

Integrated Landscape Initiatives for African Agriculture, Development, and Conservation: A Region-Wide Assessment

JEFFREY C. MILDER and ABIGAIL K. HART
EcoAgriculture Partners, Washington, USA
Cornell University, Ithaca, USA

PHILIP DOBIE and JOSHUA MINAI
World Agroforestry Centre, Nairobi, Kenya

and

CHRISTI ZALESKI*
EcoAgriculture Partners, Washington, USA

Summary. — Recent years have witnessed increased investment in African rural landscapes for agriculture and food security, poverty alleviation, climate change adaptation, and ecosystem conservation. While such investments historically tended to be made independently under sectoral programs, a new wave of integrated landscape initiatives (ILIs) is promoting integrated, multi-objective management of rural landscapes. We surveyed leaders and managers of 87 ILIs in 33 African countries to provide the first region-wide portrait of contexts, motivations, design, participation, and outcomes of such initiatives. Results suggest that ILIs are promoting “multi-functionality” of rural regions, while aiding stakeholders in mediating tradeoffs and synergies among multiple outcomes.
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1. INTRODUCTION

In recent years, many African nations and the international community have begun to place increased emphasis on agriculture and rural land use as important domains for investment, economic development, and mitigation of poverty and conflict. To a growing degree, the discourse around this shift recognizes rural landscapes as the nexus where the linked challenges of food security, energy production, economic development, ecosystem conservation, and climate change converge. While sectoral approaches to addressing these problems are still common, single-objective strategies are now increasingly seen as futile or unsustainable, while awareness about potential synergies is growing. For instance, concepts such as the Green Economy (UNEP, 2011)—supported by several global assessments and initiatives (e.g., IPBES, 2012; TEEB, 2010; WAVES, 2012)—recognize the importance of healthy ecosystems in sustaining long-term economic growth, and therefore seek to manage natural capital as part of development planning and policy. Similarly, best practice in agricultural and rural development is increasingly recognizing the centrality of climate change adaptation and natural resource management in ensuring resilient rural livelihoods, as embodied in contemporary concepts such as “climate-smart agriculture” (FAO, 2011).

At a local level, these considerations create a mandate to manage rural landscapes in ways that achieve greater multi-functionality relative to the outcomes listed above. Nearly a quarter billion Africans are currently undernourished, while grain yields in Africa are a mere 37% of those achieved in Asia (FAO, 2012; USDA, 2010). Yet, while the need to increase

agricultural productivity in Africa is clear, there is a growing body of opinion that the Green Revolution trajectory of Asia and Latin America from the 1960s through the 1990s will not provide the multiple benefits that agriculture must deliver in Africa (DeFries & Rosenzweig, 2010). Instead, there are calls for development approaches that focus more strongly on social and environmental outcomes by intensifying food production in ways that sustain the natural resource base and enhance agroecosystem and livelihood resilience (De Schutter, 2010; WRI, 2008). However, while more holistic farm-level solutions are important, they rarely are sufficient, given that key ecosystem services underpinning human wellbeing and economic activity often function at larger scales. Landscape, watershed, and sub-national scales are also the level at which competition and conflict among different sectors or

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stakeholders over scarce resources may arise. For instance, water resource allocation may pit upstream agricultural users against downstream hydropower, urban, or industrial water users. Similarly, there are many documented instances of land allocation processes in which one sector (e.g., agriculture, forestry, or mining) develops new land-use plans or grants land concessions to investors without due regard to existing conservation plans, traditional land use practices, or other conflicting designations.

In this context, many contend that integrated (i.e., multi-objective, cross-sectoral) management of rural landscapes will frequently be the best—if not the only—way to ensure that human needs are met, and conflict is mediated and mitigated, as growing human demands for food, bio-energy, and ecosystem services collide with limitations on land, water, and other natural resources (LPFN, 2012; Sayer et al., 2013). Yet, current understanding of such integrated landscape approaches is fragmentary, often anecdotal, and spread widely across several academic fields and communities of practice. To help fill this gap, we conducted a systematic assessment to take stock of the practice of integrated landscape management in sub-Saharan Africa. This assessment provides a region-wide synthesis of characteristics, patterns, outcomes, and lessons learned from past and current experience.

(a) *Prior experience with landscape approaches in Africa*

Landscape management approaches are not entirely new to Africa, but the scope, breadth, and design of such approaches has progressively shifted in some important ways. Many of the earliest integrated landscape management efforts in Africa emerged from the conservation sector, in response both to the emerging sciences of ecosystem management and landscape ecology (Noss, 1983) and to a recognition of the linkages between the livelihood needs of local communities and key drivers of biodiversity loss. The first generation of “integrated conservation and development projects” (ICDPs), from roughly 1985 to 2000, included some landscape scale projects. However, the ICDP paradigm has been criticized for having weak logical models and token levels of local participation (McShane & Wells, 2004). In addition, improvements to agricultural production and food security were rarely included as major objectives of ICDPs; rather, because of its apparent connections to deforestation and land degradation, agriculture was more commonly viewed as a conservation threat to be mitigated. In the past decade, however, the conservation sector has increasingly begun to target its work to landscapes where agriculture is an important land use, with the aim of simultaneously addressing conservation and livelihood needs through ecosystem restoration, reduction of human-wildlife conflict, enhancement of ecosystem services, and climate change adaptation and mitigation activities (e.g., African Wildlife Foundation, 2013; Egoh et al., 2012).

Key antecedents in the realm of agricultural development can also be traced back a few decades. Beginning in the 1970s and 1980s, methodologies such as farming systems, integrated rural development, and *gestion de terroirs* in West Africa sought to address agricultural development in a more holistic and often participatory manner (Batterbury, 1998; Cleary, 2003). But these approaches were generally limited to farm or village scales and did not address broader ecosystem management issues or their feedbacks to food security and rural livelihoods. A later concerted attempt to align food production, livelihood security, and ecosystem management was the cross-cutting program on Integrated Natural Resource Management (INRM), launched within the Consultative Group

on International Agricultural Research following its 1998 systemwide review. INRM research attempted to bridge the need for communities and other actors to devise suitable localized solutions, with the need to achieve broader ecosystem management goals (Campbell & Sayer, 2003). But translating INRM research into action proved challenging, as the development community found INRM concepts complex to manage and expensive to implement through conventional projects. Nonetheless, there have been some compelling examples of INRM over the past decade, which illustrate the potential of this approach (German, Mowo, Amede, & Masuki, 2012). Now, with new technological tools (such as low-cost remote sensing imagery, spatial analysis, and decision support methods), improved understandings of effective multi-scale participatory governance, and new commitments by donors and governments to address multiple interests in rural landscapes, the time for widely applying INRM-type approaches may finally be ripe.

Indeed, in just the past few years, integrated landscape thinking has begun to be incorporated into mainstream development practice and policy in Africa, albeit still on a limited basis. For instance, one of the four core “pillars” of the Comprehensive African Agricultural Development Programme (CAADP) is sustainable land and water management—an integrative, ecosystem-based approach to agricultural development (World Bank, 2008). This pillar is being implemented in 28 African countries with support from the Global Environment Facility through the TerrAfrica platform, with increasing emphasis on landscape approaches. At a national level, efforts are now underway to mainstream multi-objective landscape restoration strategies in Rwanda and in several of the Sahelian countries through the Great Green Wall initiative. Green Economy policy frameworks that address rural landscape management are being designed in several African countries, while Green Growth approaches to agricultural corridor development—oriented around integrated landscape management—have also recently been proposed (Milder, Buck, Hart, & Scherr, 2013; UNEP, 2013). Within rural development organizations, concepts of ecosystem-based resilience, which tend to move development in the direction of landscape approaches, are gaining currency. These have already been institutionalized within some poverty alleviation organizations, such as the International Fund for Agricultural Development (IFAD, 2013) and CARE (CARE, 2013). However, beyond certain policy circles and international organizations, these ideas have not yet been widely diffused, and are little in evidence in most government or local nongovernmental organization (NGO) extension programs.

