USING CRITICAL SYSTEMS THINKING TO FOSTER VIRTUOUS CYCLES OF SUSTAINABILITY AND LIVEABILITY: A PROPOSAL FOR RURAL DEVELOPMENT PRACTITIONERS

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ABSTRACT

Critical systems thinking originated with the purpose of questioning power imbalances and facilitating a reflective and systems oriented approach to some of the most complex issues we face. Sustainability is one such issue which brings with it the challenge of integrating social, environmental and economic dimensions of a situation. Liveability is often the primary motive driving an individual or communities desire for improvement. This paper suggests that one of the main ways that this desire for improvement can coincide with sustainability lies in the ability to identify and propel virtuous cycles in which both sustainability and liveability are enhanced.

Among the development sector there is increasing recognition of links between the environment and aspects of development such as poverty alleviation, health, income generation and agriculture. Whilst furnished with a diverse range of perspectives and approaches, development practice is in need of ways of conceptualizing the interaction between sustainability and liveability that emphasise the opportunities for improvement in human and ecological well-being that exist in this space. For decades, the rural development sector has been developing practices aimed at fostering participation, mutual learning and sustainability. This paper offers a contribution to expand on and improve these practices.

The paper focuses on rural development and identifies both virtuous and vicious cycles of liveability and sustainability which are relevant to development practice. Critical systems thinking is proposed as a way for rural development practitioners to conceptualise the integration of economic, social and environmental dimensions and, in doing so, support participant communities to nurture and foster virtuous cycles of sustainable liveability. Four desirable attributes of a critical systems thinking approach to rural development are identified based on development literature, critical systems literature and the authors' research into sustainability in semi-rural communities in Vietnam. These four attributes are described and compared with existing rural development practices which seek to foster virtuous cycles through learning oriented and participatory processes that recognise the connection between the human and non human world. The four attributes are: a systems thinking approach; an ethical base to action and choices; critical reflection of process and purpose and appreciation and application of diverse views and approaches.

Through these four attributes a synthesis of rural development practice and critical systems thinking is offered as a means of moving toward sustainable interactions between

the human and non-human world. This paper also offers an invitation to further dialogue on these ideas and concludes with suggestions for further learning.

Keywords: critical systems thinking, rural development, integrated approaches, Vietnam, sustainability

INTRODUCTION

Critical systems thinking (CST) practitioners have identified several different purposes for CST. These include to "challenge the inequalities of wealth, status, power and authority" (Jackson 2003b, p. 77), to raise fundamental issues of "an ethical nature" (Flood in Barton et al. 2004, p. 13), to foster "reflective professional practice" (Ulrich 2003a) and to help us move toward improvements based on a "sustainable and interactive relationship" (Midgley 1996, p. 23) between the human and non-human world. These purposes have great resonance with the demands of moving toward a more sustainable future and are considered in this paper in relationship to the sustainability challenges of rural development.

One of the main threats to sustainability is how to improve human well-being on a global scale, in other words enhance liveability, whilst at the same time maintaining or enhancing the well-being of the ecosystems which support us. A growing body of research including the World Resources Institute (World Resources Institute et al. 2005; World Resources Institute(WRI) in collaboration with United Nations Development Program 2008) and UNDP work (Duraiappah 1998; Duraiappah 2001, 2004) on poverty and environment has alerted us to the connection between the well-being of people, particularly poor people and the health of the environment. These views were confirmed by the Millennium Ecosystem Assessment (2005b), which clearly demonstrated the connection and interdependence of human well-being and ecosystem health. Failure to heed this connection impacts us all, but the most vulnerable are those people whose basic levels of liveability are yet to be satisfied.

The way in which the most vulnerable amongst us, who represent the majority of the world, negotiate the sustainability and liveability challenges ahead of them will have a major impact on our collective future. Wealthy countries continue to live beyond their means, being primarily responsible for the excessive drain on the planets resources which is proceeding more or less unabated. If current population and consumption trends continue, two planets will be need to sustain the human race by the middle of the 2030s (Global Footprint Network 2009b). At times it appears as though we are trapped in a vicious cycle in which there is no choice but to continue to mortgage our future sustainability for the sake of liveability.

The assumption that vicious cycles dominate is challenged in this paper. The focus is on the discussion of liveability and sustainability in rural or semi-rural areas in developing countries. There are three main reasons for this focus. Firstly of the 2.6 billion people living on less that $2 a day, 75% reside in rural areas (World Resources Institute(WRI) in collaboration with United Nations Development Program 2008). Secondly, these people

are most vulnerable to our future sustainability choices. For example they will be directly impacted by the sustainability of the predicted increase in agricultural production in developing countries, estimate to be four times that of OECD nations (OECD 2008). Finally, this paper seeks to prompt reflection on areas of development practice which casts these people as "recipients", "victims" or "the poor" and pushes them along certain paths of development leading to vicious cycles rather than building on their capacities to propel virtuous cycles.

This paper explores how CST, in conjunction with some existing approaches to development can be used to help us learn our way, both as practitioners and participants, into a more sustainable future in which we are cogniscant of the connection between human well-being and environmental health and are able to identify and propel virtuous cycles of liveability and sustainability. First though, the perspective on sustainability and liveability underlying this research is outlined.

SUSTAINABILITY & LIVEABILITY

Liveability, in contrast to the perspective on sustainability taken in this paper, refers specifically to human needs and preferences. The Merriam Webster online dictionary refers to it as "suitability for human living" which gives it very broad application (Merriam Webster 2009). In practice, according to Brook Lyndhurst (2004, p. 5) there are a range of interpretations of liveability on different continents, but the concept appears to share "quality of life", "well-being" and "life satisfaction" in common with sustainability. One of the great strengths of the concept is the way in which it is used to link a broader sustainability objective to the local level. In order to understand how the concept could apply in a development context it is related here to the extent to which human needs are met.

