

The Sustainable Livelihoods Approach: A Framework for Knowledge Integration Assessment

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Abstract

A number of recent approaches to sustainable development, such as the Sustainable Livelihoods Approach, are genuinely transdisciplinary as they are produced, disseminated and applied in the borderland between research, policy, and practice. Human Ecology has the capacity to contribute to a better understanding and a critical evaluation of such new approaches, but is currently lacking the tools for identification and formulation of standards for this purpose. This paper outlines an assessment framework of criteria for integrative approaches to sustainable development problems and is applied to the Sustainable Livelihoods Approach. The results show the benefits of formulating standards that can be applied to plan and evaluate integrative approaches. Such standards are necessary if the goals of holism and integration that are implied by approaches such as the Sustainable Livelihoods Approach are to be attained.

Keywords: human ecology, Sustainable Livelihood Approach, rural development, knowledge integration

Introduction

Only five years after the formal introduction of the sustainable livelihoods concept by Robert Chambers and Gordon Conway in 1991, important donor institutions such as Care, Oxfam, the United Nations' Development Programme (UNDP), and the UK Department of International Development (DFID) had adopted the *Sustainable Livelihoods Approach* (SLA) as basis for their development programmes and practices. The first elaborated definition of the concept of sustainable livelihoods reads:

a livelihood comprises the capabilities, assets (stores, resources, claims

and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term (Chambers and Conway 1991, 6).

The rapid development from concept to approach entailed an elaboration of policy-oriented livelihood frameworks, the description and analysis of driving forces, pressures, and impacts of all types of activities related to the local livelihood situation. An example of such a framework is that used by DFID (Figure 1).

One important reason for the success of SLA in winning the attention of key policymakers in donor institutions was that it offered a fresh vision of a holistic and/or integrative approach with the capacity to analyse and understand the complexity of rural development (Chambers and Conway 1991; Solesbury 2003; UNDP 1999a). When the issue of holism or integration has been discussed in relation to the approach, however, the comments have been restricted either to positive and general remarks such as indicated above, or to

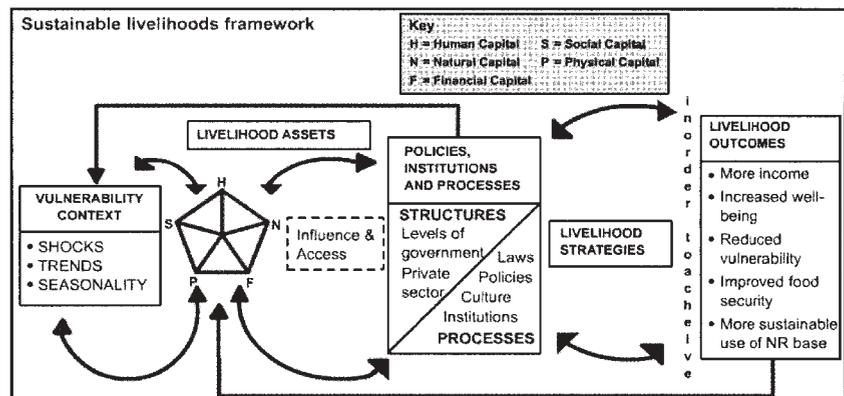


Figure 1. DFID's Sustainable livelihoods framework, adopted from www.ceciasia.org/utthan/sla.htm

an equally general and sweeping criticism, as exemplified in statements where the SLA is described as holistically seeking to capture the enormous complexity of development problems at the cost of focus, depth, and analytical clarity (van Dillen 2002).

As exemplified by the development of SLA, knowledge integration constitutes an important feature in the production, dissemination and application of knowledge related to sustainability and development. Public and private contributors to research and development programmes are increasingly calling for integrated approaches. For human ecologists, with a long tradition of interdisciplinary research on the complex interactions between people and the environment, this trend is of course welcomed warmly. Although integrative approaches carry new criteria for quality control, however, there are hardly any standards for assessing, comparing, or evaluating processes of knowledge integration. As Klein (1996) argues, criteria for judgment is the least understood aspect of knowledge integration. Without standards of judgement, any approach that labels itself interdisciplinary, integrative, or holistic, is likely to be accepted as such. The task of identifying and formulating standards for assessing and evaluating processes of knowledge integration is a challenge that remains largely unanswered.