(b) *Integrated landscape initiatives: an emerging synthesis*

The simultaneous surge of interest in landscape approaches from the conservation, agriculture, policy, and economic development domains reflects a new appreciation of rural landscapes as a critical nexus at which to understand and manage synergies and tradeoffs among multiple objectives at multiple scales. The factors that have driven this convergence—including climate change, increased land and water scarcity, renewed concern about food security and interest in agricultural investment, and increasingly sophisticated understandings of the role of ecosystems in human wellbeing—are likely to persist if not strengthen in the coming years. Now is therefore a critical moment to take stock of landscape approaches across sub-Saharan Africa, assess patterns and trends, synthesize best practices and lessons learned, and make this information available to the designers, implementers, and supporters of the next generation of activities.

In this study, we inquire systematically into the ways in which “integrated landscape initiatives” (ILIs) are being developed

and applied throughout sub-Saharan Africa. We use *integrated landscape initiative* as an umbrella concept that encompasses many existing terms, approaches, and communities of practice related to integrated landscape management. A recent tally counted more than 70 such approaches, including *landscape restoration*, *biological corridors*, *bioregional planning*, *ecoagriculture*, *whole-landscape approaches*, and *diversified farming systems* (Scherr & McNeely, 2008; Scherr & Shames, 2012). Based on common characteristics of these diverse approaches, we define an ILI as a project, program, platform, initiative, or set of activities that: (1) explicitly seeks to improve food production, biodiversity or ecosystem conservation, and rural livelihoods; (2) works at a landscape scale and includes deliberate planning, policy, management, or support activities at this scale; (3) involves inter-sectoral coordination or alignment of activities, policies, or investments at the level of ministries, local government entities, farmer and community organizations, NGOs, donors, and/or the private sector; and (4) is highly participatory, supporting adaptive, collaborative management within a social learning framework. Beyond these four basic criteria, ILIs can take a variety of forms: they may be driven by local stakeholders and/or external actors, and may comprise new attempts at integrated landscape management as well as efforts to maintain or strengthen existing integrated land-use systems that arose spontaneously or through traditional management practices but now face significant pressures or challenges.

In the context of ILIs, “landscapes” typically consist of land mosaics including crop, livestock, fish, and forest production areas; grassland, woodland, or forest ecosystems; wetlands and water bodies; and human settlements and infrastructure. Formally, landscapes may be described as cohesive land areas defined by common biophysical characteristics, socioeconomic conditions, and/or jurisdictional demarcations, and typically encompassing approximately 100 to 10,000 square kilometers (Forman, 1995; LPFN, 2012). In practice, however, some African landscapes are larger than this, as they are defined around river basins, transboundary management areas, or large forest areas. Landscape boundaries may be discrete or fuzzy, and are often defined functionally around particular management challenges (e.g., watershed protection) or goals (e.g., agricultural value chain development).

(c) *Focus of this study*

This study provides a foundational portrait of integrated landscape management in sub-Saharan Africa by conducting a structured survey of ILI practitioners and participants across the region. While not exhaustive, the survey takes a systematic approach to characterizing the context, design, and outcomes of a large, illustrative sample of ILIs from across the continent. This study is part of a broader set of “continental reviews” of ILIs being conducted for several of the world’s continents, following similar methodologies, as part of the Landscapes for People, Food, and Nature Initiative (<http://landscapes.ecoagriculture.org>), a global effort to support the effective adoption of landscape approaches to integrating agriculture, conservation, and livelihood objectives.

We posed six research questions: (1) Where and in what kinds of contexts are ILIs taking place? (2) Why are such initiatives taking place, and what kinds of challenges and problems do they seek to address? (3) What kinds of investments, activities, and governance structures are included in ILIs? (4) What kinds of stakeholders are involved in ILIs? (5) To what extent were the surveyed ILIs reported to achieve positive outcomes across the key dimensions of landscape performance, including food production, livelihoods, ecosystem

conservation, and human and institutional capacity? (6) What were the most and least successful aspects of each initiative, and are there discernible patterns of effectiveness across the full sample?

2. METHODOLOGY

We used a multi-step process to identify, screen, and survey ILIs from throughout sub-Saharan Africa. First, we created a database of potential initiatives by drawing on three sources: (1) Internet keyword searches; (2) interviews with staff of civil society, donor, and research organizations active in Africa; and (3) canvassing individuals active in the Landscapes for People, Food and Nature Initiative, which includes many leading experts on landscape approaches. (For a list of the Internet keywords used, please see the [Supplemental Material](#).)

In creating the initial inventory, we included activities initiated by grassroots actors and local organizations, as well as those catalyzed or supported by donors, government programs, regional initiatives and platforms, civil society organizations (e.g., in the conservation or rural development sectors), and private sector actors. We also included traditional, locally developed landscape management systems in instances where there were deliberate efforts underway to maintain or adapt these systems to contemporary challenges such as land degradation, climate change, population growth, or major external investment. We collected basic information on each candidate initiative—including contact information, location, timeframe, activities and investments, and stakeholder involvement—to assess its suitability for inclusion in the full survey.

Next, we screened the initial list to eliminate entries that did not appear to possess the key characteristics of ILIs. Based on the definition of ILIs presented above, we used the following screening criteria:

1. The initiative explicitly seeks to advance goals related to food production, biodiversity or ecosystem conservation, and rural livelihoods.
2. The initiative works at a landscape scale and includes deliberate planning, policy, management, or support activities at this scale.
3. The initiative is developing or supporting multi-stakeholder processes, platforms, or institutions to guide landscape planning, investment, and management. These multi-stakeholder processes include actors from multiple spatial scales (e.g., farm, village, district, national government) and representing multiple interests or sectors (e.g., agriculture, water, forestry, environment/conservation, private business).
4. The initiative has moved beyond the concept stage and can claim specific outcomes or current activities such as land use changes, policy changes, or multi-stakeholder planning and negotiation processes.

After creating the final screened list of ILIs, we invited one representative of each initiative to complete the survey, which we administered through the online service Survey Monkey. We selected survey respondents based on their familiarity with each initiative and the landscape in which it is embedded, indicated by their residency or long-term work in the landscape. We also ensured that respondents had a broad understanding of activities and issues spanning multiple scales and sectors in the landscape. In some cases, the initially identified respondent did not meet these criteria, or was unavailable to complete the survey, in which case we identified an alternate respondent.