Maslow's (1943; 1970) work on the factors that motivate and influence our view on the

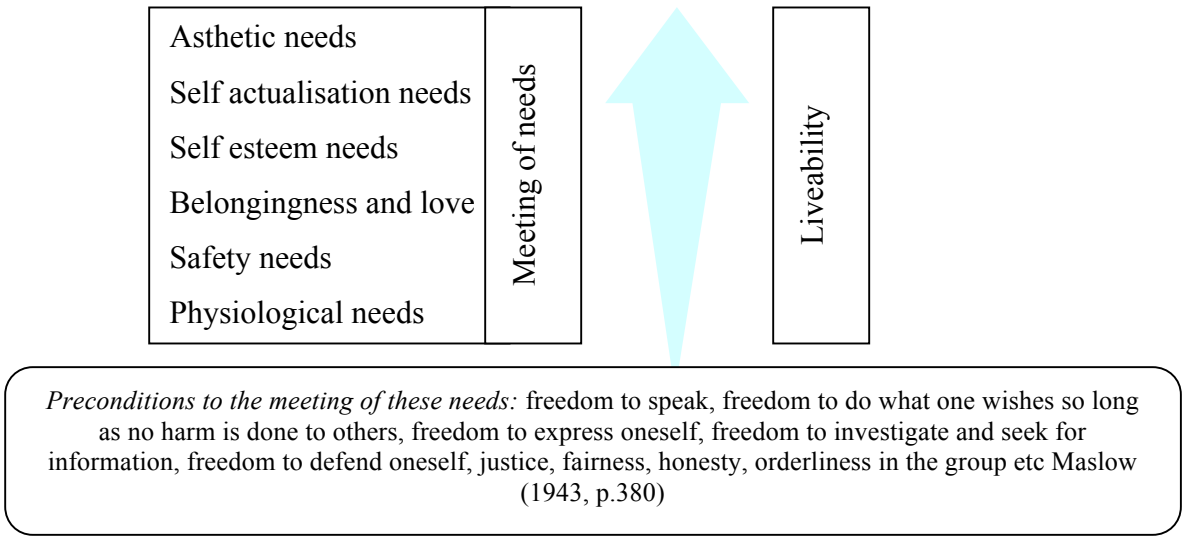

Figure 1 Proposed relationship between Maslow's hierarchy of needs and liveability

world is used to offer a scale of livability in which increasing satisfaction of higher order needs corresponds to increasing levels of livability. As shown in Figure 1 Maslow (1943; 1970) suggested that, in order of prepotency, physiological, safety, belongingness, esteem, self actualisation and aesthetic needs are important motivators. In addition he also considered in some detail the strong desire of human beings and higher order mammals to "know and to understand" (Maslow 1943, p. 380). He suggested that knowing and understanding exist in a synergistic relationship to the hierarchy of needs. Maslow also identified freedoms as the preconditions for the meeting of these needs. The depiction of these needs as a hierarchy is somewhat of an oversimplification. Beyond the fundamental physiological and safety needs, individuals differ in the extent to which they are motivated by the other needs (eg Maslow gives the example of aesthetic needs being much lower in the hierarchy for some people). In addition, as Maslow (1943, p.381) pointed out in relation to the desire to know and understand "*we must guard ourselves against the too easy tendency to separate these desires from basic needs*".
With these caveats in mind, Maslow's hierarchy offers a tool for thinking about what liveability and closely related concept of well-being entail.

As often suggested in the literature there are numerous ways of conceiving of sustainability and, correspondingly, numerous approaches to sustainability have emerged since the concept first gained official recognition in 1987 with the Brundtland report (World Commission on Environment and Development 1987). The most commonly conceived view of sustainability is based on the division of sustainability into economic, ecological and social components. As Keiner (2004) discussed these three elements have been depicted in various states of integration, ranging from three discrete circles to a triangle in which the three dimensions blend into one other. In addition, some authors have broadened the remit of sustainability to include politics (eg. O'Connor 2007), spirituality (eg. Chile & Simpson 2004), ethics (eg. Hundloe 2007), technology and in some cases several of these dimensions (eg. the STEEP framework, Morrison 1992).

For the sake of simplicity, the focus remains on the social, environmental and economic dimensions here. In this paper sustainability is regarded as a space in which social, environmental and economic objectives overlap. This sustainability space is depicted in Figure 2. This model is intended to depict the fact that in reality, there are social objectives which may not serve environmental ends, economic objectives which may not service social ends and so on. These fall outside the sustainability space. On the other hand, there are situations in which social objectives can serve environmental ends, environmental objectives social ends, economic objectives environmental ends and so on. It is suggested that the key to simultaneously achieving social, economic and environmental sustainability is to operate in the space in which objectives from each dimension overlap with the ends of the other[1]. The perspective on liveability adopted in this paper is that it resides primarily in the social dimension where social objectives are met and it can overlap with the sustainability space.

[1] This model belies the complexity of choosing objectives and the issues of power and authority associated with these choices. It is offered as a simple conceptual model which emphasizes the need to be in the space of overlap.

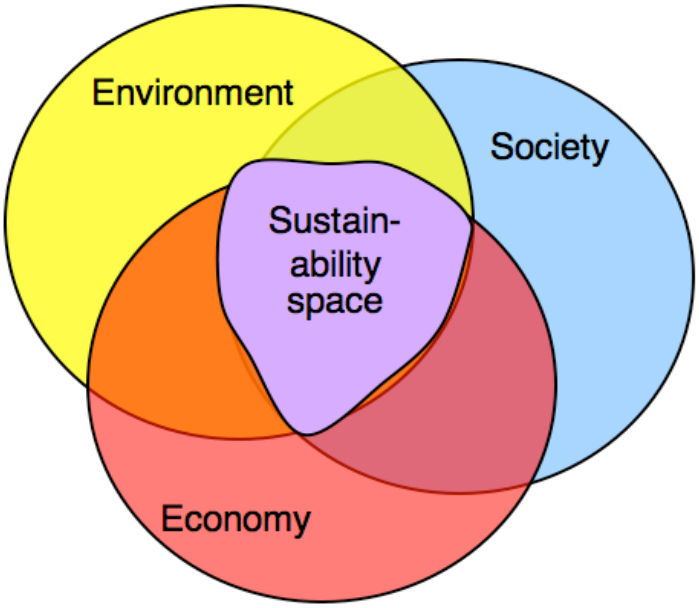

Figure 2 Integrated model of sustainability – liveability that enhances sustainability is located in the sustainability space

