

The Scales of Health –
And the Health of Scales

A Comparative Review
of Health Assessment Approaches

By: **David J. Connell** (ID#: 0108924)

For:
Prof. Tony Fuller
Sustainable Rural Communities
RST60003
Rural Studies PhD Program
University of Guelph

December 14, 1999

1.0 Introduction

This paper undertakes a comparative review of four health assessment approaches¹ – four different emerging bodies of knowledge to which the concept of health applies. These are: Healthy Cities (HC), Sustainable Livelihoods (SL), Agroecosystem Health (AESH), and Ecosystem Health (ESH). The comparison of these approaches seeks to:

- identify and delineate areas of overlap and distinction; and,
- explore where and how each of these approaches fit across the scale from individual to ecosystem, i.e., *the scales of health*.

The intent is to answer one primary question:

Does each of these health assessment approaches represent a distinct scale of health (e.g., individual health, community health, society health, ecology health)?

The question that follows this one is: what is the utility of knowing this? Does a distinction of scale help us to better understand health? In other words, if we have various scales of health, what is the *health* of having these scales?

1.1 Health, Scale, and Systems

An underlying question of this paper is: how does each health assessment approach compare to the others vis-à-vis health, scale, and systems? While looking *at* each approach, we must also look *within* each approach. Therefore, we must also ask: What is the importance of health, scale, and systems within their conceptual frameworks?

Before comparing the approaches, we will take a closer look at scale, systems, and health. These three concepts are common to the four approaches; they are also interdependent. For example, human health focusses on the individual within a social system usually bounded by a definition of community. Similarly, a healthy community exists within a society within an ecosystem.

¹ For convenience, the author uses the term *health assessment approach* to group HC, SL, AESH, and EHS. For each, in their own way, may be described, generally, as methods to measure, promote, or develop healthy systems.

Fortunately, as Waltner-Toews and Wall (1997) offer, “many issues can be clarified by specifying scale and extent” (p.1743).

1.1.1 Scale

Rapport (1994) expresses the issues surrounding scales:

Fundamental to the assessment of ecosystem health is the appropriate temporal and spatial scale of analysis. Boundaries often appear arbitrary, but their choice may make a critical difference in the validity of the analysis. If chosen at too fine a scale, insidious processes might be overlooked. Similar considerations may apply at various temporal scales. What may appear ‘abnormal’ on a short-term scale, may be seen as recurrent events on a century-long time scale. Partly the scale problem is a question of identifying major driving forces governing the dynamics of the system and bounding the system as to internalize the critical functions... (p.18).

These issues apply to each health assessment, not only to ecosystem health. While scale, in large part, gives definition *to* each of the assessment approaches, it is important to understand how scale is used *by* each approach. For example, how important is scale for defining health in Healthy Cities? How does Ecosystem Health define its own scale of inquiry?

1.1.2 Systems

The issues surrounding systems are very similar to the issues of scale. In this, we want to explore:

- How are systems defined by each health assessment approach? and,
- What is the importance of systems within the conceptual frameworks of each approach?

We start here with a definition of ecosystem, which may be applied to systems in general:

[Ecosystems are] ... functioning units of the biosphere, usually self-maintaining (often with perturbations), and deriving distinctive properties from their structural components as well as from interactions among those components (Smit et al., p.3)

Elliot and Cole (cited in Smit et al., 1998) emphasise the hierarchical nature of ecosystems. They suggest that the term ‘ecosystem’ describes the nested hierarchy of interactions within and between individuals and their environments. Another important aspect of system health is the idea of maintaining system organisation despite stresses from internal or external factors (Wall, 1996, p.1).

These aspects of systems—functioning units, distinctive properties, structural components, interactions, hierarchy, stresses, internal and external factors—contribute to distinguishing the conceptual frameworks of each health assessment approach.

1.1.3 Health

The concept of health becomes complex when precise definitions and applications are pursued (Smit et al.). Definitions, for example, tend to treat health as a state, as a resource, or in terms of capacity (e.g., to attain goals or respond to stress). In particular, the Ottawa Charter for Health Promotion (1986) refers to health as a resource that gives people the ability to manage and even to change their surroundings (Smit et al., p.6). Further, health applies to people, communities, societies, economies, business, and ecosystems, among others.

This paper keeps the concept of health open, so that we may build an understanding of health as it relates to each of the four assessment approaches: Healthy Cities, Sustainable Livelihoods, Agroecosystem Health, and Ecosystem Health.

1.1.4 Approach of this Paper

To appreciate distinctions and overlaps, the four approaches are compared using the following categories: Definition, Objectives and Principles, Conceptual Framework (General, Health, Scale, and Systems), Indicators, and Methodologies. The reasons for choosing these categories appear in Table 1.1.

Table 1.1. Choice of Categories for Health Assessment Approaches

Definition	While each of the approaches are in many ways still working on a single definition, they each offer at least one. These definitions attempt to give meaning to the concept and provide a quick reference.
Objectives and Principles	These often flow from the origins. Further, they provide a better understanding of the concept than a definition alone.
Conceptual Framework	This is the most comprehensive aspect of each approach as is presented in four sub-sections: General, Health, Scale, and Systems. This will help to understand each approach and to reveal the finer distinctions among the approaches.
Indicators	While the distinctions may remain unclear, even with a review of the conceptual frameworks of each, a look at <i>what</i> each approach attempts to measure offers a specific account of how health is assessed. The danger, however, is to view these variables in isolation of the concept as the variables alone contain many interpretations.
Methodologies	The intent here is to highlight differences and similarities in another way. How the assessments are undertaken, like variables, infer their own meaning of what health means.