The survey consisted of a questionnaire with a combination of checkbox, multiple choice, and open ended questions. (For

a copy of the survey instrument, please see the [Supplemental Material](#).) A draft version of the questionnaire was pilot tested on 15 respondents, and subsequently refined to clarify and improve several questions for the final survey instrument. The survey was offered in English, French, and Portuguese. Survey questions focused on characterizing each ILI and its context, covering six areas, which correspond to the research questions posed above: (1) landscape location, size, population, and land cover; (2) basic information about the landscape initiative, including motivations, dates, and scale; (3) activities and investments included within the initiative, in the domains of agriculture, conservation, human livelihoods, and institutional planning and coordination (hereafter referred to as the four “domains”); (4) participation of different stakeholder groups and sectors in the initiative; (5) self-reported characterization of the initiative’s outcomes in the four domains; and (6) most and least successful aspects of each initiative. In addition, the survey requested basic information about the respondent and his or her organization. All of the data used in this study are based on respondent self-reporting in response to the survey questions.

We analyzed the survey data to generate descriptive statistics for characteristics including landscape location, size, land cover patterns, initiative age, motivations, types of activities/investments, number and identity of sectors involved, number and type of participants involved, and types of self-reported outcomes. Missing values (i.e., lack of response of certain respondents to certain questions) were excluded from the analyses. To investigate the degree to which the ILIs were indeed integrated, we developed two indices to summarize the relative number of different investments and outcomes, respectively, across each of the four domains; these indices are described further below. Finally, we used *t*-tests and analysis of variance (ANOVA) with Tukey–Kramer post hoc tests to query relationships among certain ILI attributes (such as initiative age, stakeholder participation, sectoral participation, investment index, and presence/absence of specific types of investments) and between these attributes and the outcome indices. Open-ended responses were manually tabulated, grouped into similar themes where appropriate, and reported based on the frequency of occurrence of such themes.

3. RESULTS

From the pre-screened ILIs, we collected complete survey data on 105 cases. Of these, we excluded 15 because the survey information revealed that the case did not meet our criteria for ILIs and another three because multiple responses were submitted for a single ILI. The remaining 87 ILIs were included in subsequent analysis.

Only eight of the 87 initiatives began before 2000. Two-thirds of the initiatives began, in their current arrangement, in 2007 or later; however, 48% of these were continuations of previous projects or initiatives in the same landscapes. At the time the survey was conducted, in 2012, 82% of the initiatives were ongoing while the remainder had already ended.

(a) *ILI locations and contexts*

We identified ILIs in 33 countries in sub-Saharan Africa. The greatest numbers were identified in Kenya (15), Ethiopia (9), South Africa (7), Democratic Republic of Congo (7), and Uganda (6). There were nine initiatives that spanned multiple countries, typically encompassing large transnational ecosystems or watersheds. The initiatives spanned all major

biomes represented in Africa ([Olsen et al., 2001](#)), with tropical and subtropical savannas/grasslands present in 69%, tropical and subtropical forests in 43%, desert in 11%, and montane grasslands, flooded grasslands, Mediterranean forests and scrubland, and mangroves each present in only a few landscapes. Approximately one-third of the initiatives had multiple biome types represented in the landscape.

The ILI landscapes ranged in size from tens of square kilometers to tens of thousands of square kilometers, with populations that ranged from several hundred to several million residents. These landscapes were delineated in a number of different ways: according an administrative boundary (e.g., a group of villages, district, or province), river or lake basin, protected area and its buffer zone, or an ecoregion or ecosystem type. In some cases, the geographic extent of the ILI followed none of these existing delineations but was oriented around a specific project objective or set of management challenges.

Respondents reported which of fourteen different land cover types (e.g., tropical moist forest, wetlands, annual grain crops, *etc.*) were present in the ILI landscapes as major land covers (each comprising at least 5% of the landscape) and minor land covers (each comprising less than 5% of the landscape). The surveyed ILIs are generally taking place in “mosaic” landscapes that, on average, each include more than four major land covers and four minor land covers. The large majority of initiatives took place in landscapes that included both major agricultural land cover types (for crops, livestock, and/or plantations; 89% of all initiatives) and major areas of natural ecosystems (native forest and/or grasslands; 76% of all initiatives). Urban and industrial areas represented a major land cover in 49% of the landscapes and was a major or minor land cover in all but 11 of the landscapes. Seventy-eight percent of the landscapes contained wetlands or lakes, but these were usually minor components of the landscape.

(b) *Motivations and impetus*

A variety of challenges and opportunities provided the impetus and guiding framework for the ILIs. Respondents cited a wide range of motivations, with strong representation of both conservation and agricultural interests ([Figure 1](#)). Many of the individual motivations spanned agriculture and conservation, such as sustainable land management, soil conservation, and efforts to reduce the negative impacts of agriculture. Although the ILIs were motivated by more than eight issues each, on average, 60% of respondents reported, in a separate open-ended question, that one or two issues were of primary importance in shaping the initiatives ([Figure 2](#)). There was no significant difference in the overall number of motivations reported by initiatives that identified one or two primary objectives and ILIs that did not identify primary objectives (*t*-test, $p = 0.22$). For initiatives that identified one or two primary objectives, biodiversity and natural resource conservation was by far the most common “entry point” (reported by 37 initiatives) while improving agriculture and enhancing livelihoods were less common (reported by 17 and 16 initiatives, respectively). Specific livelihood-related objectives identified in the open-ended responses included: increasing household well-being through the adoption of alternative livelihood strategies, improving food security, promoting community empowerment, increasing income, diversifying income sources, reducing poverty, and promoting the equitable use of scarce resources. In seven cases, the need for improved landscape planning and coordination—such as new co-management plans or better governance systems for land and

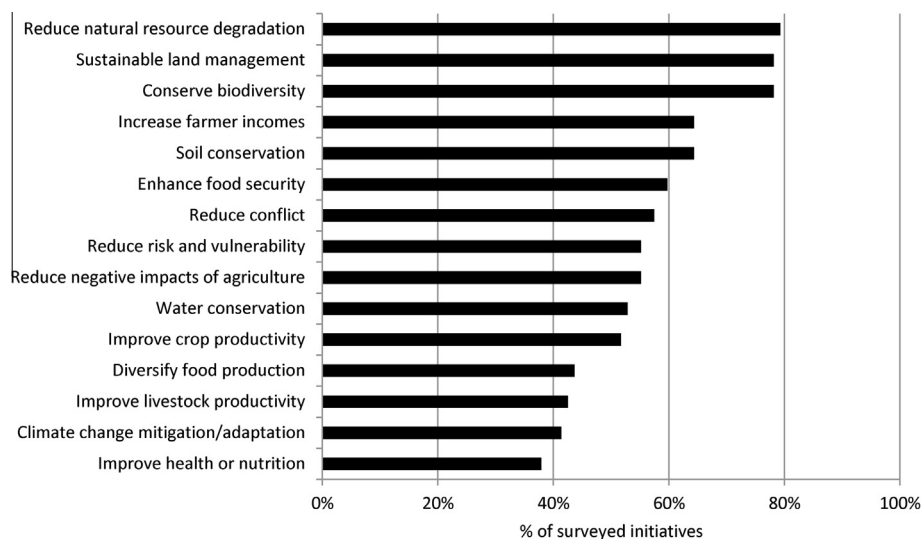


Figure 1. Main motivations reported for the initiatives. The horizontal axis indicates the percentage of initiatives for which respondents selected each of the motivations.