Sustainability conceived of in the broad sense of meeting environmental, social and economic objectives is yet to be embraced by the development sector, even though it has featured in numerous world summits on sustainable development which aim to progress the planet on various issues of liveability and sustainability. The prominently used term tends to be defined in terms of continuation of project benefits (eg AusAID, Quality Assurance Group & PIA/OPRE 2000, p. 1) or as environmental sustainability and curtailing environmental loss (eg. Australian Agency for International Development 2008). Even in circumstances in which a more comprehensive view is taken, the model in play in the development sector is more like that depicted in Figure 3 than that the model depicted in Figure 2. In the model depicted in Figure 3, the various aspects of sustainability are regarded as discrete and emphasis is placed on balancing and trading off between environmental, economic and social sustainability (eg. Loeber et al. 2007). It is only in recent years that a search for overlaps, which coincides with a shift toward the model depicted in Figure 2 has occurred. This shift is illustrated by, for example, the increasing research on the relationship between poverty and the environment (Asian Development Bank 2009; Duraiappah 2004; IUCN 2006; UNDP-UNEP Poverty-Environment Initiative 2008; World Resources Institute et al. 2005; World Resources Institute(WRI) in collaboration with United Nations Development Program 2008).

The concept of liveability enables us to bring this discussion back to the individual people experiencing these processes. Increasing liveability, in other words the extent to which human needs are met, has been an important focus of the development sector since the 1970s when the focus shifted away from purely economic measures to include more human dimensions of development (AID/WATCH 2008, p. 14) . Because of the discrete sustainability model prevalent in the sector, during the 30 years of focusing on poverty

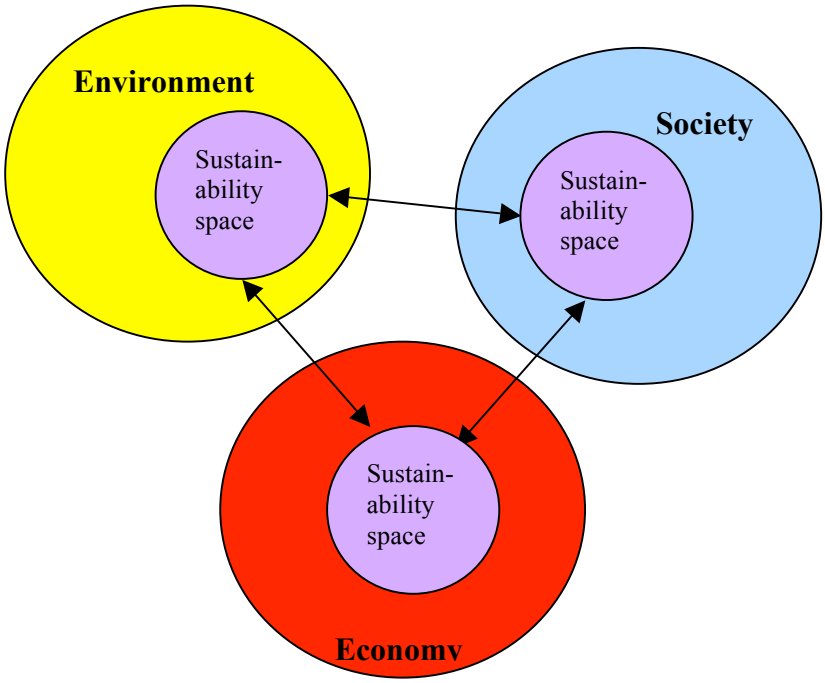

Figure 3 View of sustainability prevailing in the development sector

alleviation efforts to improve liveability have revolved primarily around the social and economic dimensions, without detailed consideration of the overlap between these and the environmental dimensions of sustainability.

The position taken in this paper is that adopting a conceptual framework more like that depicted in Figure 2 is critical to moving toward both sustainability and liveability. However the interaction between the dimensions of sustainability and the corresponding impact on liveability can be both virtuous and vicious. The existence of these virtuous and vicious cycles is discussed in the following section after Ranis et al (2000) who used these concepts in their study of the relationship between human development and economic growth. Virtuous cycles then become the focus of the remainder of the paper as it goes on to discuss the way in which critical systems thinking can contribute to and expand on existing rural development approaches which recognize and seek out ways to propel virtuous cycles.

VIRTUOUS AND VICIOUS CYCLES OF LIVEABILITY AND SUSTAINABILITY

A vicious cycle is driven by competition or conflict between liveability and sustainability. In a vicious cycle efforts to increase either liveability or sustainability propel the vicious cycles in which liveability, sustainability or both are detrimentally affected. These vicious cycles are of major significance, particularly for people in rural areas who depend directly on environmental sustainability because of their daily need for ecosystem services (Sachs & Reid 2006). These cycles can exist in any of the three dimensions of

sustainability but are at their worst when they cross dimensions. In these cases attempts to satisfy economic, social or environmental objectives fail and at the same time cause declines in one or more of the other domains. A poverty-environment trap is one example of this kind of vicious cycle (eg Barrett & Swallow 2006; Swallow et al. 2009). These are circumstances in which, for example, farming practices cause declines in soil quality which in turn decreases yield and income, preventing farmers from investing in improvement of soil quality, which would assist in improving yield and income (King 2006). At their worst, such as in some areas of India, vicious cycles like this have contributed to large numbers of farmer suicides (Fadnavis 2006). Another example of a vicious cycle can be seen in the way in which increases in development, as measured by the human development index often correspond with increases in a countries' ecological footprint[2]. An analysis of trends[3] in these two indicators over the 30 years between 1975-2005 was conducted by the Global Footprint Network (2009a). The analysis shows that in many countries with high development, for example USA, Kuwait, Ireland and Portugal, ecological footprint increases have been associated their "progress".

These examples indicate that vicious cycles of sustainability and liveability exist at all levels of development. However the vicious cycle does not tell the whole story in each instance. Swallow et al (2009, p. 2) in their study of Lake Victoria, noted that some people were in poverty traps but there were also households and areas *"in a synergistic cycle of higher levels of production, adequate investments in land management, and increasing incomes"*. In the areas studied, they identified that (Swallow et al. 2009, p. 13):

> *"appropriate agricultural development, coupled with the promotion of appropriate land and water management practices, appears to be the main pathway to synergies between economic development and environmental conservation."*

Similarly in the analysis of the Global Footprint Network, there are some countries which have increased human development and also lowered their ecological footprint (eg Greece, Hungary, Australia and Norway). These two examples illustrate that both vicious and virtuous cycles exist and suggest that there are ways to direct development toward virtuous cycles.