The Assessment Framework

A number of recent approaches to sustainable development, such as the *Sustainable Livelihoods Approach* (SLA), are genuinely transdisciplinary as they are produced, disseminated and applied in the borderland between research, policy, and practice. This paper is an attempt to define an assessment framework of additional criteria for such approaches. The assessment framework is applied on SLA, as an example of an approach that is envisioned as an integrative and holistic effort to understand and promote complex development processes. This attempt is important for three reasons. First, if we agree that we need integrative or holistic approaches in order to further our understanding of sustainable development processes and establish effective policies and practices, additional criteria for integrative approaches would enable researchers and policymakers to evaluate to what extent specific approaches have succeeded in generating integration and holism. Second, assessment criteria would be very useful when integrative efforts are proposed and planned. By defining specific aims and standards of knowledge integration, more reasonable expectations of what an integrative effort should accomplish could be established already in a planning phase. Third, establishing additional assessment criteria would help to avoid polarized views on integrative approaches. Without relevant criteria for evaluation of integrative ap-

proaches, we are either left with unrealistic hopes, or unfounded criticism.

Four questions form the basis for the framework:

- I. Where is the integrated knowledge of the approach *used*?
- II. What *purpose* of integration is presented by the approach?
- III. What *forms* of integration are accomplished by the approach?
- IV. What *degree* of integration is accomplished by the approach, within each *form*?

The assessment framework consists of four sections that correspond to the four questions presented above. Sections one and two build upon categorizations by Egneus et al. (2000) and Klein (1990; 1996) that are related to knowledge integration within universities, while sections three and four are more independent elaborations.

Use of Knowledge Integration

Following Egneus et al. (2000), three uses of knowledge integration are identified: production, dissemination and application. As the SLA case shows, these uses should not be seen as isolated from each other, but rather as more or less integrated steps in a whole process of knowledge use. At the same time, each form of knowledge use has epistemological and methodological principles which are at least partly its own, requiring specific processes of integration (Egneus et al. 2000; Klein 1990). Applying a differentiation of the use of knowledge integration reveals that most of the literature on interdisciplinarity and transdisciplinarity relates to knowledge production rather than dissemination or application of knowledge. This means that studies related to knowledge integration focus on research rather than policy or practice.

Production of Knowledge

When knowledge integration is applied to production of knowledge, it is mostly referring to different ways of gathering or collecting information. Knowledge production is often intimately associated with disciplinary academic research and its cognitive and social norms of what should count as good science (Gibbons et al. 1994). A number of writers, however, have questioned the academic authority over knowledge production (Asad 1973; Bourdieu 1990; Bourdieu and Wacquant 1992; Foucault 1980; Gibbons et al. 1994; Schoenberger 2001; Swidler and Arditi 1994; Turnbull 1994). Gibbons et al. (1994) argue that a new mode of knowledge production has emerged that is more responsive to standards formulated by various stakeholders outside the academic arena. SLA could be seen as an example of this trend, where much of the production of knowledge has taken place at institutions such as the Institute for Development Studies (IDS) and

Overseas Development Institute (ODI), or NGOs such as CARE or Oxfam. These institutions and NGOs are not only responsive to scientific standards, but also to standards formulated by governmental and non-governmental policy-makers, and stakeholders involved in the implementation of development programs and projects.

Dissemination of Knowledge

Dissemination of knowledge refers to contexts where knowledge is spread or shared. The literature on knowledge integration and dissemination is almost exclusively related to formal education such as various attempts to create interdisciplinary or theme-based curriculum at different levels of the education system (Bird 2001; Collins 2002; Egneus et al. 2000; Klein 1996; Lonning et al. 1998; Moore 2000). This academic notion of dissemination, however, needs to be broadened in order to incorporate other contexts where knowledge is disseminated. For example, the introduction of new media for recording, transmitting and accumulating knowledge, changes knowledge itself (Swidler and Arditì 1994). Many documents related to the SLA are easily available as PDF files at different websites, where the primary use of SLA often is to spread awareness of the approach to practitioners or policymakers.