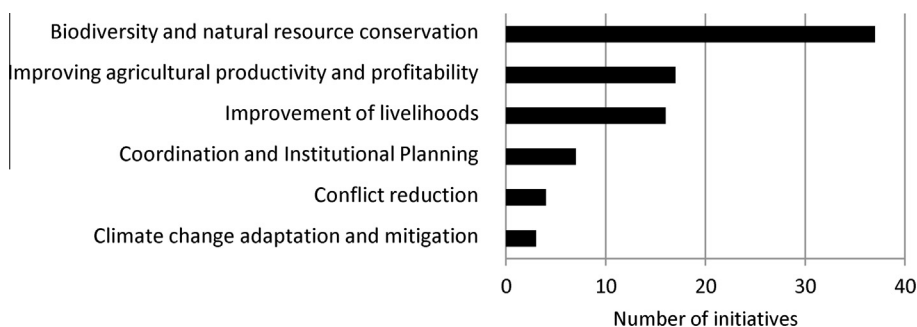


Figure 2. Number of initiatives reporting each of six main categories of primary motivations. “Primary motivation” signifies the one or two overriding reasons for the initiative. The six categories were created based on post hoc classification of open-ended responses for the survey question on primary motivations. Results are shown only for the 52 initiatives that indicated primary motivation(s).

resource management—was seen as a primary motivating factor and end in itself.

(c) Leaders, participants, and stakeholders

The survey instrument defined ILI “participants” as those who played a role in creating or carrying out the initiative or its component activities, not those who were merely informed or consulted as affected stakeholders. Under this definition, respondents consistently reported multi-stakeholder participation in ILIs (Figure 3). An average of more than nine stakeholder groups per initiative was actively engaged in design and/or implementation of the initiative or its component activities. We classified stakeholder groups as either internal to the landscape (e.g., local land managers, farmer groups, communities, and organizations whose purview is mainly the landscape itself or a sub-area thereof, such as local NGOs or municipal or district government) or external to the landscape (e.g., higher administrative levels of government as well as national and international NGOs, donors, or research institutions). Based on this classification, all but four of the initiatives reported participation from internal and external stakeholder groups. Forty-seven percent of initiatives had apparently balanced participation from inside and outside the landscape, suggested by the fact that the number of

participating stakeholder groups from each category was equal or differed by only one. Of the remainder, 37% had participation from more stakeholder groups from within the landscape while 16% had participation from more stakeholder groups from outside of the landscape.

One or more governmental entities were involved in the design or implementation of 95% of the initiatives. Participation of governmental bodies from within the landscape (local and district levels) was slightly more common (86%) than participation from bodies operating at larger administrative scales (state/provincial and national levels) (77%). NGOs from both inside and outside of the landscapes participated in the majority of the initiatives (Figure 3). Producer groups participated in 83% of the initiatives. However, participation from other private sector actors was rare (14% total from agribusiness and industry). All of the initiatives that engaged extractive industries were reported to involve a much higher total number of stakeholder groups, about fourteen on average.

Many of the initiatives involved participants from potentially marginalized groups. This included participation of indigenous groups in 41% of initiatives and landless people groups in 13% of initiatives. Women were specifically identified as participants in 57% of the initiatives.

All but six of the initiatives reported multi-sectoral participation, and the large majority included three or more

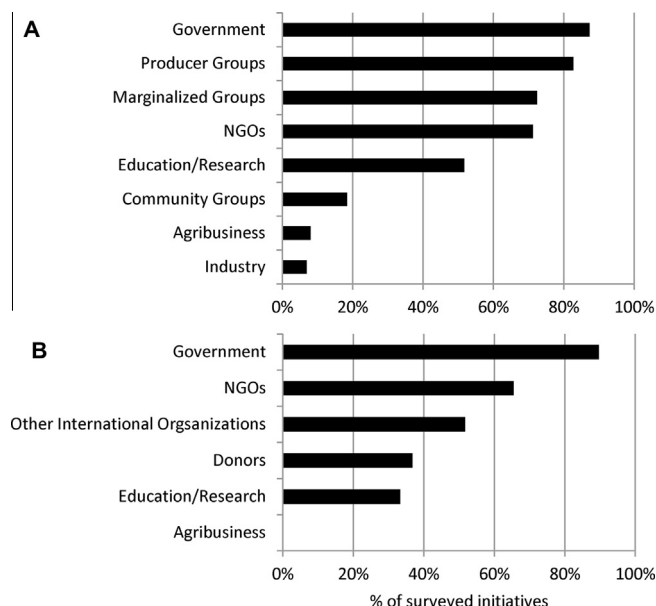


Figure 3. Percentage of initiatives in which each of fourteen different groups participated. Results are reported for stakeholder groups from inside the landscape (panel A) and outside of the landscape (panel B). Stakeholder groups within the landscape include organizations whose purview is largely the landscape itself or a sub-area thereof (e.g., local NGOs, farmer groups, communities, and municipal or district government) as well as local land managers. Groups from outside the landscape include higher administrative levels of government as well as national and international NGOs, donors, or research institutions.

sectors (Figure 4). Not surprisingly, the natural resources/environment and agriculture sectors were the most commonly involved, in 86% and 80% of cases, respectively (Figure 5). These were also the only two sectors featured in the six single-sector initiatives. The forestry and livestock sectors, closely linked to natural resources and agriculture, were also each involved in half or more of the initiatives. The education sector was involved in nearly one third of the initiatives. Less frequent was participation by the health, energy, or infrastructure sectors, which were each involved in fewer than 20% of the surveyed initiatives.

(d) Investments, activities, and coordination mechanisms

Figure 6 summarizes the proportion of initiatives that included each of 33 possible investments and 22 possible outcomes provided as choices on the survey questionnaire, across

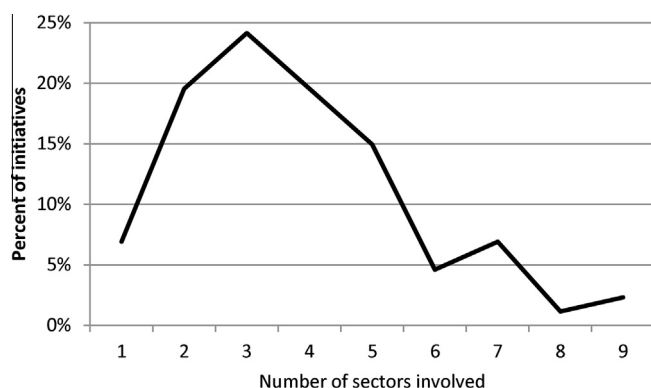


Figure 4. Level of multi-sectorality of the study initiatives, described here by the percent of initiatives involving a given number of the sectors is listed in Figure 5.

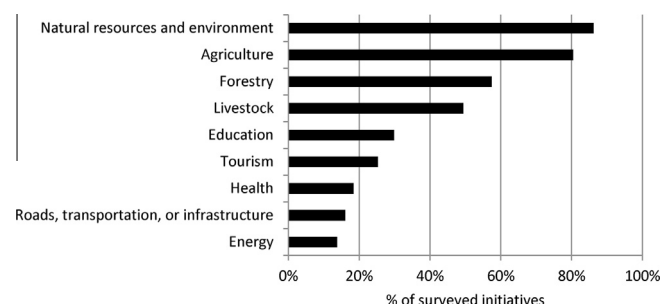


Figure 5. Sectoral participation indicated by the percentage of initiatives involving each sector.

the four domains of landscape multi-functionality. ILI investments included training and capacity building, implementing specific land management practices (e.g., crop, soil, and forest management), improving infrastructure (e.g., irrigation systems), enhancing social development and social equity (e.g., related to health, gender, and land tenure), and developing new policies and governance structures.