2.0 Comparison of Health Assessment Approaches

This section presents the outcomes from comparing each component (e.g., Definition, Objectives, Indicators) of the health assessment approaches. The comparisons are presented separately as sub-sections, following the same format for each. The format is:

- A statement is made to indicate if the comparison reveals weak, moderate, strong or very strong distinctions among the approaches.
- A table presents a summary of each component for each approach. This information was culled from a review of the literature.
- A explanation of the underlying distinctions follows.

2.1 Definitions

A comparison of definitions reveals **strong** distinctions among approaches, as shown in Table 2.1. Generally, although simplistically, we can associate HC with individuals, SL with communities, AESH with agriculture, and EH with ecology.

Table 2.1 Comparison of Definitions

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>Individual</p> <p>A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential (Duhl, p.89)</p> <p>WHO (1997):</p> <ul style="list-style-type: none"> - Population enjoys a high quality of life - Takes care not to transfer socioeconomic and environmental or health problems to other places or future generations - Creates new principles and processes of sustainable urban planning - Intersectoral approach incorporating spatial and environmental aspects as well as health, social, cultural and economic elements 	<p>Community</p> <p>The capability of people to make a living and improve their quality of life without jeopardizing the livelihood options of others, either now or in the future</p> <ul style="list-style-type: none"> - The ability to cope with and recover from shocks and stresses; - Economic effectiveness, or the use of minimal inputs to generate a given amount of outputs; - Ecological integrity, ensuring that livelihood activities do not irreversibly degrade natural resources within a given ecosystem; and - Social equity which suggests that promotion of livelihood opportunities for one group should not foreclose options for other groups, either now or in the future. <p>(DFID, 1999c, p.1)</p>

Table 2.1 Comparison of Definitions (continued)

AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Agricultural system</p> <ul style="list-style-type: none"> - Managed primarily for the purpose of producing food and fibre and other agricultural products - Comprise domesticated plants and animals, biotic and abiotic elements of the underlying soils, drainage networks, and adjacent areas that support natural vegetation and wildlife - Explicitly include people - Have socioeconomic and public health, as well as environmental dimensions (Waltner-Toews cited in Smit et al., p.4) - A holistic view, explicitly recognising biophysical and socio-economic dimensions, and the interrelationships between them (Snit et al., 1998, p.1) 	<p>Ecological system</p> <p>An ecological system is healthy and free from “distress syndrome” if it is stable and sustainable—that is, if it is active and maintains its organization and autonomy over time and is resilient to stress (Costanza, 1992, p. 248).</p>

Key words in Duhl’s definition of Healthy Cities are “community resources which enable people.” Thus, this highlights the focus on people, which may be further refined as a focus on individuals. As Pilar and McCarthy (1994) state, the community strives for improved health of *individuals* using available resources, emphasising social and personal resources. This gives meaning to the characteristics of a healthy, sustainable community listed by WHO, but does not detract from the focus on individuals.

Sustainable Livelihoods’ ‘people-centred’ refers to people metaphorically (as opposed to ‘policy-centred’ (WHO, 1999)). This is not explicit in the definition, however the literature (Rennie and Singh, 1999a; UNDP, 1999a; UNDP, 1999b) refers to people in this way. For example, “This focus on people is equally important at higher levels (when thinking about the achievement of objectives such as poverty reduction, economic reform or sustainable development) as it is at the micro or community” (WHO, 1999). Further, SL situates itself within an ecosystem (Rennie and Singh, 1995), not within a community. Hence, SL refers to the community’s capability to cope with shocks and stresses. This is the context for understanding economic effectiveness, ecological integrity, and social equity. While SL’s definition embraces attributes of systems (temporal scale, external shocks and stresses), it does not mention health.

Agroecosystems explicitly recognise biophysical and socio-economic dimensions, and the interrelationships between them (Smit et al., p.1). Therefore, it defines itself as including people—“the most influential mammalian community” (Smit et al., p.4). This helps to distinguish AESH from ESH. In addition, AESH is further defined as *ecosystems* managed for the purpose of producing agricultural goods, including food and fibre (Smit et al. p.1). This is distinct from Ecosystem Health (ESH), which provides a technical account of the health of ecological systems.

2.2 Objectives and Principles

The inherent generalities of objectives limit our ability to understand the approaches. Nevertheless, **moderate** distinctions among objectives and principles appear, as shown in Table 2.2. Similarities arise between HC and SL, as well as between EASH and ESH. This creates a two-way division among the four approaches.