Application of Knowledge

Application of knowledge is related to efforts to solve problems in society. Egneus et al. (2000) argue that application of knowledge in societal problem-solving by necessity involves integration, or at least combination of knowledge. The concepts of interdisciplinarity and transdisciplinarity are often invoked as necessary for effective approaches to complex problems facing the world today (Alberti and Waddell 2000; de Kok et al. 2000; DeTombe 2002; Harriss 2002; Hisschemöller et al. 2001; Klein 1991; Mulder 2001; Scholz and Tietje 2002; White 2002). SLA has at least part of its roots in an applied and problem-solving context, as well as in policy-directed work. It could be argued that the approach is a response to the need to handle complex problems with a more integrated and holistic perspective.

The Purpose of Knowledge Integration

The second part of the assessment framework acknowledges that integrative approaches might have different purposes and asks what we want to achieve when we initiate processes of knowledge integration. The following three broad purposes are adopted from Klein (1990; 1996).

Broadening

Broadening implies an integrative effort with the pur-

pose of taking more variables into account, such as more methods, more or extended viewpoints or perspectives, but with a strong sensitivity to the underpinnings of the units that are taken into account. When people's livelihoods are viewed as the starting point rather than the end, the purpose of integration is broadening. For example, when there is an acknowledgement that soil erosion needs to be approached based not only on basic ecological functions, but also on the local social and cultural situation, as well as the local economy and its connection to the larger "market" economy, this is broadening.

Reconfiguration

Integrative work can aim at reconfiguring knowledge by transferring established knowledge into new, integrative contexts. It can also lead to established knowledge becoming applicable in new contexts and give rise to new combinations for knowledge production, dissemination or application. The key to understanding reconfiguration as a separate purpose from broadening is the development of a new integrative context. Broadening can be conducted without the establishment of a new context. The purpose of the Sustainable Livelihoods Framework, as presented by Scoones (1998), is a specific example of knowledge reconfiguration. By combining a number of separate variables (income-generation, access to natural resources, social mobilization, food-security etc.), research methods (participatory research, surveys, qualitative interviews), and different perspectives (poverty-alleviation, the effect of migration on rural communities, sustainability of resource-use etc.), within one single framework, there is reconfiguration of knowledge.

Synthesis

Synthesis refers to the appearance of new coherent knowledge. A synthesis of knowledge brings together knowledge components that before were considered separate wholes (as for example different theories, disciplines, methods, or institutions) to a common understanding or a whole, thereby redefining the former borders between the separate units. While reconfiguration allows knowledge units to continue to be separate wholes, the purpose of a synthesis is to establish a new whole of interlinked units. In the specific context of SLA, Chambers and Conway (1991) claim that the separate concepts of capability, equity and sustainability (and the theories behind them) combine in the new concept of sustainable rural livelihoods. The purpose of integration is not broadening, since the separate concepts that are being integrated are systematically linked to each other. Neither is the purpose reconfiguration, since the separate concepts make up a new, coherently defined whole: the concept of sustainable livelihoods.

The Forms of Knowledge Integration

The distinction between different purposes of knowledge integration offers a very broad guide to why knowledge integration is taking place. The next step of the assessment framework is to define different forms of knowledge integration in order to approach the question of what is actually integrated by a particular integrative effort. Academic knowledge integration is often assessed according to three forms of integration (multidisciplinary, interdisciplinary, transdisciplinary), but these categories are far too general in scope and do not give any guidance as to the specific knowledge components that are being integrated (Bruun 2000; Egneus et al. 2000; Klein 1990; 1996). This section of the assessment framework is built on the assumption that integration of different components of knowledge lead to different forms of integration. Four forms of integration are identified, all of which are relevant but not confined to disciplinary knowledge integration.

Theory Integration

In some cases, there is a greater distance between different theories within disciplines (for example between Marxist and liberal theories of economy) than between disciplines (for example between a Marxist sociologist and a Marxist anthropologist). Theory integration refers to when boundaries or borders between separate theories or theoretical/conceptual frameworks are crossed. Bruun (2000) proposes the term epistemic framework instead of disciplines in order to address bodies of knowledge rather than their institutional context. Epistemic frameworks consist of a relatively coherent body of interrelated components such as models, theories, methods, techniques, concepts, instruments, and categories of data. Defining theoretical and conceptual components as belonging to the same form of knowledge integration as methodology, techniques, instruments and categories of data, however, disregards that many methodological approaches cannot be linked to specific theories or conceptual frameworks. For example, when Bebbington (1999) calls for a framework that can bridge the more materialist and the more hermeneutic and actor-centred notions of poverty and livelihood, he is referring to perspectives on poverty that are not linked to coherent sets of methods. He is calling for integration of theories rather than methods.

