratives and implicit understandings that were already presented decades ago. It is noted in the documents that the problems considered must be analyzed in a multidisciplinary context and take local-to-global interactions into consideration. Yet, in reality, little progress has been made in terms of including narratives that acknowledge new insight into the dynamics, feedbacks and transformation processes of complex human-environment systems. New conceptual ideas have been put forward to help understand change processes in human-environmental systems (Chapin *et al.*, 2009). Such conceptual frameworks, linking human adaptive capacity, vulnerability, resilience and transformability could provide useful lenses to explore the possible pathways of sustainable change and adaptation in marginalized drylands (Smith *et al.*, 2009). For example, it may be suggested that, for these regions, the way forward is not to increase resilience, but to increase transformability in order to enable a transformation from the current type of system to some other kind of system. This may entail changing the ways people make a living, developing new 'goods and services' and operating at different scales. Hence, transformation and transformability are emerging as critical issues of concern.

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References

- Adger W. N., Benjaminsen T.A., Brown K., and Svarstad H.** (2003). Advancing a political ecology of global environmental discourses. *Dev. Change* 32: 681–715.
- Anyambaa A. and Tucker C. J.** (2005). Analysis of Sahelian vegetation dynamics using NOAA-AVHRR NDVI data from 1981–2003. *J. arid Envir.* 63 (3): 596–614.
- Ba M., Mbaye M., Ndao S., Wade A. and Ndiaye L.** (2000). *Région de Diourbel: Cartographie des changements d'occupation-utilisation du sol dans la zone agricole du Sénégal Occidental*. Drylands Research Working Paper 21. Crewkerne, United Kingdom.
- Barbier E. B.** (2004). Explaining agricultural land expansion and deforestation in developing countries. *Am. J. Agric. Econ.* 86: 1347–1353.
- Barton E.** (2000). Sanctioned and non-sanctioned narratives in institutional discourse. *Narrative Inquiry* 10: 341–375.
- Batterburry S. and Warren A.** (2001). The African Sahel 25 years after the great drought: assessing progress and moving towards new agendas and approaches. *Glob. envir. Change* 11 (1): 1–8.
- Bolwig S., Rasmussen K. and Hansen M. K.** (2007). New Perspectives on Natural Resource Management in the Sahel. *Policy Study submitted to the Danish Agency for International Development Assistance (Danida)*.
- Boyd C. and Slaymaker T.** (2000). Re-examining the 'more people, less erosion' hypothesis. Special case or wider trend? *Natural Resources Perspectives* 63. London, Overseas Development Institute.
- Chapin III F.S., Kofinas G. P. and Folke C.** (eds) (2009). *Principles of Ecosystem Stewardship: Resilience-based natural resource management in a changing world*. Springer Verlag, New York.
- Dietz A. J., Ruben R. and Verhagen A.** (2004). The impact of climate change on drylands- with a focus on West Africa. *Springer Environment & Policy Series* 39.
- Falloux F. and Talbot L.** (1993). *Crisis and*

- opportunity – environment and development in Africa. Earthscan, London.
- GEF** (2011). Six questions to Monique Barbut, CEO of GEF, on the Green Wall. http://www.thegef.org/gef/pubs/6_question_Great_Green_Wall
- Grainger A.** (2009). The role of science in implementing international environmental agreements: The case of desertification. *Land Degrad. Dev.* **20**: 410–30.
- Herrmann S. M. and Hutchinson C. F.** (2005). The changing contexts of the desertification debate. *J. arid Envir.* **63** (3): 538–555.
- Herrmann S. M., Anyambab A. and Tucker C.J.** (2005). Recent trends in vegetation dynamics in the African Sahel and their relationship to climate. *Glob. envir. Change* **15**: 394–404.
- Hickler T., Eklundh L., Seaquist J., Smith B., Ardö J., Olsson L., Sykes M. and Sjöström M.** (2005). Precipitation controls Sahel greening trend. *Geophys. Res. Lett.* **32** (21): 214–215.
- IRIN** (2011). IRIN Africa. <http://www.irinnews.org/Report.aspx?ReportID=92422>
- Kalame F. B., Kudejira D., and Nkem J.** (2011). Assessing the process an options for implementing National Adaptation Programmes of Action (NAPA): a case study from Burkina. *Mitigation and Adaptation Strategies for Global Change* **16** (5):535–553.
- Leach M. and Mearns R.** (1996). Environmental change and policy. In *The lie of the land – challenging received wisdom on the African environment.* (M. Leach and R. Mearns, eds), pp. 1–33. International African Institute, James Curry & Heinemann, London.
- Marcussen H. S.** (1999). Environmental paradigms, knowledge systems and policy. The case of Burkina Faso. *Geografisk Tidsskrift-Danish J. Geog.* Special Issue **2**:93–103.
- Marcussen H. S. and Reenberg,A.** (1999). On scale and disciplinarity in the study of natural resource use in the Sahel – lessons from the SEREIN research program. *Geografisk Tidsskrift-Danish J. Geog.* Special Issue **2**:1–14.
- Mortimore M. and Adams W. M.** (2001). Farmer adaptation, change and ‘crisis’ in the Sahel. *Glob. Envir. Change* (Human and Policy Dimensions) **11** (1): 49–57.
- Mortimore M.** (2005). Dryland development: Success stories from West Africa. *Environment* **47** (1): 9–22.
- Mortimore M. and Turner B.** (2005). Does the Sahelian smallholder’s management of woodland, farmtrees, rangeland support the hypothesis of human-induced desertification. *J. arid Envir.* **63**: 567–595.
- Mortimore M.** (2009). *Dryland Opportunities: A new paradigm for people, ecosystems and development.* IUCN, Gland, IIED, London, UNDP/DDC, Nairobi.
- NAPA, Burkina Faso** (2007). http://unfccc.int/cooperation_support/least_developed_countries_portal/ldc_work_programme_and_napa
- NAPA, Mali** (2007). http://unfccc.int/cooperation_support/least_developed_countries_portal/ldc_work_programme_and_napa
- NAPA, Niger** (2006). http://unfccc.int/cooperation_support/least_developed_countries_portal/ldc_work_programme_and_napa
- NAPA, Senegal** (2006). http://unfccc.int/cooperation_support/least_developed_countries_portal/ldc_work_programme_and_napa
- Niemeijer D. and Mazzucato V.** (2002). Soil degradation in the West African Sahel - how serious is it? *Envir.* **44** (2): 20–31.
- OECD** (2009). *Regional Atlas of West Africa.* OECD, Paris.
- Olsson L., Eklundh L. and Ardö J.** (2005). A recent greening of the Sahel – trends, patterns and potential causes. *J. arid Envir* **63**: 556–566.
- Osbahr H. and Allan C.** (2003). Indigenous knowledge of soil fertility management in southwest Niger. *Geoderma* **111**(3-4): 457-479.
- Osman-Elasha B. and Downing T. E.** (2007). *Lessons learned in preparing National Adaptation Programmes of Action in Eastern and Southern Africa.* European. Capacity Building Initiative Report, GTZ.
- Ouedraogo E. M. A. and Zombre N. P.** (2001). Use of compost to improve soil properties and crop productivity under low input agricultural system in West Africa. *Agric. Ecosys. Envir.* **84** (3): 259–266.
- Rasmussen,K., Fog, B. and Madsen J. E.** (2001). Desertification in reverse? Observations from northern Burkina Faso. *Glob. envir. Change* **11**: 271–282.
- Raynaut C.** (ed.) (1997). *Societies and nature in the*