There are numerous approaches that have helped make steps in the direction of identifying and propelling virtuous cycles, or at least have great potential to. The approaches of particular interest to this research are the ecohealth approach (Lebel 2003) which has linked human health to ecosystem health as well as the collection of approaches that have shed light on how ecosystem services and human needs can be connected in more "virtuous" ways. To name a few, these include agroecology (Altieri 2002), agroecosytem analysis (Conway 1985, 1987), permaculture (Mollison & Holmgren 1978b) and sustainable agriculture (Pretty et al. 1995; Pretty 1995; Pretty,

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[2] The ecological footprint is based on "*the area of biologically productive land and water required to produce the resources consumed and to assimilate the wastes generated by humanity, under the predominant management and production practices in any given year*." (Wackernagel et al. 2002, p. 9266). It does not include impacts on biodiversity or space required for wild species.

[3] For an animated illustration of change in the relationship over time, a visit to http://www.footprintnetwork.org/en/index.php/GFN/page/fighting_poverty_our_human_development_initiative/ is highly recommended.

Morrison & Hine 2003). Closely related to these approaches are the practices and concepts which place people and the things they value at the heart of the decisions and actions which affect their lives and their futures. Examples include participatory rural development after Chambers and colleagues (Chambers 1983; Jiggins & Röling 2000), social learning (Rist et al. 2006; Woodhill & Röling 1998) and social ecology (Hill 2005).

As the experiences of many of the practitioners acknowledged above indicate, achieving sustainable liveability is a very difficult and complex challenge. The premise put forward in this paper is that meeting this challenge requires more integrated ways of conceptualizing sustainability and envisaging what we wish to achieve. The following section builds on some of existing approaches to place the relationship between sustainability and liveability in a broader framework drawn from systems thinking and critical systems thinking in particular. The ultimate intention of this process is to further our ability to know how, as both practitioners and participants, to each other in learning toward virtuous cycles.

USING CRITICAL SYSTEMS THINKING TO LEARN OUR WAY TOWARD VIRTUOUS CYCLES

Before considering the specific contribution of CST to learning our way toward virtuous cycles, the perspective on critical systems thinking adopted in this research needs to be clarified. Broadly speaking there are two schools within critical systems thinking. These have been referred to as the "meta-methodological approach" and the "contingent or contextually dependent development of the practical approach" (Pollack 2006, p. 391) or as the "total systems intervention" school and the "critical systems heuristics" school (Ulrich 2003a, p. 327). There has been considerable discontent regarding which of these two schools best represents the critical systems thinking field (Bowen 2004; Jackson 2003a, 2005; Omerod 2004; Ulrich 2003a, 2003b; Ulrich 2004a, 2004b). Midgley (1996) has presented a critique of both schools of CST and an alternative perspective which embraces elements of each. It is the approach adopted by Midgley (1994; 2003; 2003; 2004), and other individuals with similar perspectives such as Gregory (2003) and Flood (Barton et al. 2004; Flood 1999) which guides this research. These approaches are favoured on the basis that they recognize that power and authority are exerted in all situations and because they have broadened out the thinking of CST to embrace the unknowable, dissonant perspectives and our interaction with the non-human world. The framework for thinking about CST in this paper is guided by Midgley's (1996, p. 11) three commitments of critical systems thinking[4]:

- *Critical awareness - examining and reexamining taken for granted assumptions along with the conditions that give rise to them,*
- *Emancipation - ensuring that research is focused on improvement, defined temporarily and locally taking issues of power into account,*

[4] These three commitments draw on an earlier list of five commitments put forward by Jackson (2003b)(first in 1991 and republished in 2003).

- *Methodological pluralism - using a variety of research methods in a theoretically coherent manner, becoming aware of their strengths and weaknesses to address a corresponding variety of issues.*

In essence, critical systems thinking offers a way of learning about the world and acting in it. The purpose here is to expand on these characteristics in light of the need to identify and propel virtuous cycles of sustainability and liveability. However, to enable application of the critical system thinking concepts there is a need to translate these three commitments into a form and language that is more meaningful for an audience of development practitioners and participants who may not have had exposure to formal systems concepts and who have diverse levels of concern for academic concepts and approaches. To facilitate this translation, the following question was asked:

> *What attributes would you expect to see in community based, rural development practice which was informed by critical systems thinking and aimed to achieve virtuous cycles of sustainability and liveability?*

Four attributes were identified in response to this question. It is suggested that these attributes would facilitate the integrated model of sustainability advocated in Figure 2 and in doing so facilitate the sustainable, interactive relationship between the human and non-human world which Midgley (1996) discussed. The four attributes are a systems approach; ethical base to action & choices; critical reflection on process and purpose and appreciation of diverse views and application of diverse approaches. These attributes have been identified on the basis of Midgley's three commitments, the general literature on critical system thinking, literature on development practice and practical exploration of issues of sustainability and liveability. The practical experiences referred to formed part of the authors' doctoral research within five low income communities in Hai Duong province Viet Nam in 2006.

Systems thinking approach

The first contribution that critical systems thinking can make is to foster a systems approach to the challenges of sustainability and liveability. Of course a systems approach is not unique to critical systems thinking, but it is a crucial part of the CST package. The ability to take a systems approach is a precursor to other aspects of CST in that it frames a way of viewing and thinking about the world, which in turn influences action.

Existing practice in sustainability and rural development have embraced systems concepts to varying degrees. Examples of systems based approaches to sustainability include panarchy theory (Gunderson & Holling 2002; Holling 2001) and Meadow's leverage points concept (Meadows 1999) and Kays Self Organising Holarchic Open (SOHO) System approach (1999). Instances of the adoption of these concepts and related theories in practice include agroecosystem analysis (Conway 1985, 1987), adaptive management (Jiggins & Röling 2000), Ison's work on rural development (Ison, Maiteny & Carr 1997) and social learning (King 2000), with the latter example specifically considering critical systems thinking. These approaches vary in the extent to which they make connections between sustainability and liveability, with some focusing primarily on

ecological sustainability, and not integrating this with increases in liveability through the meeting of human needs.