We compared the relative numbers of ILI investments and outcomes in each domain by calculating a set of summary indices. The “investment index” for each ILI was calculated by first dividing the number of investments identified in each domain (i.e., agriculture, conservation, livelihoods, and institutional planning and coordination) by the total number of possible investments (i.e., the number of choices provided on the questionnaire) in that domain and then normalizing this ratio to a 25-point scale. We then combined these domain scores with equal weights to derive a summary investment index with a maximum of 100 points. We used a similar procedure to calculate an “outcome index” based on the self-reported outcomes selected by respondents. It should be noted

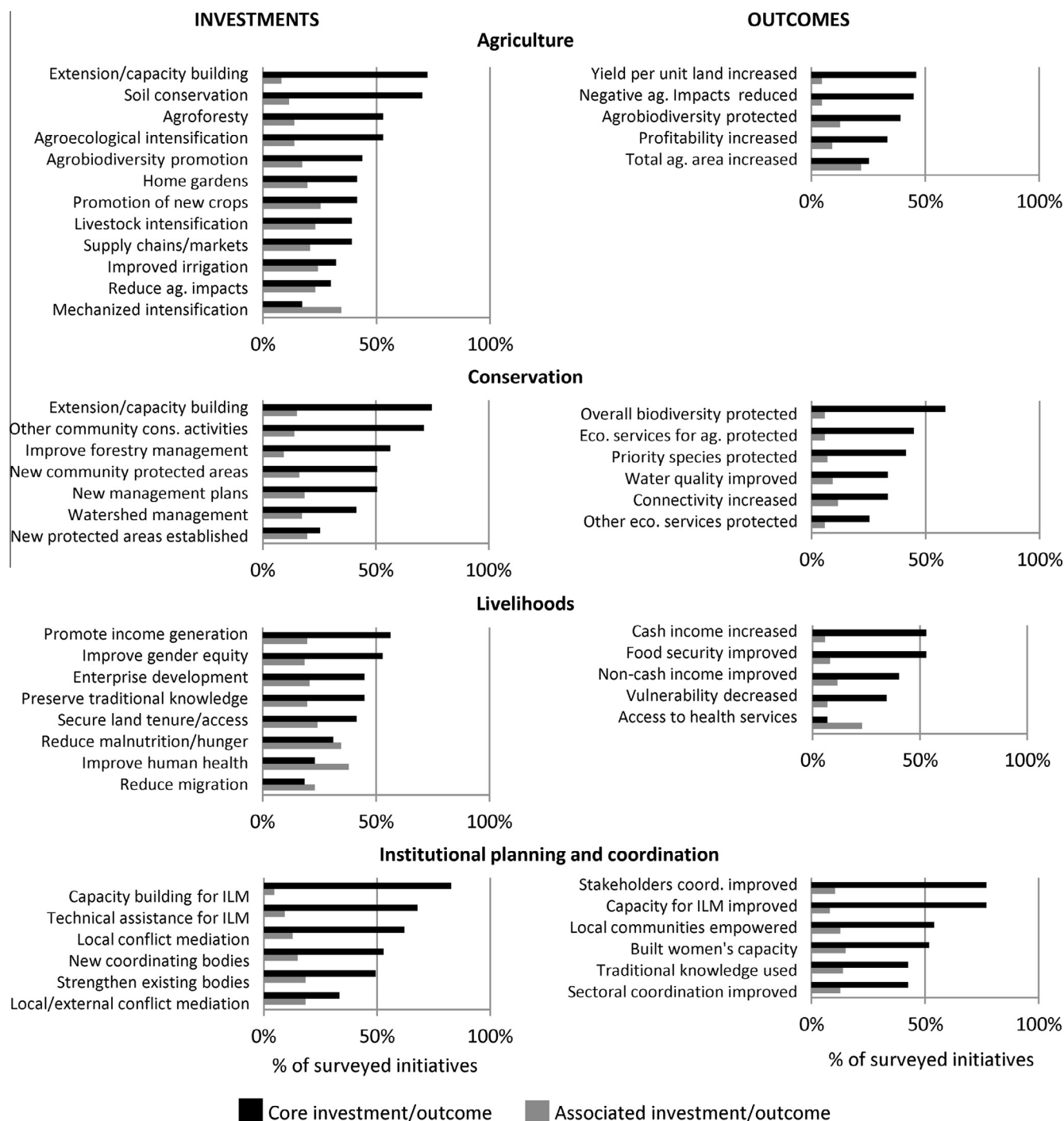


Figure 6. Proportion of the surveyed initiatives that were reported to include each of 33 investments and activities (left panel) and to achieve each of 22 outcomes (right panel) across the four domains of landscape multi-functionality. Investments included as part of the initiative itself are designated as “core” while those that took place in the landscape outside of the purview of the initiative are indicated as “associated.” Outcomes attributed to initiative activities are designated as “core” while those attributed to other factors are designated as “associated.” Investment and outcome descriptors are abbreviated here to conserve space; please see the survey instrument ([Supplemental Material](#)) for the full descriptions.

that these indices summarize the relative number and variety of investments and outcomes in each domain (as selected from among the pre-defined set of choices on the questionnaire), but not necessarily the magnitude of these investments and outcomes.

Overall, we found that the large majority of initiatives were investing in pursuit of multiple objectives: 94% of initiatives

invested in at least three of the domains while 83% invested in at least one activity in all four domains. In the 3% of initiatives that invested in only one domain, the other domains were represented to some degree by associated investments made by other actors in the landscape, outside the scope of the ILI.

Of the four domains, institutional planning and coordination exhibited the highest mean investment index, indicating

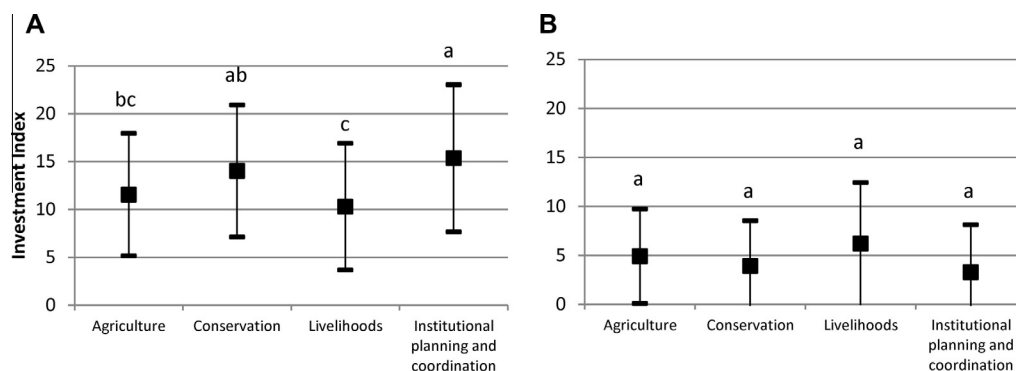


Figure 7. Mean investment index plus or minus one standard deviation, by area of investment, for core investments made by the initiatives (panel A) and associated investments made by other actors in the landscape (panel B). Different letters above each data series denote significant differences among domains ($p < 0.05$) based on Tukey's HSD test.

investment in many different planning and coordination activities (Figure 7, panel A). For instance, 66% of initiatives invested in creating new landscape coordinating bodies or strengthening existing ones, and 68% provided technical assistance to support integrated landscape management. Many ILIs included efforts to mediate and resolve conflict, including 62% of ILIs that worked to resolve conflict among multiple local stakeholders and 33% that worked to mediate conflict between local and external stakeholders.