Table 2.2 Comparison of Objectives and Principles

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>Enhance well-being of people Objectives: - Enhance the physical, mental, social, and environmental well-being of the people who live and work in the cities - Put health on the agenda of decision-makers in cities and to build a strong lobby for public health at the local level - Explicit political commitment at the highest level - New organisational structures to manage change - Commitment to developing a shared vision - Investment in formal and informal networking Principles: Equity, health promotion, intersectoral action, community participation, supportive environments, accountability, the right to peace (WHO, 1997)</p>	<p>Poverty Reduction Purpose: To promote sustainable livelihoods for the poor - Focus on policies and an enabling environment - To bridge the gap between micro- and macro-level development initiatives (Rennie and Singh, 1995, p.26) Goals: - Improved access to high-quality education, information, technologies and training and better nutrition and health - A more supportive and cohesive social environment - More secure access to, and better management of, natural resources - Better access to basic and facilitating infrastructure - More secure access to financial resources - A policy and institutional environment that supports multiple livelihood strategies and promotes equitable access to competitive markets for all (DFID, 1999a)</p>
AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Improve health of agriculture - Explicitly recognise health as including biophysical, socio-economic, and human community dimensions - To create a framework specifically for agriculture-centred ecosystems, distinct from ecosystem health (Smit et al.)</p>	<p>Protect the natural environment Objectives: - Identify problems of and potential solutions for assessments and causes of ecosystem degradation and effective restoration of ecosystem health - Develop systematic methods for diagnosing major causes of ecosystem breakdown - Assess options for restoration or rehabilitation, - Assess risks or threats to the viability of systems (Rapport, 1994) Principles: - Provision of ecosystem services - Safeguarding management options - Minimizing subsidy - Minimizing damage to neighbouring systems - Societal values and ecosystem process (Rapport, 1995)</p>

A comparison of HC and SL objectives reveals strong similarities. Much of this rests upon goals associated with sustainability, whether in cities or with respect to livelihoods. As such, access to services, cohesiveness and solidarity, infrastructure, and management of natural resources represent immediate commonalities. In addition, both place high emphasis on affecting change in local policy on health. Interestingly, each recognise two dimensions of the local environment: HC

refers to informal and formal networks; SL refers to micro- and macro-level policy. Neither, however, refer to systems in their objectives.

AESH and ESH, on the other hand, deal explicitly with systems in their objectives. Further, both acknowledge interdisciplinary approaches as necessary in the pursuit of improved system health. On this, we can say that these systems-centred approaches are significantly distinct from HC and SL.

As noted in the distinction between the definitions of AESH and ESH, the former strives to distinguish itself from ecosystem health, emphasising again the role of humans within agroecosystems. ESH elaborates more fully the objectives of a systems-based approach. These, in turn, also apply to AESH.

2.3 Conceptual Framework – General

A look at the general aspects of each approach’s conceptual framework reveals **moderate** distinctions (see Table 2.3). Three features emerge from the comparison. Firstly, the scope and complexity of each approach increases from HC to ESH. Secondly, and more significantly, AESH alone embraces all of the other approaches. This ‘anomaly’ overrides the apparent distinctions that exist among the other three approaches. Thirdly, the role and place of people diminishes from HC to ESH.

Table 2.3 Comparison of Conceptual Framework - General

<p>HEALTHY CITIES</p>	<p>SUSTAINABLE LIVELIHOODS</p>
<p>Human health/human development.</p> <ul style="list-style-type: none"> - view cities as human ecosystems or social ecosystems (Duhl, 1990) - Focuses on the level of governance closest to the population - good health and sustainable human development will only be achieved if the relationships between economic, social, and environment are equitable, sustainable and livable - Community conviviality, environmental viability and economic adequacy need to be balanced - Community conviviality is related to the web of social relations, civic community and social solidarity - Environmental viability refers to the quality of the local ecosystem, including air, water, soil and the food chain - Economic adequacy means having a level of economic activity that can meet basic needs (WHO, 1997) 	<p>Adaptive strategies of communities within identified ecosystems.</p> <ul style="list-style-type: none"> - Emphasises a people-centred approach based on an analysis of people’s strengths, rather than needs - Uses asset-based perspective of strengths and how these are used for sustaining livelihoods - Assets form the core of the conceptual framework. Five types of capital (assets): social, natural, physical, financial, and human - Primary concern is increasing access to these assets - Views people as operating in a context of vulnerability - Assets gain their meaning and value through the prevailing social, institutional and organisational environment (DFID, 1999a; DFID, 1999b)
<p>AGROECOSYSTEM HEALTH</p>	<p>ECOSYSTEM HEALTH</p>
<p>Complex reality of human and biophysical systems functioning at a variety of scales.</p> <p>Approaches and methods:</p> <ul style="list-style-type: none"> - Holistic - comprehensive definition of health - Disaggregated - health is defined separately for each dimension - Community-based - employs community-based interpretations. (Smit et al., 1998) 	<p>Complex ecological systems.</p> <ul style="list-style-type: none"> - Bridges the natural sciences, social sciences and health sciences - Brings a fresh perspective to environmental issues - Self organising - Hierarchical (holarchies and holons) (Rapport, 1995, p.1; Kay, 1999)

The overlap of AESH with the other approaches exists within Smit et al.'s (1998) categorisation of approaches and models (see Appendix A). The three main categories defined are Holistic, Disaggregated, and Community-based. Each of the approaches and methods that took place as part of the Agroecosystem Health Project fall within these categories. We also see that Sustainable Livelihoods falls within "Disaggregated" under the sub-category of "Human Dimension of Agroecosystem Health." This sub-category "includes the well-being of individual humans and the communities they form," wherein one aspect of well-being "relates to human and community livelihood" (Smit et al., p.21). The sub-category, "Community Health," encompasses Healthy Cities. Herein, the interest is "the role community environments have on individual lifestyles, attitudes, well-being, empowerment, and self-efficacy" (Smit et al, p.22). Ecosystem Health falls under the sub-category, "Biophysical Dimensions of Agroecosystem Health." As stated by Smit et al., "(i)n many respects the biophysical health of agroecosystems may be interpreted as being synonymous with ecosystem health..." (p.24). Thus, AESH as presented by Smit et al. encompasses each of the other three approaches.