The key strength of systems thinking highlighted here is the way in which it enables interconnections to be made between different parts of the sustainability system depicted in Figure 2 (ie within and between the social, environmental and economic dimensions). With these interconnections an awareness of the wider consequences of actions, both in the immediate and longer term can come. Through consideration of interconnections, systems thinking can also bring with it an appreciation of the value of the other parts of the system. Such appreciation can arise from increased awareness of intrinsic value of, for example, other people, other species, or whole ecosystem functions. Alternatively the appreciation can be oriented around instrumental value stemming from the interdependence of the parts of a system. For example, the ecosystems services concept (Daily 1997; Duraiappah 2004; Millennium Ecosystem Assessment 2005a) has helped bring into the mainstream a recognition of the importance of many things ecosystems do for humans which we have tended to take forgranted such as water & air purification, soil renewal, control of agricultural pests and so on (for more examples see Daily 1997, p. 4).

Recognising interconnections through systems thinking can also bring together the social and environmental dimensions of sustainability. Ison (2003), in a discussion of agroecosystem analysis, illustrated how systems thinking can be used in this way. He referred to work done by he and a colleague (Pearson & Ison 1997 in Ison 2003) in which they suggested that connectivity, based on a persons experience of an invitation be included as another measure of agroecosystem performance.

In order to understand the way in which systems thinking can contribute to the creation of virtuous cycles of sustainability and liveability, the example of poverty traps is considered. In their discussion of poverty traps, Barrett and Swallow (2006) described how the availability of certain strategies effected whether a poverty trap was experienced. They suggested that "*The set of feasible strategies depends on the stock of assets one controls: financial, human, natural, physical and social capital"* (2006, p. 5). The ability to control stocks of assets referred to by Barrett and Swallow (2006) is closely linked to the concept of agency which, together with opportunity structure is an important aspect of empowerment and the achievement of development outcomes (Narayan 2002, 2005). Individual agency and capabilities include human, social, political and psychological aspects (Narayan 2005). It is suggested that systems thinking offers a way of enhancing these capabilities, in particular human capabilities which Narayan (2005, p. 10) defines as "*good health, education and productive or other life enhancing skills*" and psychological capabilities which include "*self-esteem, self confidence, and an ability to imagine and aspire to a better future*" (Narayan 2005, p. 12). By enhancing these capabilities, systems thinking can open up new strategies for action, which as Barrett and Swallow (2006) identified are often required to escape poverty traps. Supporting and, if necessary, developing existing thinking that leads to strategies that enhance both sustainability and liveability, is critical. An evaluation of a World Vision Andean permaculture project (Willetts 2006) revealed participant experiences consistent with this point of view. In the communities where the systems thinking aspects of permaculture were emphasised, the

project appeared to have a greater impact on well-being (Smith, Willetts & Mitchell 2006).

Helping individuals and communities identify new strategies is one way systems thinking can contribute to the creation of virtuous cycles. Systems thinking can increase confidence in problem solving ability because of the way it fosters connections both in space and time, encourages greater awareness and knowledge of the connected parts, enhances ability to act in ways mindful of this connectedness and enables adaptation to new circumstances. It is likely that all people already do systems thinking, or at least have the ability. The task of a critical system thinking development practitioner would be to build on existing system thinking skills and work with participants to explore how this way of thinking can be used, together with other ways of thinking, to identify new and nurture existing strategies of sustainable liveability. An example of this process in action can be found in Integrated pest management (IPM) which has been so successfully used in Farmer Field Schools in Indonesia (Van Den Berg & Jiggins 2007)and Andhra Pradesh (Mancini et al. 2008). IPM could be thought of a systems thinking approach to pest management. It enables farmers to understand the ecosystem of their crop and to adopt pest management strategies which are often cheaper in the long term and certainly less harmful to their health and to the environment than persistent spraying with pesticides. In doing so, farmers can create virtuous cycles of liveability and sustainability.

Systems thinking can also contribute to the creation of virtuous cycles is by directly empowering people through the impacts that enabling being able to arrive at new strategies which help improve their situation has on confidence and self esteem. According to Diener and Biswas Diener (2005) feelings of competence, such as those which systems thinking can foster, are one of the key precursors for empowerment. This is because increases in psychological capabilities are linked directly to increases in psychological well-being which Narayan (2005, p. 22) describes as "*one's self-judgment as a happy, well functioning, competent, self confident human being*" which in turn relates directly to the meeting of higher order needs as described by Maslow (1943; 1970), and to higher levels of liveability.

In the authors doctoral research, she sought to combine the possibilities raised in the previous three paragraphs and use permaculture (drawing on Holmgren 2002; Mollison & Holmgren 1978a) as a vehicle for investigating how systems approach can be made more tangible and practical in a development context[5]. In brief, a set of four modified principles was used to explore systems thinking and sustainability and liveability issues amongst Vietnamese professionals and village leaders in Hai Duong province in northern Viet Nam. The four principles were presented as a way to improve the practice of the Green Productivity for Integrated Community Development Program (GP-ICD) (Asian Productivity Organisation 2002) which was already in place in the province. The principles were:

- *Work with and respond to natural processes;*
- *Observe, be creative and interact;*

[5] The ways in which systems theory and permaculture relate have been discussed by Smith, Willetts and Mitchell (2006; 2007) and are not considered in detail here.

- *Value and use resources mindfully; and*
- *Be aware of and use linkages and connections*.

Prior to the introduction of these principles, it was already apparent that the participants in the research engaged in systems thinking. For example, during workshops, numerous participants clearly made connections between environmental pollution and health, between air pollution and fruit tree production, between development and pollution and between participation in the project and solidarity in the community. The purpose behind introducing the principles was to offer a framework in which to conduct the existing systems thinking and to foster further systems thinking, particularly as part of a problem solving/opportunity identification process. The response to these principles was favourable. For example, at a workshop senior officials from the province noted[6]:

- *"Using permaculture gives us the way how to see something overall and select solutions which both save and protect the environment and bring benefits."*
- *"It's method to look at a system as a whole and make better decisions in resource use."*

A core group of people from five villages continued to explore these concepts with the author over the course of 5-6 months during 2006. The process indicated that a focus on tangible and practical examples of systems thinking in action make a great contribution to the understanding of what a systems approach entails.