The other areas of investment matched the trends observed in the main entry points, with investment in conservation being the most common, followed by agriculture. The livelihoods domain showed the lowest relative number of investments, and 10% of initiatives reported no investment in this domain. Associated investments made by other actors in the landscape show the opposite of the trend in core investments, with the largest relative number of investments being made in the livelihoods domain and the least in institutional planning and coordination, although these differences in numbers of associated investments are not statistically significant (Figure 7, panel B).

Almost all respondents (97%) reported capacity building as a component of their ILIs. This included capacity building related to agricultural practices (72%), forestry and natural resources (75%), and integrated landscape management (83%). Forty-eight percent of the ILIs invested in capacity building in all three areas.

(e) ILI outcomes

Overall, 63% of ILIs reported at least one positive outcome in all four domains, and 72% reported positive outcomes in at least three domains. ILI outcomes related to institutional planning, coordination, and human capital were the most consistently cited: more than three-quarters of respondents reported increased local capacity to sustainably manage landscapes and improved coordination and cooperation among stakeholders. In addition, a high proportion reported local community empowerment (54%), empowerment or capacity building of women (52%), and improved cross-sectoral coordination (43%) (Figure 6). Across the other three domains, only three outcomes were reported in more than 50% of the initiatives: overall biodiversity protection (59%), improvement in food security (53%), and increase in household cash income for low-income residents (53%).

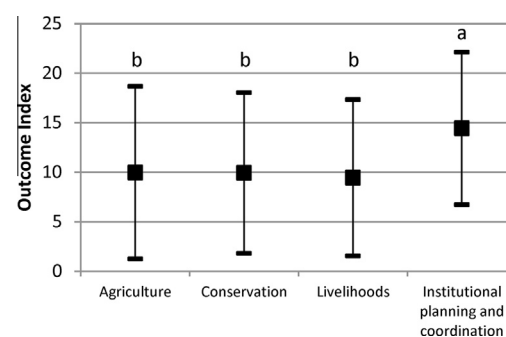


Figure 8. Mean outcome index plus and minus one standard deviation by outcome area. Different letters above the data denote significant differences among domains ($p < 0.05$) based on Tukey's HSD test.

On average, the overall outcome index for initiatives was significantly lower than the investment index (mean of 44 out of 100 vs. 51 out of 100, respectively) (paired t -test, $p = 0.009$). Respondents reported positive outcomes for an average of about two-fifths of the questionnaire options for the agriculture, conservation, and livelihoods domains, and about three-fifths of the options in the institutional planning and coordination domain (Figure 8). The higher proportion of outcomes in the institutional planning and coordination domain relative to the other domains is statistically significant (ANOVA, $p < 0.001$; Figure 8).

(f) Relationships among sets of variables

Correlation between the investment and outcome indices was significant and positive ($r = 0.45$, $p < 0.001$). Given that all the initiatives indicated multiple objectives and almost all invested across multiple domains, it is interesting that initiatives that reported having one or two primary motivations invested in fewer activities and reported fewer outcomes, on average, compared to initiatives in which there were no overriding motivation(s) (t -test, $p = 0.01$). In addition, when respondents identified one or two primary motivations, outcome scores in the domain(s) related to these primary motivation(s) were not significantly higher than scores for the other domains (paired t -test, $p = 0.27$). Notably, these primary motivations were identified as such in an optional, open-ended question separate from main checkbox reporting of motivations. When comparing initiatives classified as having low

multi-objectivity (reporting 1–5 main motivations), moderate multi-objectivity (6–10 main motivations), and high multi-objectivity (11–15 main motivations), higher levels of multi-objectivity were associated with a higher outcome index score (ANOVA, $p < 0.001$; Tukey HSD, $p < 0.05$ between the low and high groups).

Initiatives that invested in two or more forms of capacity building reported significantly higher numbers of outcomes than those that invested in fewer types of skills and capacities (t -test, $p < 0.001$). The establishment of new coordinating bodies by any group in the landscape was positively associated with a higher outcome index (t -test, $p = 0.01$), as were efforts to strengthen existing coordinating bodies (t -test, $p = 0.03$). Inclusion of conflict mediation activities, either among local actors or between local and external stakeholders, was positively related to higher numbers of outcomes, but these relationships were not statistically significant (t -test, $p = 0.22$ and $p = 0.17$, respectively). The number of stakeholder groups involved in an ILI was not significantly associated with the numbers of outcomes in any of the four domains, or across all domains. Initiatives with a higher proportion of internal stakeholders (internal:external stakeholder ratio > 1.3) had higher mean outcome index scores (mean = 56.2) than those where stakeholder participation was relatively balanced or skewed toward external stakeholders (mean = 43.5 and 43.0, respectively); however, this difference was only marginally significant (ANOVA, $p = 0.08$).

Initiatives explicitly identifying women as a stakeholder group reported significantly higher outcome index scores than those that did not (t -test, $p = 0.05$). However, the involvement of other potentially marginalized groups (i.e., indigenous groups and landless people groups) was not significantly associated with higher outcome scores. Participation of governmental entities—whether at the local, district, sub-national, or national levels—was not associated with significantly different outcome scores.

(g) *Most and least successful aspects*

Respondents were invited to provide open-ended responses on what they perceived to be the most and least successful aspects of their initiative. Conservation of soil, water, and biodiversity was mentioned most frequently (by 18% of respondents) as the most successful aspect. Improvements in local capacity—not only for land management but also for participatory decision-making—were identified for 17% of the initiatives. Improvement of livelihoods of local groups or communities, including increased cash and non-cash income, improved food security, and the successful development of alternative livelihood strategies, was cited by 16%. This result is notable given that the livelihoods domain garnered the lowest average investment and outcomes scores, suggesting that, although ILIs may not be achieving as many different livelihood outcomes, those that were achieved strongly influenced the perceived success of a subset of the surveyed ILIs. Several respondents also noted an increased awareness or changed attitudes and mindsets as key successes (11%). For example, one respondent reported increased awareness “about the importance of landscape-level thinking” while another reported broad community acceptance of revegetation of steep slopes due to a shift in attitude.

Other successes were related to tangible changes attributed to the initiative, such as the designation of a new protected area, establishment of a new governing body, enactment of a new set of policies, or adoption of specific agricultural and natural resource management practices. Several respondents

also noted the inclusion or increased participation of important stakeholder groups such as local communities and women.

Many of these same themes re-appeared in other landscapes as being among the most challenging or least successful aspects. Difficulties with coordinating stakeholders, building trust, reducing conflict, and assembling key actors were common challenges. However, the most frequently mentioned challenge was accessing continuous funding to carry out or scale-up initiative activities. Limitations in market access and infrastructure were also cited as key challenges leading to lack of success. This result concurs with the low levels of ILI participation by private sector stakeholders and by the infrastructure sectors. Finally, some respondents expressed frustration with challenging contexts in which increasing human pressures on the natural resource base and unsupportive public policy frameworks made it very difficult to carry out integrated, coordinated action with a view toward broader or longer-term sustainability.