Leaving this question of fit aside, we turn to the third general aspect, that of people. Healthy Cities, in its focus on human health, is most concerned with individuals. SL, on the other hand, concentrates on the context within which sustainable livelihoods are achieved through adaptive strategies (Rennie and Singh). Assets (or types of capital) lie "at the heart" of the SL concept (DFID, 1999a). Thus, SL may be viewed as one step removed from people. Similarly, AESH is further removed from people. AESH looks at the context of livelihoods as one aspect of the human ecosystem (Smit et al.). ESH is the most abstract, looking only at ecological ecosystems, wherein humans are a species and communities refer to populations of species (Rapport, 1994; Rapport, 1995).

2.4 Conceptual Framework - Health

Although the importance of health in defining each conceptual framework diminishes from HC to ESH, there are **very strong** distinctions among concepts of health as shown in Table 2.4. The focus shifts from human health to community health to agriculture health to ecology health, as we move from HC to ESH.

Table 2.4 Comparison of Conceptual Framework - Health

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>Human health</p> <ul style="list-style-type: none"> - An outcome of the effects of all the factors affecting the lives of individuals, families and communities in different ways and through different pathways (WHO, 1997) <p>Determined by:</p> <ul style="list-style-type: none"> - Living and working conditions - Quality of the physical and socioeconomic environment - Quality and accessibility of care services (WHO, n.d.) 	<p>Community health.</p> <ul style="list-style-type: none"> - Resilient in the face of external shocks and stresses; - Not dependent upon external support (or if they are, this support itself should be economically and institutionally sustainable); - Maintain the long-term productivity of natural resources; and - Do not undermine the livelihoods of, or compromise the livelihood options open to, others. (DFID, 1999a, p.7)
AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Agricultural health.</p> <ul style="list-style-type: none"> - Captures multiple dimensions of agroecosystems <p>Encompasses:</p> <ul style="list-style-type: none"> - The state of well-being - Capacity to respond to stress - Ability to meet goals associated with the biophysical, socio-economic, and human community dimensions (Smit et al., p.5) 	<p>Ecological health.</p> <p>Ecosystem Distress Syndrome – presence or absence of a key indicators characteristic of stress</p> <p>Counteractive Capacity (Resilience) – capabilities for coping with stress</p> <p>Risks or “Threats” – estimates potential impacts of known sources of stress on receiving systems. (Rapport, 1994)</p>

The evolving definition of health as proposed by the World Health Organization (WHO) is an essential foundation for Healthy Cities, Agroecosystem Health, and Ecosystem Health. Each, in their discussion of the concept of health, derive their own meaning from this. Sustainable Livelihoods, on the other hand, only refer directly to health as a bio-medical indicator (e.g., mortality rate).

The concept of health within each approach is consistent with its respective focus on people. Hence, health plays a fundamental role in building the conceptual framework for Healthy Cities, as it is the most people-centred: “Health is created by caring for oneself and others, by being able to make decisions and have control over one's life circumstances” (WHO, 1986). WHO (1997) refers specifically to “human health.” Although an important part of AESH and ESH, the concept of health is less central to each, more often used to inform the framework rather than help create it. Also apparent about health concepts in AESH and ESH, is that the determinants of health become more technical and less personal or social.

In addition to the bio-medical references to health, Sustainable Livelihoods offers another perspective. Although the relation is not explicit in the literature, SL’s definition of sustainability (DFID, 1999a, p.7) is closely related to the definition of a *healthy* ecosystem (Costanza, 1992, p.248; Rapport, 1994) and agroecosystem (Smit et al., p.5). It is also similar to the commitments of the Healthy Cities approach as outlined in the Athens Declaration (WHO, 1998). In this way, sustainable and healthy may be used synonymously – thus, *Healthy Livelihoods*.

2.5 Conceptual Framework – Scale

There are **weak** distinctions of scale among the conceptual frameworks (Table 2.5). This is due, in large part, to the lack of references to scales by either HC or SL. On the other hand, temporal and spatial scales are essential elements of both AESH and ESH. (It is important to note, however, that this section addresses how scale is used *by* each approach. The intent is not to assess the scale *of* each approach.)

Table 2.5 Comparison of Conceptual Framework - Scale

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>Size of City</p> <ul style="list-style-type: none"> - As the scale (i.e., size) of a city increases, so do the interdependence and complexity of the city as a system (Duhl, 1990) 	<p>Level of Policy</p> <ul style="list-style-type: none"> - Social and economic policy conditions at the district, provincial, national and international levels (Rennie and Singh, 1995, p.31)
AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Scale of Application</p> <ul style="list-style-type: none"> - The meaning of health depends upon the scale at which it is applied, e.g., individual, community, or population (Smit et al., p.6) 	<p>Scale of Analysis</p> <ul style="list-style-type: none"> - Systems must be studied from different types of perspectives and at different scales - Appropriate temporal and spatial scale (Kay, 1999)

Healthy Cities and Sustainable Livelihoods which make brief, if indirect, mention of scale. Duhl’s (1990) concept of scale relates to the emerging complexity of bigger cities and its associated increase in required networks and pathways. It does not, however, inform the conceptual framework for Healthy Cities. Rennie and Singh (1995) refer to policies at different levels of government, but don’t use the term scale. Neither Duhl’s or Rennie and Singh’s references are central to their respective frameworks.