The tangible issue of most interest to participants regarded waste management and resource use. Exposure to practices such as aerobic composting, banana circles and worm farming provided a link between the principles and practice, a link which the participants acknowledged was valuable to them. The majority of participants indicated that they intended to apply these practical skills in their own communities. During the course of the field work, one community began a trial of using a banana circle to compost leather waste.

Although it was beyond the scope of the field work to trace actual changes in practice that resulted from participation in these workshops, the experience illustrates the use of systems thinking to increase feelings of competence and to make available strategies that may not have been previously available, or were not regarded as having value. In doing so, the experience is likely to have satisfied some desires to know and understand and some needs associated with self esteem because of the increased capacity to problem solve which the combination of systems principles and practical skills offered the participants. Ultimately, as with all learning experiences, the way in which the learning experience is taken in is at the discretion of the participant (Prosser & Trigwell 1999). This point brings us to the next attribute of the proposed critical systems thinking approach to rural development, which is an ethical base to action and choices.

[6] Anonymous response captured on a feedback form after the workshop.

Ethical base to action and choices

The ideas of intergenerational and intragenerational equity which underpin the concept of sustainability, as described by Brundtland (WCED, 1987), are inherently ethical concepts. As numerous authors have pointed out (eg. Abeysuriya 2008; Bawden 2003; Hundloe 2007; O'Connor 2007), ethics is a fundamental aspect of sustainability, though it is not always made explicit. Liveability is also an inherently ethical concept in that it is concerned with the ways in which we treat others and are treated ourselves. Critical systems thinking has the capacity to make an important contribution to the ethics associated with acting in the sustainability and liveability space. One of the key features of critical systems thinking which is a prerequisite for identifying virtuous cycles is its grounding in ethics. Flood, drawing on the work of Churchman, (Flood 1999, p. 253) encapsulated this grounding when he noted:

> *"A key principle of systemic thinking, according to Churchman, is to remain ethically alert."*

The commitment to emancipation inherent in CST, and the associated idea of ethical boundary critique developed by (Midgley 1996, 2000) and following on from Churchman and Ulrich, broaden and at the same time specify some ways of being ethical. Midgley's suggestion that we make a "general commitment to improvement (and sustainable improvement in particular)" (1996, p. 16) rather than emphasizing only human emancipation is significant. The implication for sustainability and liveability is that the search for virtuous cycles in which the environmental, economic and social dimensions are addressed becomes an ethical imperative. An ethical base to actions and choices has links to all three commitments of CST, but particularly to the commitment of emancipation and critical awareness.

Drawing on this connection to emancipation and the focus of critical systems thinking on challenging power and authority, several existing threads in development practice can be drawn together to detail this ethical imperative. The first thread is aligned with Midgley's broader perspective on emancipation which offers the foundation of an ethical approach which gives consideration to human well-being (liveability) and ecological well-being (an important component of sustainability). This thread supports and encourages the systems approach described in the previous section and focuses primarily (but not exclusively) on the way in which basic needs (such as physiological and safety needs) are satisfied. As Maslow (1970) and others have outlined, the meeting of these basic needs is the precursor to the desire to meet all other needs. Rural development practices aligned with this view include the sustainable agriculture approaches focused on food security (eg. Pretty 2000), water and sanitation projects (eg. Satterthwaite, McGranahan & Mitlin 2005), project addressing land tenure and land rights (Prowse & Chimhowu 2007) and approaches that link human health to ecosystem health (Lebel 2003). However, not all rural development projects revolve around meeting basic needs. The second thread is concerned with "higher needs" and aspects of practice which would form part of any critical system thinking driven approach to development practice.

The second thread is associated with the way in which needs, such as belonginess, self esteem and self actualization as well as the desire to know and understand can be met. Existing practices aligned with this thread include the commitment to participation and to learning inherent in the participatory and learning oriented approaches already mentioned (Chambers 1992; Jiggins, Röling & van Slobbe 2007; King 2000; Rist et al. 2006). In the previous section on systems approaches it was suggested that systems thinking itself can contribute to empowerment by enhancing psychological capabilities. In addition to this, there is a need for wider distribution of knowledge about ways of meeting these needs that reinforce virtuous cycles of sustainability and liveability. Sustainable agriculture would be one such example.

The third thread relates specifically to the practitioner and the way in which they engage with the process and particularly the interpersonal aspects of power. This thread is aligned with the shifts to a learning paradigm in rural development advocated by Pretty and Chambers (1994) in which the researcher, or in this case the practitioner, become very much part of the process, as advocated by Ison (2002). This change was also characterized in some circles by a shift away from technology transfer toward facilitation by practitioners (Röling 1994). These changes continue to break down the more traditional concentration of power in the foreign development worker, the holder of expertise and source of "the answer". Such dilution and sharing of power would be an important focus for a practitioner guided by a critical systems thinking approach. Following on from the paradigms advocated by Pretty and Chambers and colleagues, there are several additional elements that an explicit consideration of power could involve. These are considered to varying degrees in existing practice, but they are made explicit here in the context of a critical systems thinking framework.

The first is for the practitioner to be realistic and honest about the extent to which potential empowerment will translate into actual empowerment, particularly if there are powerful external forces at work. Whilst Diener and Biswas-Diener (2005, pp. 133-134) have highlighted that the "*experience of well-being includes the feeling and belief that one can accomplish ones' goals*" they also note that "*external conditions do not in fact allow for effective action, the person is not truly empowered*."

The second element is openness and honesty with participants regarding sustainability and liveability disparities between the practitioner and participants. For example, would it not be ethical practice to be honest about the irony of being a person from a country which takes more than its fair share of the planet talking to someone who is yet to gain their fair share about being sustainable? One way the author went about achieving this honesty was to draw attention to the difference in ecological footprint between Australia and Viet Nam in workshops with Vietnamese village representatives. The image used in 2006 to prompt explicit discussion about the sustainability and liveability disparity between participants and the practitioner (in this case the author who is from a middle class background in Australia) is shown in Figure 4.