4. DISCUSSION

At the outset, we note two important caveats for the interpretation of the survey data. First, data on the initiatives are self-reported, without independent verification by the research team. Thus, the accuracy of information on parameters that are essentially objective (e.g., certain landscape characteristics, ILI characteristics, or positive outcomes in measurable quantities across the four domains) may be limited by the knowledge or the quality of data available to the respondent. In addition, data on themes that may be more subjective (e.g., ILI motivations, participation of sectors and stakeholders, and positive outcomes in more difficult-to-measure realms such as human knowledge and institutional capacity) may reflect the intentional or unintentional bias of each respondent. A related limitation is that information on each initiative is based on the responses of a single representative of each ILI, who has a particular perspective based on his or her role in the initiative. In some cases, the respondent may have had a personal interest or stake in portraying the initiative in a positive (or negative) light.

To the extent possible within the constraints of a broad, continent-wide survey, we attempted to mitigate these limitations through the design and implementation of the survey. First, we defined key terms and parameters (e.g., what is meant by “participation”) in the survey instrument to reduce the role of subjective interpretation and increase consistency in question interpretation. Second, we specifically selected respondents who had a broad knowledge of the context, activities, and outcomes of the initiatives in which they participated. Third, we carefully screened survey responses to identify any irregularities that could indicate a lack of knowledge of the initiative or understanding of the survey questions. When necessary, we made follow-up contact to clarify respondents’ answers.

A second key caveat is that the 87 analyzed initiatives may not be fully representative of all of the ILIs currently or recently implemented in sub-Saharan Africa. Rather, they represent those that we were able to identify through a network of partners, contacts, or from their Internet presence, and that were subsequently able to furnish relatively complete information through an online or paper survey. This may result in some bias toward initiatives in which larger NGOs, donors, or research organizations were involved. Notwithstanding these two caveats, however, the survey responses provide a

rich dataset to begin to understand ILIs more systematically across sub-Saharan Africa, and to identify key questions for further research.

4.1 *A new paradigm?*

Overall, integrated landscape management in Africa does not appear to be as widespread or as well-developed a paradigm as it is on certain other continents. For instance, in Latin America, a similar survey turned up a substantially larger number of ILIs—including many more older and longstanding initiatives—as well as a variety of policies and platforms supporting integrated landscape management (Estrada-Carmona, Hart, DeClerck, Harvey, & Milder, Submitted for publication). However, based on the starting dates of the surveyed African ILIs, there appears to be an exponential rise in the use of landscape approaches over just the past five years, consistent with some of the trends noted in the Introduction.

If ILIs are viewed as merely the sum of their parts, then in many ways they are not novel: most included many of the same types of investments in agriculture, conservation, and livelihood improvement that have long been mainstays of rural development projects and sectoral government programs. What these initiatives add is an intentional effort to use multi-stakeholder, multi-scale frameworks to plan and implement the activities across an entire landscape, in a more coordinated fashion. In the most comprehensive of these, multi-sector governance, coordination, and adaptive management functions become the hub for linking stakeholders, activities, and policies. In other instances, ILIs have emerged mainly from the agricultural development or conservation entry points, but have diverged from conventional project models in that multi-objective design and broader thematic and/or spatial frameworks are seen as critical for achieving sustained improvements. In these cases, too, there is a central emphasis on capacity building, participation, and multi-stakeholder planning and coordination, which cannot often be said of earlier, ostensibly integrated, approaches such as ICDPs.

(b) *Does an integrated landscape approach pay off?*

Although the survey data on outcomes are not detailed enough to draw definitive conclusions about relative effectiveness and its causes, the results do suggest some potential values associated with integrated landscape management. At the broadest level, the fact that 63% of initiatives reported positive outcomes across all four domains suggests that integrated initiatives are capable of simultaneously meeting disparate objectives integral to landscape sustainability. This finding is significant insofar as several of the domains (e.g., agriculture and conservation, or livelihoods and conservation) have historically been portrayed as mutually incompatible (e.g., Balmford, Green, & Phalan, 2012) and have been (and largely continue to be) advanced through sectoral programs that may cause objectives in one domain to be pursued at the expense of objectives in other domains. The significant positive relationships between the relative numbers of investments and outcomes ($p < 0.001$), and between the number of motivations and outcomes ($p < 0.001$), further suggest that deliberate efforts to pursue multi-objective approaches to landscape management can pay off in the achievement of broader sets of outcomes supporting landscape multi-functionality. However, this inference must be made with caution, as it could be partially

an artifact whether each survey respondent took a conservative or liberal approach to checking boxes in the checklist survey questions on ILI motivations, investments, and outcomes.

Results from the optional open-ended survey question on primary motivations provide corroborating evidence of the value of a multi-objective orientation for landscape initiatives. Specifically, initiatives that identified one or two motivations of primary importance (apart from the other motivations identified in the closed-ended survey question) reported lower overall outcome scores, and equivalent or lower outcome scores even in the domain(s) related to the primary motivation(s). This finding suggests that a strong sectoral focus or single orienting project aim is not necessary to achieve progress related to priority landscape objectives. In doing so, it provides a rebuttal to the concern of some sectoral actors about “mission drift” associated with broadening the scope of, or expanding the range of pertinent considerations in, project and program design. We note, however, that our results do not reveal the magnitude or reach of each reported outcome, and it is therefore possible that initiatives reporting smaller numbers of outcomes are in fact making greater progress in each of these areas than initiatives that report larger numbers of outcomes.

One of the four defining features of ILIs (as elaborated in this paper) is the use of participatory adaptive management approaches within a social learning framework. Such approaches have previously been found to enhance the ability of stakeholder groups to navigate complex management challenges and negotiate conflict, particularly in contested or dynamic settings such as rural landscapes with competing demands on land, water, and other resources (Armitage et al., 2009). Our results reveal that not only were ILIs actively pursuing such approaches, but that participatory management frameworks appeared to support landscape multi-functionality. For instance, greater participation by local stakeholder groups, investment in at least two forms of capacity building, and investment in new or existing multi-stakeholder coordinating bodies were all associated with greater numbers of positive outcomes. In the context of mosaic landscapes, the active involvement of diverse stakeholder groups may increase the probability of uncovering hidden dependencies between social and natural systems that may impinge on several outcome domains. It may also help reduce tradeoffs among sectoral aims by surfacing key conflicts and facilitating the negotiation of such tensions through the multi-stakeholder processes that characterize ILIs (Guariguata, Sist, & Nasi, 2012; Schwilch et al., 2012). Conversely, initiatives with narrower sectoral entry points may be more likely to exclude important actors—and the perspectives they bring to management decisions—either by design or by oversight.

An examination of reported outcomes in the institutional planning and coordination domain suggests an additional benefit of integrated landscape approaches, namely their potential to increase the resilience of rural landscapes to biophysical and socioeconomic dynamics and shocks. Specifically, a high proportion of initiatives reported improvements in multi-stakeholder coordination, institutional capacity, and awareness of inter-sectoral linkages and co-dependencies, often within just a few years. Drawing from the broader body of research on socio-ecological systems, these outcomes would appear to be significant for putting in place the management processes and institutional mechanisms that can adaptively manage complex systems over time (Andersson & Ostrom, 2008).