Scale, on the other hand, is essential to systems. With regard to ESH, Kay (1999) posits that there is no correct perspective to studying it due to its hierarchical nature. Alternatively, these systems must be studied from different types of perspectives and at different scales of examination. Rapport (1994) states that the problem of scale “is a question of identifying major driving forces governing the dynamics of the system and bounding the system as to internalize the critical functions” (p.18). For AESH, scale is a concern of application: “the meaning of health depends upon the scale at which it is applied, e.g., individual, community, or population” (Smit et al. p.6).

2.6 Conceptual Framework - Systems

Generally, systems become more important as we move toward ESH, lending **moderate** distinctions among approaches, as shown in Table 2.6.

Table 2.6 Comparison of Conceptual Framework - Systems

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>Cities as systems</p> <ul style="list-style-type: none"> - Complex, multidimensional communities - Must create continuing and dynamic means to cope with both its internal problems and with its connections to the outside world - Meet the total and varied needs of heterogeneous populations (Duhl, p.89). 	<p>A dynamic, self-organising approach</p> <ul style="list-style-type: none"> - Interdependency between sustainable livelihoods and ecosystems - Ecosystems are dynamic and interactive - Depends upon sustainable natural resources - Adaptive strategies conceived in human socio-economic systems and in nature - Sustainability is distinguished between environmental, economic, social and institutional aspects of sustainable systems (Rennie and Singh, 1995; DFID, 1999a)
AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Exists within nested hierarchies</p> <ul style="list-style-type: none"> - Occurs within a very complex set of social, cultural, ecological, and economic relationships (Waltner-Toews and Wall, 1997, p.1741) - Agricultural activity carried out within the context of, and is constrained by the conditions found in, larger and smaller systems - Gives meaning to the dynamic relationships among its components. (Smit et al., 1998, p.53) 	<p>Ecosystems are self-organizing</p> <ul style="list-style-type: none"> - Dynamics are a function of positive and negative feedback loops - Emergence and surprise are normal phenomena - Inherent uncertainty and limited predictability - Systems organize about attractors - Change tends to be very rapid and even catastrophic - There is not a “correct” preferred state for the ecosystem (Kay, 1999, p.1)

A city is a complex, adaptive system; it responds to stress and possesses an ability to cope (Duhl, 1990; WHO, 1997). This is consistent with general systems theory. Duhl, however, does not explore the interdependencies of the city with the external environment, only that the city exists within and is subject to the environment. WHO (1997) defines human health as a part of the global ecosystem, and sustained by the global ecosystem. In this, WHO emphasises the interdependencies of health and the environment. Much of this discussion takes place as part of the third phase of the Healthy Cities project that links health with sustainable development through Agenda 21.

The literature on sustainability makes great use of systems. SL incorporates environmental, economic, social and institutional aspects of sustainable systems into its concept. (DFID, 1999a). SL defines sustainable systems as accumulating stocks of assets, increasing the capital base over time (DFID, 1999a). This informs SL’s focus on change and the resulting adaptive strategies essential to sustaining livelihoods.

AESH finds itself in an interesting position as a combination of two systems, human and ecological. The emphasis on the hierarchical nature of systems theory helps to address this inherent challenge. In so doing, it leaves ESH to take on the more technical aspects of systems theory.

2.7 Indicators

Each approach uses biophysical, human, social, economic, and political categories of indicators in distinctly different ways, which we may categorise as **very strong** (see Table 2.7).

Table 2.7 Comparison of Indicators

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>City Profiles Public health report that measures:</p> <ul style="list-style-type: none"> - lifestyles and behaviour - quality of life - environment (e.g. air quality, water quality) - socioeconomics (Doyle et al., 1997; Breuer, 1998, p.1) 	<p>Define nature of changes Ecosystem – a gro-ecological zones; climatic variables, eg, rainfall patterns and major droughts. Socio-economic – nature of enterprises; income sources and their distribution; migration and other demographic factors; employment; human health indicators (e.g. mortality rates) Political -- nature of government; the extent of centralization and decentralization of political authority (i.e. local self-government) (Rennie and Singh, 1995, p.48)</p>
AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Human and Biophysical Dimensions</p> <ul style="list-style-type: none"> - Human: physical conditions, social satisfaction, community interaction, economic status, and farming system viability - Biophysical: species abundance, landscape diversity, and ecosystem (Smit et al., 1998) 	<p>Ecological Dimensions Biophysical – nutrient cycles, energy flows, bio-diversity, plant and animal species dominance, etc. Socio-economic – what is required to sustain the economic activity and human communities occupying the land. Human health – increased circulation of contaminants in food webs and via increases in infectious disease outbreaks; increased malnutrition as a result of decreased yields in ecosystem productivity due to the proliferation of agricultural pests and pathogens. Policy dimension –types and effectiveness of various policy instruments including regulations, financial incentives, tax rebates and exemptions, laws, auditing, etc. (Rapport, 1994, p.4)</p>