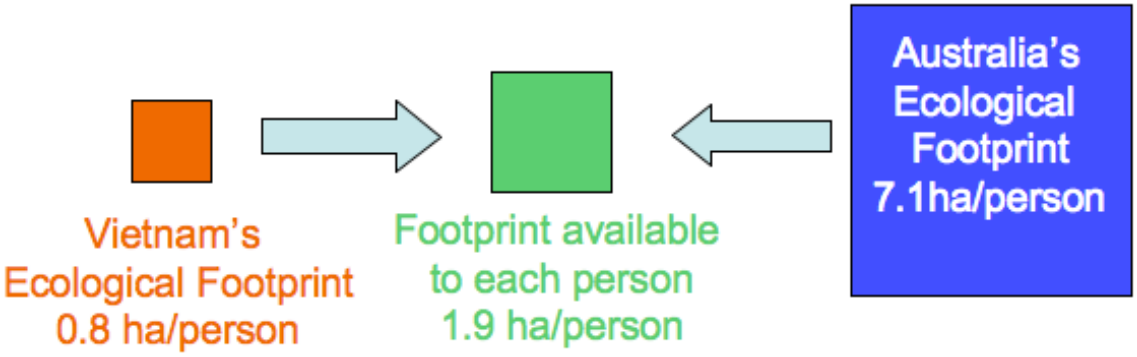

Figure 4 Comparison of Viet Nam and Australia's ecological footprint with the footprint available to each person based on the earths' carrying capacity (data currently available on the footprint shows that Viet Nam's footprint is approximately 1.3 ha/person (Global Footprint Network 2009))

The third element of breaking down power disparities involves openness to being wrong, to realizing the incompleteness of ones' knowledge and to being personally transformed by the process. As Flood suggests (Barton et al. 2004, p. 13) we should be:

> *"using the systems concept to construct understanding and appreciation, but never to think that we know ultimately what is out there, or indeed to be clear in our mind that we never have comprehensive and clear absolute theories."*

The importance of being exposed to different views and learning from them has been discussed by Gregory (2003) and Palmer et al (2007) suggested some ways in which openness to personal transformation can enhance systems practice.

Questioning our actions, to challenge their ethical basis is a necessary and important part of practice. This is the focus of the next attribute of critical systems thinking: critical reflection on process and purpose.

Critical reflection on process and purpose

Critical reflection on process and purpose is in affect a bridge between the commitments of critical awareness and methodological pluralism in critical systems thinking. It is through reflection that we gain awareness, and as already eluded to, the gaining of awareness can in itself be emancipatory or empowering. However it is through action that ultimately we change our world and this is where methodological pluralism comes into play. The focus in this section is on the role that critical reflection can play in helping create action toward virtuous cycles of sustainability and liveability by both in the guiding the practice of a practitioner and in facilitating the emancipatory or empowering processes.

Reflection is an important tool for learning and learning theorists describe levels of reflection in various ways. Many hierarchies of reflection culminate in what might be called critical reflection, which had described as questioning of accepted practices (Ghaye & Ghaye 1998) or reflecting on reflection itself (Van Manen 1977).

Using CST to Foster Virtuous Cycles

In order to envisage how these ideas relate to development practice and the propulsion of virtuous cycles the concepts of first, second and third order loop learning are adopted. These levels of learning are described below.

- Single loop/first order learning is about performance and asking "are you doing things right?" (Rist et al. 2006, p. 221). It is about "past, lived experiences"(Percy 2005, p. 128) and the questioning of actions (Dyball, Brown & Keen 2007).
- Double loop/second order learning is focused on norms and asking " are you doing the right things?" (Rist et al. 2006, p. 221) It involves experiences which "challenge the first-order experience and lead to reconsideration and modification of that experience or knowledge. " (Percy 2005, p. 128). Assumptions are questions in this form of learning (Dyball, Brown & Keen 2007).
- Triple loop learning involves questioning governing values (Dyball, Brown & Keen 2007) and thinking about the "way in which knowledge and power may become entangled in practices of knowledge-construction in society" (Flood & Romm 1996, p. 592).

When put in terms of these loops of learning it is suggested that a critical systems thinking approach would strive for at least second order learning in both the practitioner and the participant. In the context of the sustainability and liveability the ability to critical reflect, to an extent, unlocks the capacity to utilize systems thinking to its fullest potential and to be able to avoid vicious cycles and move toward virtuous cycles of sustainability and liveability. Having said that, in undertaking this reflection, one must retain humility and remember, as Flood (1999, p. 251) has suggested:

> *"Learning our way into a mysterious future calls for continuously revisiting what might be going on, what we are doing and achieving, and the way we are doing it."*

One way in which the practitioner could achieve second loop and possibly third loop learning is by conducting an ethical boundary critique (Midgley, Munlo & Brown 2003) at the outset of a project and throughout the project so that they become critically aware of values which have been excluded from the process and why these have been excluded. Ulrich's critical systems heuristic (Ulrich 1987) also offer a starting point for reflecting on professional development practice, in particular the way in which the purpose of the activity has been defined, who defined it and how the associated processes are designed and by whom. In development circles, other tools available to prompt critical reflection on practice consistent with the creation of virtuous cycles include the characteristics Pretty and Chamber's ascribe to the new professionalism associated with a learning paradigm (Pretty & Chambers 1994, p. 186).

With respect to the participants in a project, it is possible for projects to be designed to foster critical systems thinking by prompting reflection with an increasing level of criticality. This process could be likened to the idea of sweep-in, advocated by Churchman (discussed in Flood 1999, p. 253) in that it encourages consideration of "ever-more features" of a given situation. The following discussion of the authors' research in Viet Nam illustrates some of the complexities associated with such a process in a development context. In this research, reflection of research participants was prompted through both open-ended questions to groups and individuals and statements to

which a response was requested. Table 1 gives some examples listed according to the stages of reflection (Fisher 2003, adapted from Gibbs 1988) that the questions aimed to prompt. These questions reflect the three loops of learning described above. As indicated in Table 1 some questions prompted second order learning but none targeted triple loop learning. However it was hoped that through prompting reflective processes, individuals would, of their own volition, begin to ask some critical questions regarding how their values relate to their situation of sustainability and liveability. Given the importance in Vietnamese culture of saving face, it is considered unlikely that participants would have shared second order experiences or third order experiences with the author. In the cultural and political context of Vietnam, it also would have been inappropriate to push for answers to questions of this nature.