Method Integration

In order to produce, disseminate or apply knowledge, different methodologies, techniques, instruments and categories of data can be used. Following the arguments above, method integration may be part of interdisciplinary integration when disciplines or epistemic frameworks are integrated.

Methods, however, might also be integrated as a separate process. For example, Scholz and Tietje (2000) attempt to integrate quantitative and qualitative methods through a number of case study methods. Research methodologies in knowledge production, however, are not the only methodologies. There are also methods for dissemination and application of knowledge. For example, there are various strategies, techniques and instruments that are used to disseminate knowledge, which can be adjusted to different contexts, target groups and purposes. Examples of methodologies for application of knowledge are the different methodologies and strategies that development organisations have used to fight poverty, from, for example, giving out food, to initiating processes of empowerment through participatory approaches.

System Integration

Knowledge integration can take the form of a system approach, broadly meaning a holistic view of subparts and the interrelationships among the subparts of a system (Rapoport 1972). An obvious disciplinary example of such integration is system ecology. A system is a defined whole, consisting of integrated elements, or subparts, which are related to each other as well as the whole. Generally, the relationships between system subparts are governed by system principles, specific for the system in question (Emery 1981). For example, a system can be defined as static or dynamic, purposive or non-purposive, mechanistic or organic, etc. Systems can be natural (such as an ecological system or the human body), cultural (such as a ritual or a system of beliefs), social (such as when we see society as a system), etc. A common characteristic of a system is that the whole is something more than the subparts added together. The system carries a value or function as a whole, not as the aggregation of subparts. For example, Scoones' (1998) framework accounted for earlier can be viewed as a system in the sense that it consists of defined subparts that are related to each other (even though the relationships are not defined in detail). One of the subparts is economic capital, which is related to a system (the sustainable livelihoods framework). Economic capital is not an economic theory or a method, but a property of the framework and defined in relationship to the other subparts of the system (social capital, physical capital, natural capital, etc.), as well as the framework as a whole.

Institution Integration

Even though some disciplines may share similar theoretical and methodological approaches, knowledge integration might be blocked by reasons of administration, status or power-struggles linked to the institutional identity of the disciplines. Institution integration is about crossing borders between different ways of organizing knowledge. Despite the

fact that knowledge is intimately connected to power, social relationships and social organizations, processes of knowledge integration are often discussed without sufficient consideration of how knowledge is organized (Schoenberger 2001; Shapin 1995; Swidler and Ardit 1994). This is particularly true in the context of interdisciplinarity, where disciplines conventionally are defined according to object and method of study, rather than as social institutions (Bruun 2000). Institution integration often incorporates integration of interests of various stakeholders. In the context of SLA, the United Nations' Development Programme stresses the need to involve all relevant local organizations, alongside key government ministries and donor organizations, in the planning and implementation process (UNDP 1999). In this example, SLA could be viewed as an attempt to integrate different institutions of knowledge, all organizing knowledge relevant to the approach.

The Degree of Integration

The last section of the assessment framework concerns the degree of integration. While the purpose of integration points at the general aim of knowledge integration, the degree of integration is a de facto assessment. The categorization of academic knowledge integration into multidisciplinary, interdisciplinarity, and transdisciplinarity is sometimes referred to as degrees of integration rather than forms (Bruun 2000; Egneus et al. 2000; Klein 1990; 1996). Since the scope of the assessment extends disciplinary integration, the degrees of integration are defined more broadly:

No integration: Knowledge comes from only one component and no specific activity, approach or methodology for integration is elaborated.

Existence of knowledge from more than one component: Knowledge comes from at least two components, but no specific activity, approach or methodology for integration is elaborated.

Low level of integration: Integration is an explicit part of the process, but has not resulted in new coherent knowledge.

High level of integration: Integration is an explicit part of the process, and has resulted in new coherent knowledge or synthesis.