Despite the overlapping interests, we see differences among specific measures for each approach. It is evident that HC's City Profiles focus on human health indicators. SL's effort to understand the nature of change (that leads to adaptive strategies) pursues basic indicators of ecosystem, socio-economic, and political health. AESH seeks to measure the viability of agricultural systems, and in the process uses more technical measures of physical, social and economic conditions. Finally, ESH employs the most technical indicators. In doing so, as in other aspects of the framework, lessens the human aspects in their efforts. Collectively, the choice of indicators by each approach clearly demonstrates an increasing scope of inquiry.

2.8 Methodologies

From a researcher's point of view, the methodologies employed by each approach become more technical and more deterministic (from HC to ESH). At the same time, stakeholder participation is common among all four approaches. However, consistent with the trend toward technical methods, the role of participants decreases across each approach. Herein, we find **moderate** distinctions among methodologies, as shown in Table 2.8.

Table 2.8 Comparison of Methodologies

HEALTHY CITIES	SUSTAINABLE LIVELIHOODS
<p>Community surveys In-person, mail, and telephone methods, as well as indices, focus groups, and workshops to collect either subjective or objective information (Flynn and Dennis, 1997) Stakeholders: Local authorities, health authorities, academic institutions, community groups, tenants groups, businesses, politicians, health issue groups, environmental action groups, elderly groups, transport groups</p>	<p>Ecosystem-based; Participatory</p> <ul style="list-style-type: none"> - define type of ecosystem (elaborate here) - involve people in research methodology <p>5 step process:</p> <ul style="list-style-type: none"> - participatory assessment of the risks, assets, entitlements and indigenous knowledge base - analysis of the macro, micro and sectoral policies, and governance arrangements - assessment and determination of the potential contributions of modern science and technology - identification of social and economic investment mechanisms - ensuring that the first four stages are integrated and interactive in real time (UNDP, 1999, p.2)
AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
<p>Mixed methods Statistical analysis of primary and secondary data, surveys, land-use analysis, data collection in the field, experimentation (Smit et al, 1995)</p>	<p>Technical Analysis</p> <ul style="list-style-type: none"> - selection and validation of a suite of indicators which, collectively, distinguish well-functioning systems from pathological systems; - systematic protocols for diagnosis of probable causes of pathology; and - methods for preventative and rehabilitative actions. (Rapport, 1994)

Empowerment is central to the goals of Healthy Cities; and participation, likewise, is a cornerstone of HC's methods. So much so, that mobilising community interests directs and changes healthy public policy (WHO, 1986, 1999). The "people-centred" approach of Sustainable Livelihoods builds upon participatory methods (UNDP, 1999a), rather than community mobilisation per se. This does not undermine the importance of participation in SL. Indicators of health, for example, are expected to be negotiated with local people (UNDP, 1999a). This does, nonetheless, delineate the role of people in SL's methodology as distinct from HC.

Similarly, the community-based approach to Agroecosystem Health involves people directly in the methods, incorporating the perceptions and interpretations of individuals in the study area. For example, a study by Fletcher and Waltner-Toews derived a consensus on what agroecosystem health meant from a survey of residents (Smit et al., 1998). These methods are not representative of all AESH approaches and may, in fact, only represent one particular method. (Appendix A lists Community-based approaches among all other approaches.) AESH is characterised more by various models of systems and their applications.

Rapport (1999) described the role of negotiating the terms of health with stakeholders involved in ESH projects. This is an important part of the ESH research process and must be completed prior to conducting the research. This method flows from the premise that health is a construct of societal values and, therefore, can only be defined in the context of the community of

interest. Beyond this (relatively brief) use of participation, ESH methodologies rely upon technical analysis of ecological systems.

3.0 Conclusion I: The Scales of Health

The primary intent of this paper is to determine if the four health assessment approaches, Healthy Cities, Sustainable Livelihoods, Agroecosystem Health, and Ecosystem Health, constitute distinct scales of health. Table 3.1 presents a summary of the above analyses and syntheses. The comparison of each approach by various components revealed a range of distinctions from weak to very strong, as well as areas of overlap. The conclusion is that distinct scales of health *might* exist, with potential to change this to ‘yes, they do constitute distinct scales.’

Table 3.1 Summary of Health Assessment Approaches

	Strength of Distinctions	HEALTHY CITIES	SUSTAINABLE LIVELIHOODS	AGROECOSYSTEM HEALTH	ECOSYSTEM HEALTH
Definition	STRONG	Individual	Community	Agricultural system	Ecological system
Objectives/ Principles	MODERATE	Enhance well-being of people	Poverty Reduction	Improve health of agriculture	Protect the natural environment
Conceptual Framework (General)	MODERATE	Human health/human development	Adaptive strategies of communities within identified ecosystems.	Complex reality of human and biophysical systems functioning at a variety of scales.	Complex ecological systems.
Health	VERY STRONG	Human health	Community health.	Agricultural health.	Ecological health.
Scale	WEAK	Size of City	Level of Policy	Scale of Application	Scale of Analysis
System	MODERATE	Cities as systems	A dynamic, self-organising approach	Exists within nested hierarchies	Ecosystems are self-organizing
Indicators	VERY STRONG	City Profiles	Define nature of changes	Human and Biophysical Dimensions	Ecological Dimensions
Methodologies	MODERATE	Community surveys	Ecosystem-based; Participatory	Mixed methods	Technical Analysis

The conclusion is tentative because an opportunity exists to clarify concepts, thereby improving the distinctions among approaches. Of primary concern is the breadth of AESH's conceptual framework. While the general concept of AESH, as defined by Smit et al., encompasses each of the other approaches, other aspects of this approach suggest otherwise. In fact, in every other aspect AESH appears distinct from the others.