(c) *Implications for governance and policy*

While the establishment of new institutions and capacities for landscape management is a promising sign, these steps do not necessarily mean that governance processes or outcomes will be robust and sustainable in the long term. One concerning trend is that some key stakeholders—particularly those from the private business sector—often appeared to be missing from ILIs. The reason for this absence is not entirely clear from our data, but is consistent with results from a similar review of ILIs in Latin America (Estrada-Carmona, Hart, DeClerck, Harvey, & Milder, Submitted for publication) and with the view that multi-stakeholder processes may entail a cost and risk for private business (i.e., in submitting to a decision-making process with uncertain outcome) with little financial upside. Regardless of the reason, this participation gap may inhibit the effectiveness of ILIs in addressing weak market linkages, which are a common impediment to rural development in Africa. The absence of powerful actors as stakeholders in ILIs also poses a risk that gains achieved through careful multi-stakeholder negotiation could be derailed by major decisions made outside of such processes. Indeed, private investors and powerful local elites in Africa have a history of circumventing local authority and democratic processes—most recently through a wave of agricultural “land grabs.”

A second potential limitation is that, although government bodies at multiple administrative levels were usually involved as stakeholders in ILIs, only infrequently did we find evidence of robust government support or leadership. In some cases, this lack of strong participation stemmed from a lack of resources or mandate; in others cases, existing power structures appeared to exhibit little enthusiasm for alternative processes that could usurp or complicate their authority. Furthermore, existing administrative units (e.g., districts, councils, and constituencies)—which are often the basis for distributing funds, power and patronage—may impede effective local support of landscape initiatives because they have no ready basis for supporting activities that cross administrative boundaries.

ILIs clearly operate in a political realm in which different actors vie for benefits or specific outcomes on behalf of themselves, their allies (e.g., family, group or tribe members; political or business allies; *etc.*), or their constituents. A full understanding of the political ramifications of ILIs—including distributional effects and consequences for power and the exercise thereof—is beyond the scope of this study. What is apparent from our results, however, is that respondents reported ILIs as generally having several of the characteristics typical of effective democratic governance processes, including multi-stakeholder participation, strong representation of local stakeholders (including potentially marginalized groups), and the presence of platforms for negotiation or coordination. As with any political process, there is the risk that ILIs could be co-opted by powerful interests to serve their own ends. However, ILIs would appear to be a poor vehicle for doing so, insofar as they may complicate the achievement of any one specific aim by introducing complexities associated with multiple landscape objectives, stakeholders, and scales of management. Indeed, our results suggest that a far greater risk is that those who do not wish to submit to the type of multi-stakeholder management processes embedded in ILIs will simply decline to participate, and instead pursue their ends through other routes that may undermine the effectiveness of the ILI. One potential policy remedy to address this scenario would be requirements for powerful actors (such as private investors) to engage in local or landscape-level planning and negotiation processes related to land and key natural

resources. Such requirements may be embedded, for example, in environmental review processes; stipulations on the granting of permits, land rights, or other preconditions of major investment projects; and lending terms and safeguards of development banks and other financial institutions.

Many survey respondents expressed concern that ILI activities and coordination processes were being funded on a temporary basis, often from sources external to the landscape (e.g., donor-funded projects), rather than being embedded in government policies and programs, or other durable means of support. Given that one of the hypothesized benefits of robust landscape governance is to help groups of stakeholders respond to changing circumstances and novel conditions (i.e., adaptation), such mechanisms must be sustained indefinitely, although their establishment may be catalyzed by time-limited project investments. The general lack of sustained sources of local support (financial and otherwise) in the surveyed African ILIs bodes poorly for their long-term sustainability, unless other types of support and incentive mechanisms can be developed.

Finally, it is important to recognize that the aim of ILIs is, above all, to achieve long-term sustainability, multi-functionality, and conflict reduction in rural landscapes where stakeholders are demanding the delivery of multiple goods and services. However, throughout much of Africa there is understandably a focus on solutions that can be immediately effective and rapidly scaled up, particularly for food security and poverty reduction. In this context, Green Revolution investments (e.g., improved seed, access to fertilizer and other agrochemicals, and improved market linkages) hold appeal because their impacts on yield and hunger may be rapid and readily documented (ActionAid, 2009). For instance, Malawi's fertilizer subsidy program is often cited by policymakers as a success story because it transformed the country from being food insecure to being a maize exporter within a few years. Without qualifying the importance of such achievements, it is important to note, as well, the economic burden of subsidies on national budgets, the ecological implications of high-input agriculture, and the possibility that other options may be available to achieve similar benefits with fewer tradeoffs. In this context, ILIs may be considered as a more holistic development approach, which takes into account ecological, social, and economic factors across multiple scales to target investments and influence outcomes. In many instances, ILIs can complement more narrowly focused investments aimed at addressing specific short-term needs.

(d) *Future directions for research*

By synthesizing experience with ILIs from across sub-Saharan Africa, the results presented here can help inform action by practitioners and policymakers around the already emerging interest in landscape approaches on the continent. However, further study will be needed to assess quantitative outcomes, better understand key drivers and mechanisms, evaluate cost-effectiveness, and compare ILIs to other rural development strategies. We suggest three priority needs for new evidence on ILIs: (1) more quantitative evidence on the outcomes of integrated management for landscape multi-functionality, especially on outcomes related to food production and poverty alleviation; (2) evidence that more rigorously links landscape management processes to key outcomes (i.e., credible attribution); and (3) research that unravels the specific mechanisms underlying such linkages, including the human and institutional resources and capacities needed to support landscape management. The complex nature of

socio-ecological systems makes this type of information far more difficult to provide than for relatively straightforward investments or policies. However, unless key ILI outcomes are tracked and reported quantitatively, it will be difficult to compare integrated landscape approaches to other development strategies—or to assess cost-effectiveness—for key results such as increased food security, reduced levels of poverty, or increased flows of ecosystem services.

We suggest two research approaches that could help meet the needs identified above. First, with greater research investment, it should be possible to retrospectively collect and analyze quantitative data on multiple landscape outcomes within ongoing ILIs. Such data would provide independent verification of ILI characteristics and outcomes, an important complement to information self-reported by ILI leaders and managers. This type of research has been carried out for a few individual landscapes, but not consistently across a large sample size (akin to the one in this study) that might permit more generalized conclusions and cross-site comparisons. Quantitative data should be also disaggregated in suitable ways to reveal, for instance, the ways in which changes in food production, income, and poverty are distributed across a landscape and its different populations, particularly the poorest and most vulnerable segments.

Continuing to monitor changes across all four domains over a ten to twenty year period will be important for assessing long term dynamics, understanding implications for the

resilience of human and ecological systems, and uncovering indirect consequences or benefits of multi-objective approaches. In fact, only at the decadal timescale may it be possible fully to assess whether ILIs provide a more sustainable or resilient approach to food security, poverty alleviation, and ecosystem conservation than other types of strategies and investments.

Second, understanding of ILIs could be greatly augmented through the use of mixed methods approaches that build upon the summary characterizations reported in this article with in-depth assessments of individual ILIs attained through multiple interviews, direct observation, case histories, and other techniques. Similar work has been done for other types of multi-scale natural resource governance, but ILIs have some unique traits that merit their own investigation. Such work could help clarify the different designs of landscape institutions and their effectiveness in different social, political, and biophysical contexts; elucidate political dynamics, opportunities, and limitations for ILIs to advance effective democratic governance; and delve more deeply into the nature and significance of participation in ILIs by different stakeholder groups. It would also probe the specific dynamics of multi-scale, multi-sectoral stakeholder processes, in which key decisions often lie at the boundary of, if not outside, the ordinary purview of many actors. Finally, there is much to be learned from ILI practitioners about key features of the enabling environment and policy context that support or undermine their efforts.

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APPENDIX A. SUPPLEMENTARY DATA

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.worlddev.2013.07.006>.

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