Putting Theory into Practice

A sample of 40 strategically selected documents, downloaded from four websites, have been assessed (Appendix 1). The selection of documents was governed by the aim to include a representative spectrum of documents from each website. The year of publication ranges from 1992 to 2003. The documents range from consultancy reports and evalua-

tions of specific projects to strategy papers, articles, policy paper drafts, case studies, toolboxes, workshop reports, PowerPoint presentations, etc. The Livelihoods Connect website (managed by the UK Department of International Development) was selected as an example of a network that collects and spreads knowledge about the Sustainable Livelihoods Approach. The UNDP website was selected as an example of multinational organization. The ODI website was selected as an example of an institution that functions as a think tank related to the approach. The CARE website was selected as an example of a NGO outside the United Nations.

Each document was carefully analysed qualitatively following the sections of the assessment framework. A substantial number of the documents could not be categorised into only one of the three forms of knowledge use. In fact, as the results of the analysis will show, in nine documents SLA is used for production as well as dissemination and application of knowledge. The fact that the approach in a number of documents is related to more than one knowledge use presented problems for the analysis. As stated earlier, each category of knowledge use has epistemological and methodological principles that are partly its own, requiring specific processes of integration. This means that for documents with more than one use of SLA, the degree of integration should be assessed in relation to each form of knowledge use.

The quantitative assessment presented below was conducted in three steps. Firstly, *knowledge use* was analysed at the level of the total sample, and at the level of the four websites. Secondly, the *purpose of knowledge integration* was analysed at the level of the total sample, the level of the four websites, and in relation to *knowledge use*. Thirdly, *the degree of knowledge integration* was analysed at the level of the total sample, the level of the four websites, in relation to *knowledge use*, and finally in relation to *purpose of knowledge integration*. The four degrees of integration in the framework were turned into a scale from zero (no integration) to three (high level of integration). As SLA is used for more than one form of knowledge use in many documents, the values indicated by the quantitative analysis of knowledge use therefore exceeds the total number of documents.

Assessment of the Use of Knowledge Integration

Production is the most common form of knowledge use in the sample (43%), dissemination accounted for 33%, while application accounted for 24%. Analysing and comparing knowledge use at the level of website, shows that the percentage of application as knowledge use ranges between 13% at the Livelihoods Connect website to 29% at the CARE website. The reason for this difference might be that CARE is an operative NGO, while Livelihoods Connect is an information network for sharing knowledge and experience without any

direct links to the implementation of policies and programmes. This argument is confirmed by the fact that knowledge production constitutes 44% of the use of SLA at the Livelihoods Connect website, but only 29% at CARE. The highest percentage of use for knowledge dissemination is found at the ODI website, where dissemination accounts for 47%. The relatively low percentage of knowledge production at the ODI website (29%) is surprising, considering that ODI acts as a think tank with regard to development issues.

Despite the fact that SLA is often described as an approach to societal problems, such as poverty and lack of development in rural areas, the approach has so far primarily been used as a framework for knowledge production. The knowledge produced by the approach is of course intended to be applied in the context of development projects and programmes, but as the results shows, there are less examples of application than examples when SLA is used as a framework for production or dissemination of knowledge. Even though SLA is rarely envisioned as a framework for dissemination of knowledge, dissemination of knowledge forms an important part of its ongoing development. In order for the promoters of the approach to move from analytic and diagnostic work to solving problems in rural or urban areas of poor countries, the principles of SLA have to be distributed and understood by all relevant institutions. Furthermore, there is a need for standards of practice, whether as production or application of knowledge.

Assessment of the Purpose of Knowledge Integration

The total sample analysis shows that SLA predominantly reconfigures established knowledge. In 54% of the documents, reconfiguration was assessed as the primary function. In 28% of the documents the function of integration was broadening, while in 18% of the documents, the function was synthesis.

Assessing the purpose of integration at the level of the website shows both similarities and differences between the four websites. Reconfiguration is the most common purpose among documents in all four websites, ranging from 50% (Livelihoods Connect and CARE) to 70% (UNDP). A notable difference is that synthesis is the purpose of integration in only 10% of the documents collected at UNDP and Livelihoods Connect, while it is the purpose of integration in as much as 30% of the documents collected at CARE. The highest percentage of broadening was recorded at the Livelihoods Connect website (40%), compared to the three other websites, where the percentage of broadening ranged from 20% to 27%.