Clarifying the general concepts of AESH will help to improve upon the 'moderate' rating of distinction. To begin, Smit et al.'s work may be qualified. The nature of the Agroecosystem Health Project lent itself to being inclusive (this may be attributed to funding and its associated politics). As such, the essential nature of AESH is blurred. A review of the other AESH components presented in this paper strongly suggests a concept specifically built upon agricultural systems. Using this as the basic underpinning, the Holistic approaches identified by Smit et al. represent AESH more succinctly (see Appendix A for a list of these approaches). The Disaggregated approaches should then be excluded from AESH, hence, also excluding Healthy Cities, Sustainable Livelihoods, and Ecosystem Health. Community-based Views of Agroecosystem Health, the third category presented by Smit et al., may be better situated within AESH as a methodology, rather than as an approach or model. This change overcomes the ambiguity of the AESH concept, and isolates AESH as distinct from the others as opposed to encompassing the others.

Another clarification helps to further distinguish the general concepts of each approach. As mentioned earlier, the 'sustainable' part of Sustainable Livelihoods shares many characteristics with constructs of 'healthy.' Reframing SL as *Healthy Livelihoods* serves to emphasise the health aspect, thereby improving the logical progression of health as a concept.

Accepting these clarifications strengthens the distinctions among each conceptual framework. In so doing, these distinctions may be viewed as **very strong**. What emerges, then, are four distinct *scales of health*:

- (i) Human system health (Healthy Cities)
A healthy individual in a community
- (ii) Socio-economic system health (Sustainable Livelihoods)
A healthy community (i.e., one that adapts to change) within an ecosystem
- (iii) Agriculture system health (Agroecosystem Health)
A healthy balance of human and biophysical systems within a larger ecosystem
- (iv) Ecological health (Ecosystem Health)
A healthy ecosystem within the planet earth

4.0 Conclusion II: The Health of Scales

*Innovation occurs at the boundaries between mind-sets,
not within the provincial territory of one knowledge and skill base.*

—Dorothy Leonard-Barton

Defining scales of health is appropriate. It enables us to understand the distinctions among approaches, as well as the strengths of each, and points to areas for specific progress. In this, the tables in this paper provide a roadmap to select the approach best suited to the nature of the inquiry. All this falls ‘within the provincial territory of on knowledge or skill base,’ however.

What of the boundaries between mind-sets? What are the relations between and among the scales of health? How do we reconcile the variances between scales? All healthy individuals may not mean a healthy society; a healthy society does not require all healthy individuals; and so on. What is healthy for one scale is not necessarily healthy for another. Who decides, then, what is an appropriate construct of health? What scale of health takes priority?

In response to these questions, two critically important observations may be made. First, “societal values underpin all health assessments” (Rapport, 1996, p.10). Second, “Healthy societies are those where people constantly re-negotiate how power and wealth are distributed” (Waltner-Toews, 1999, p. 10).

The scales of health are more than a roadmap for an inquiry, they provide a framework for negotiating concepts based on values and power. For example, Kay (1999, p.1) states that there is not a ‘preferred state’ for ecosystems. This may be a satisfactory ecosystem health perspective, however, there are preferred states of individuals and communities. A framework, therefore, enables us to position various perspectives and constructs of health, to contextualise objectives, and to understand distinctions among concepts. The essence of successful negotiations is knowing where each party stands. Thus, the scales of health offer a framework for negotiating tensions across the boundaries—they offer a platform for innovation.

We are left, then, with a final, ‘living’ question: Are the scales of health scientific study or policy framework?

Appendix A: AESH Approaches and Models

(Source: *Agroecosystem Health: Analysis and Assessment*, Smit et al., 1998)

Holistic Views

This perspective starts with the whole, seeking a comprehensive definition of AESH.

- AES as human-centred (emphasise human elements more explicitly than others)
- AES as flourishing (acknowledges the health of all living organisms and their collectivities)
- AES as transformation ability (concentrates on the system's capacity to respond to stress)
- AES as a balance and trade-off (deals with balances between ecological conditions and human demands)
- AES as multi-faceted (identify evaluative criteria which are applicable across components, spatial scales and temporal scales).

Disaggregated Views

This perspective is also a scholar-oriented view but takes a disaggregated approach where health is defined separately for each dimension.