- Sahel*. SEI Global Environment & Development Series. Routledge, London.
- Reenberg A.** (2009). Embedded flexibility in coupled human-environmental systems in the Sahel: Talking about resilience. In *The Question of Resilience Social Implications of Environmental Changes*. (K.Hastrup, ed.), pp. 132–158. The Royal Danish Academy of Sciences and Letters, Copenhagen.
- Reenberg A.** (1998). *Analytical approaches to agricultural land use systems in the Sahel*. SEREIN Occasional Paper No. 8, Copenhagen.
- Reij C.** and **Thiombiano T.** (2003). *Developpement rural et environment au Burkina Faso: la rehabilitation de la capacite productive des terroirs sur la partie nord du Plateau Central entre 1980 et 2001*. Amsterdam, Free University of Amsterdam, GTZ and USAID: 80 pp.
- Reynolds J. F., Smith D. M., Lambin E. F., Turner B. L., Mortimore M., Batterbury S. P., Downing T. E., Dowlatabadi H., Fernández J. J., Herrick J. E., Huber-Sannwald E., Jiang H., Leemans R., Lynam T., Maestre F. T. and Ayarza M.** (2007). Global desertification: Building a science for dryland development. *Science* **316**, 847–851.
- Safriel U.** and **Adeel Z.** (2005). Dryland Systems. In *Ecosystems and Human Wellbeing, current state and trends, vol. 1*. (R. Hassan, R. Scholes and N. Ash, eds), pp. 625–658 Island Press, Washington.
- Safriel U.** and **Adeel Z.** (2008). Development path of drylands: thresholds and sustainability. *Sustainability Science* **3**: 117–123.
- Speirs M.** and **Marcussen H. S.** (1999). Environmental planning in Africa – action or words? *Geografisk Tidsskrift-Danish J. Geog. Special Issue* **2**:81–91.
- Smith D. M., Stafford N., Abel B., Walker and Chapin III I. F. S.** (2009). Drylands: Coping with uncertainty, thresholds and changes in the state. In *Principles of Ecosystem Stewardship: Resilience-based natural resource management in a changing world*. (F. Chapin et al., eds.), pp. 171–195. Springer Verlag, New York.
- Swift J.** (1996). Desertification: Narratives, winners and losers. In *The lie of the land – challenging received wisdom on the African environment*. (M. Leach and R. Mearns, eds), pp. 73–90., International African Institute, James Curry & Heinemann, London.
- Tappan G., Wood E., Hadj A., Lietzow R. and Sall M.** (2000). Monitoring climate and human impacts on the vegetation resources of Senegal: drought, agricultural expansion, and natural resource management. *USGS/EROS Data Center, USAID/Senegal Project Report PASA No. 685-P-00-00005-00*.
- UNCCD** (1993). *United Nations Convention on Combating Desertification*. Bonn, Germany, United Nations Convention on Combating Desertification.
- UNFCCC** (2007). *Climate change: Impacts, vulnerabilities and adaptation in developing countries*. UNFCCC, Bonn.
- World Bank** (2009). *Making development climate resilient: A World Bank strategy for Sub-Saharan Africa*. Report no. 46947-AFR. Africa Region.
- Zimmerer K. S.** (1994). Human Geography and the “New Ecology”: Prospects and Promise of Integration. *Ann. Ass. Am. Geogr.* **84** (1):108–125.