To be able to relate the purpose of integration to the three different categories of knowledge use, the sample had to be divided according to the three categories of *knowledge use*, as

Table 1. Purpose of integration (broadening, reconfiguration, synthesis) in relation to knowledge use (production, dissemination, application).

<i>Knowledge use</i>	<i>Total number of documents</i>	<i>Broadening</i>	<i>Reconfiguration</i>	<i>Synthesis</i>
Production	10	4	4	2
Dissemination	7	2	5	0
Application	0	N/A	N/A	N/A
Production + Dissemination	6	0	4	2
Production + Application	6	1	4	1
Dissemination + Application	2	2	0	0
Production + Dissemination + Application	9	2	6	1
TOTAL	40	10	22	8

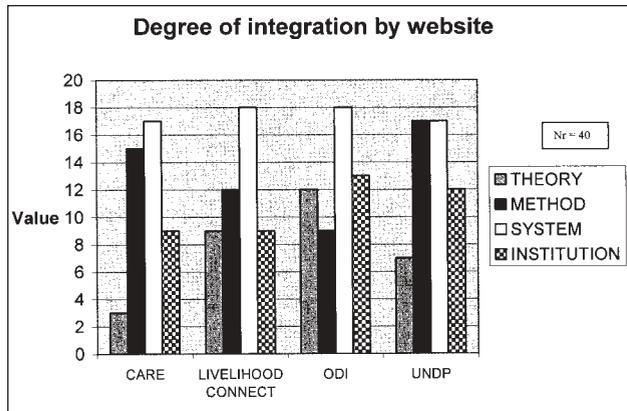
well as possible combinations between them (Table 1). The first thing to note from the table is that there are no documents where the only use of knowledge is application. Secondly, examples of synthesis as purpose of knowledge integration is only found in documents incorporating production as knowledge use.

The conclusion is that despite the fact that SLA is envisioned as an holistic and integrative approach, it aims at broadening or reconfiguring knowledge, rather than changing the borders between established units of knowledge. So far, the purpose of the approach is not, at least not primarily, to establish new, coherent knowledge, but to develop a new framework that makes it possible to relate separate units of knowledge to each other and to the new framework.

Assessment of the Degree of Integration

As mentioned before, the four categories of degree of integration were coded from zero (no integration) to three (high level of integration). Looking at the degree of integration for the total sample (Figure 4), it can be concluded that system integration shows the highest degree of integration, with a mean value of 1.75 (closest to *low level of integration*). Method integration has a mean value of 1.325, institution integration 1.075 (closest to *existence of knowledge from more than one component*), and theory integration 0.775.

The comparison of degrees of integration between the four websites show both similarities and differences (Figure 2). In all of the four websites, system integration showed the highest degree of integration (although, the degree of method integration among the 10 documents downloaded from UNDP was as high as the system integration). This is not surprising considering that the focal point of SLA is a systematic framework of relevant factors, comprising a livelihood. The highest degree of method integration is found at the UNDP website, followed by CARE. This might reflect the



Comment: In each of the 40 documents, the degree of integration within each form of integration was coded from 0 (no integration) to 3 (high level of integration).

Figure 2. Degree of integration at the four websites (Livelihoods Connect, ODI, UNDP, CARE) and according to four forms of knowledge integration (theory integration, method integration, system integration, and institution integration).

fact that both UNDP and CARE are organizations, which implement development policies through projects and programmes, thereby putting more effort into the development of methodologies, while Livelihoods Connect is a network gathering and spreading documentation and ODI is more of a “think-tank.” This difference between the websites is further reflected when comparing degrees of theory integration. Here, ODI has the highest score, followed by Livelihood Connect.

The results from relating the degree of integration in the sample to the uses of knowledge integration are presented in Table 2. Notable from this table is the low degree of method

Table 2. Mean degree of integration within four forms of integration (theory integration, method integration, system integration, and institution integration), in relation to knowledge use (production, dissemination, application).