- Human dimension of AES (defining the health of the human dimension of AES via individuals, their communities, as economic systems wherein health relates to human and community livelihood)
- Individual human and population health (conventional approach often referred to as the 'biomedical' model)
- Community health (of interest is the role community environments have on individual lifestyles, attitudes, well-being, empowerment, and self-sufficiency)
- Economic health (deals with sustainability, welfare economics, resource economics, and environmental economics)
- Biophysical dimension of AES (may be interpreted as being synonymous with ecosystem health because the study of some of the same patterns and processes such as energy, nutrient and material cycling, rates of decomposition, and production are appropriate for both)
- Species/community health (focuses on certain aspects of species or communities of species)
- Habitat/landscape health (characterizes biophysical health according to the environmental attributes understood to be important for non-domesticated species of fish, birds, and wildlife)
- Ecosystem functions and processes (estimates the efficiency with which ecosystems perform functions and processes).

Community-based Views

This is based on the view points of those living and working within specific agroecosystems, yielding a community-based definition of agroecosystem health

Employs community-based interpretations or AESH which result from incorporating perceptions and interpretations of individuals living in, and making decisions about, their farms, communities, and regions

References

- Boothroyd, Peter and Margaret Eberle (1990). “Healthy Communities: What They Are, How They’re Made” in *CHS Research Bulletin*. UBC Centre for Human Settlements, August 1990. Vancouver, B.C.: University of British Columbia
- Breuer, David, Editor (1998). *City health profiles – a review of progress*. World Health Organization Regional Office for Europe, Copenhagen.
- Costanza, Robert, Bryan G. Norton, and Benjamin D. Haskell (Eds.) (1992). *Ecosystem Health: New Goals for Environmental Management*. Washington, D.C: Island Press.
- Department for International Development (1999a). *Sustainable Livelihoods Guidance Sheets: Introduction*. www.dfid.gov.uk
- Department for International Development (1999b). *Sustainable Livelihoods Guidance Sheets: Framework*. www.dfid.gov.uk
- Doyle, Yvonne, David Brunning, Colin Cryer, Stephen Hedley, Christine Russell Hodgson (1997). *Analysis of Data from Cities Across Europe*. South East Institute of Public Health, Royal Tunbridge Wells Kent, United Kingdom. Edited by P. Webster & C. Price. World Health Organization Regional Office for Europe, Copenhagen.
- Duhl, Leonard J. (1990). *The Social Entrepreneurship of Change*. New York, NY: Pace University Press.
- Flynn, Beverly C. and Louise I. Dennis (1995 revised). *Documenting the Urban Health Situation: Tools for Healthy Cities*. World Health Organization Regional Office for Europe, Copenhagen.
- Garcia, Dr Pilar and Dr Mark McCarthy (1994). *Measuring Health: A Step in the Development of City Health Profiles*. World Health Organization Regional Office for Europe, Copenhagen.
- Kay, James J. (1999). *Ecosystems as Self-organizing Holarctic Open Systems: Narratives and the Second Law of Thermodynamics*. (www.uwaterloo.ca/jjkay/pub/SOHO/SOHO.pdf)
- Rapport, David J. (1994). “Ecosystem Health: “Ecosystem Health: An Emerging Integrative Science” Agroecosystem Health Project: Discussion Paper #9. University of Guelph, Guelph, ON.
- Rapport, David J. (1995). “Ecosystem Health: Exploring the Territory” Agroecosystem Health Project: Discussion Paper #10. Guelph, ON: University of Guelph.
- Rapport, David J. (1999). (Unpublished) Presentation to PhD Rural Studies Program, University of Guelph.
- Rennie, J. Keith and Naresh C. Singh (1995). *A Guidebook for Field Projects: Participatory Research for Sustainable Livelihoods*. UNDP Sustainable Livelihoods Unit. www.undp.org/sl/documents.
- Smit, Barry et al (1998). *Agroecosystem Health: Analysis and Assessment*. Guelph, ON: University of Guelph.
- Toronto Healthy City Office (1997). *Coming Together: Healthy City Toronto 1993-1997*. Toronto City Hall: Toronto.
- UNDP (n.d.) *Sustainable Urban Livelihoods Concept Paper (Draft)*. www.undp.org/sl.

UNDP Sustainable Livelihoods Unit (1999) *Sustainable Livelihoods Concept Paper*.
www.undp.org/sl/documents

Wall, Ellen (1996). “Resource Model For Agroecosystem Health.” *Agroecosystem Health Project: Discussion Paper #15*. Guelph, ON: University of Guelph.

Waltner-Toews, David and Ellen Wall (1997). “Emergent Perplexity: In Search of Post-normal Questions For Community and Agroecosystem Health.” *Social Science and Medicine*, 45, 1741-1749.

Waltner-Toews, David (1999). *The end of medicine: the beginning of health*. Department of Population Medicine, Guelph, ON: .University of Guelph.

WHO (1997). “City planning for health and sustainable development” *European Sustainable Development and Health Series: 2*. Original English. 1997. Denmark: World Health Organization.

WHO (1986). Ottawa Charter for Health Promotion 1986. WHO Collaborating Centre for Supportive Environments for Health. Denmark: World Health Organization

WHO, n.d. *Healthy Cities Makes a Difference*. Centre for Urban Health Healthy Cities Project, Health Organization European Regional Office, Copenhagen, Denmark

WHO (1998). *Athens Declaration for Healthy Cities*. WHO Regional Office for Europe URL:
<http://www.who.dk/>

WHO (1999). *About the WHO Healthy Cities Project*. WHO Regional Office for Europe URL:
<http://www.who.dk/>