Use of knowledge integration	Number of documents	Mean degree of theory integration	Mean degree of method integration	Mean degree of system integration	Mean degree of institution integration
Production	10	0,8	1,5	1,8	1,0
Dissemination	7	0,71	0,29	1,29	0,57
Application	0	N/A	N/A	N/A	N/A
Production + Dissemination	6	0,83	1,5	1,83	1,33
Production + Application	6	0,67	1,5	1,83	1,17
Dissemination + Application	2	1	1	2	1
Production + Dissemination + Application	9	0,67	1,78	1,89	1,22
TOTAL	40	0,775	1,325	1,75	1,075

Comment: In each of the 40 documents, the degree of integration within each form of integration was coded from 0 (no integration) to 3 (high level of integration).

integration in documents where the only use of knowledge is dissemination. It therefore seems as if method integration is linked to production or application of knowledge, rather than to dissemination. Even though it is not at all surprising, it is still important to note that the degree of theory integration is highest in the documents where production is the only form of knowledge use (the group that is a combination of dissemination and application is higher, but only incorporates two documents). It is interesting to see that if theory integration is taken away, the knowledge use group incorporating all three uses of knowledge accounts for the highest degree of integration, taken together. This could imply that in cases where the different uses of knowledge are integrated or combined, there exists a solid platform for knowledge integration.

Lastly, the degree of integration is related to the purpose of knowledge (Table 3). The prediction for this analysis was that in documents where the function of integration is broadening, the degree of integration should be lower than in documents where the function is reconfiguration or even more so, when the function is synthesis. Based on the sample, the prediction is confirmed in all cases except that the mean degree of theory integration is higher for broadening than reconfiguration. One possible explanation for this is that the degree of theory integration in most of the documents is too low to be interpreted as the purpose of integration (e.g. integration might have taken place without any clear aim or purpose).

Concluding from the assessment of the degree of integration, it is only in terms of system integration that SLA is an integrative, holistic approach. The average degree of system integration in the sample corresponds to the primary, integrative purpose in the sample, which is reconfiguration.

Conclusion

The assessment framework applied here raises questions about whether the present acceptance of SLA among many development institutions and organisations is based on reasonable expectations of what the approach will contribute to. There are five main areas that need further development:

- More efforts are needed to acknowledge and integrate the different uses of the approach. The differentiated use of knowledge integration in the sample could be viewed as a strength of the approach in the sense that it covers the whole process of knowledge production, dissemination and integration. The relationship and links between these uses, however, are rarely explicit or systematically designed. This is especially evident in the efforts to integrate methods, which seem exclu-

Table 3. Mean degree of integration within four forms of integration (theory integration, method integration, system integration, and institution integration), in relation to purpose of integration (broadening, reconfiguration, synthesis).

Purpose of integration	Number of documents	Mean degree of theory integration	Mean degree of method integration	Mean degree of system integration	Mean degree of institution integration
Broadening	11	0,91	1,18	1,64	0,91
Reconfiguration	22	0,59	1,32	1,77	1,09
Synthesis	7	1,14	1,57	1,86	1,29
TOTAL	40	0,775	1,325	1,75	1,075

Comment: In each of the 40 documents, the degree of integration within each form of integration was coded from 0 (no integration) to 3 (high level of integration).

sively related to production or application of knowledge.

- The purposes of knowledge integration needs to be clearly defined. If the main purpose of the approach is broadening, we should not expect a high degree of integration. If the ambition of the approach is to reconfigure and even establish a new, coherent knowledge of sustainable development problems, however, we are right to expect a higher degree of integration.
- The integration of theories relevant to the approach need to be developed, since the lack of theory integration in the sample poses serious questions about the historical and theoretical foundation of the approach.
- More efforts are needed to develop and integrate relevant methodologies for knowledge dissemination and to integrate methods based in natural sciences in the production of knowledge.
- The institutional integration of SLA must be strengthened. This does not mean that all organizations and institutions have to abide by a single approach, but rather that experiences and developments are systematically and openly shared. Without such developments it is doubtful whether SLA will fulfil the high hopes of holism and integration associated with it.

This paper has presented an assessment framework that establish an “integration profile” of any integrative approach and allows for target areas to be pinpointed for refinement and further development. The application of the assessment framework on SLA shows the potential for human ecology to develop standards for knowledge integration, which can contribute to more integrative approaches to sustainable development problems in research, education, policy and practice. Hopefully the assessment will stimulate a discussion among human ecologists about how to judge processes of knowledge integration and how human ecology can contribute to increased understanding of such processes.

Endnote

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Appendix

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