The discussion of cultural specific issues is relevant to all aspects of development practice. The points made above highlight the need for the reflection process to be contextually and culturally appropriate. Reflection can still be beneficial, for as Maturana and Varela (1988, p. 49) have said "*the being and the doing are inseparable*" or as Kolb (1984, p. 26) suggested "*No two thoughts are ever the same, since experience always intervenes.*" It follows that by answering these reflective questions something would have shifted in each person, if only a small thing. When fuelled by the strong human desire to know and understand described by Maslow (1970), anything is possible. The questions listed in Table 1 are thought of as opening doors to particular ways of thinking. As learning theory suggests, metaphorically speaking, whether or not an individual walks through the door is their choice.

In this consideration of the ways in which critical reflection can assist in enhancing learning toward virtuous cycles of sustainability and liveability, acting toward these virtuous cycles has been touched on. The following section deals more specifically with action and considers the role that diverse approaches and views would play in a critical systems thinking approach to rural development.

Table 1 Illustration of the relationship between stages of reflection and the kinds of questions asked during the research in Viet Nam

Stage of reflection (taken from Fisher 2003)	**Example of a corresponding reflective question posed to research participants**
1. **Description**: *what happened?*	Please explain a new idea or concept that you learned today.
2. **Personal experience:** *what was I thinking and feeling?*	What was something you liked about the workshop? Why did you like this?
3. **Evaluation:** *what was good and bad about the experience?*	How did observing and talking with people help you collect information?
4. **Analysis:** *what sense can I make from this experience?*	In what ways do you think this training has changed the way you think about problems in your community?
5. **Confrontation**: *what values,*	What was something that surprised you about

beliefs and assumptions did I carry into this experience? Where did they come from? How do they differ from the values, beliefs and assumptions of others involved in the experience? How do they connect to wider social and political forces? What are the ethical implications of my actions?	other participants in the workshop? Why did this surprise you?
6. **Reconstruction:** what could I have done differently? What will I do differently next time?	What will you do in your village that uses ideas from the training?

Appreciation of diverse views and application and diverse approaches

The fourth and final attribute of a CST approach to development practice revolves around the appreciation and application of diverse views and approaches. Essentially this attribute is about facilitating culturally responsible and effective means of improving a situation and recognising that a diversity of views on a situation correspond with a diversity of ways of dealing with it. This attribute is closely linked to the potential for learning in discordant circumstances already mentioned (Gregory 2003) and is relevant to both practitioners and participants. It draws directly from all the CST commitments but particularly methodological pluralism and critical awareness. Fulfilling this attribute extends directly from the previous discussion, requiring what Flood and Romm (1996) have termed a "reflexive consciousness".

There are many levels at which methodological pluralism can be applied to foster application of diverse views and approaches. But before application, appreciation of these diverse views is necessary to enable the value of alternative ways of doing things to be realised. Bell (1998) offers an anecdote that illustrates very well the importance of such appreciation. The anecdote describes efforts of an international aid agency to fix a grasshopper "plague" in Northern Africa which was not regarded as a plague by the local people. As Bell (1998, pp. 180-181) explained after a plan for eradicating the grasshoppers had been devised it was discovered that:

> *"the "mess" was not the mess first thought. Variegated grasshoppers are a delicacy of some considerable value and a rich source of protein."*

In this situation appreciation of the value of the grasshoppers to the local community could have been established at the outset if the international aid agency had exercised their "reflexive consciousness" and critically reflected on whose values were being considered in the definition of the problem. Assuming that the way the international agency conceptualized the situation can be liken to a "theory", this example is offers a clear evidence of Flood and Romm (1996, p. 589) warning regarding the way in which "*adherence to one theory confines explanation of organisational and societal affairs and*

therefore restricts options."

Bell's (1998) anecdote illustrates a situation in which some of the tools of CST such as ethical boundary critique and critical systems heuristics could have been used to reveal different views on a situation. Complementary methods for improving the ability to appreciate are evident in mental tools for coping with culture shock. A particular tool that the author found useful in her field work in Vietnam was to remind herself, when confronted with a disorienting, discordant situation, to "stop, suspend judgment and find common ground". This simple reminder was based on cultural competency training the author had participated in during preparation for an Australian Youth Ambassador for Development placement. It proved useful in a diverse range of situations as it provided the space for critical reflection, appreciation and learning. As such it could be used in a critical systems thinking approach to rural development to appreciate the value of existing participant practices and understandings of phenomena.

Once a readiness to appreciate diverse views and associated approaches is developed, a practitioner would be able to offer more appropriate support to a community or a household regarding the selection of ways to improve their situation. It is suggested that methodological pluralism can be considered at levels ranging from technical methods e.g. how to make compost, to the procedural e.g. how to engage a community. Openness to alternative methods, ability to adapt and awareness of values that may be marginalized are aligned with the farmer first "movement" in rural development which was galvanised by Robert Chambers and colleagues (Chambers, Pacey & Thrupp 1989) with their publication of the same name in 1989. These participatory approaches are linked to greater appreciation of multiple perspectives (Pretty & Chambers 1994, p. 184) such as the know-how of women, young people and the aged and the recognition of the contribution indigenous knowledge and traditional practices can make when facing a challenge. In recent years Chambers (2008) has made the explicit link between participatory approaches and pluralism, prompting a vision that is closely aligned with discussion of pluralism amongst CST practitioners. Chambers (2008) suggests that:

> *"Paradigmatically, eclectic pluralism means that branding, labels, ownership and ego give way to sharing, borrowing, improvisation and creativity, all these complemented by mutual and critical reflective learning and personal responsibility for good practice*."

The way in which this process is conducted needs to be consistent with the other attributes of a CST approach. An ethical approach would mean that practitioner views would not be forced upon participants but that individuals would be provided the opportunity to learn for themselves about the existence of and value of diverse views. For example, in a discovery learning project in Cambodia, the facilitators of the project did not insist on equal participation of women from the outset (King 2007). However they found that over the course of time, the women came to be involved because the men had discovered that they needed the women's knowledge to continue with the project. This resulted in a realization by the men that may not have occurred if the project had mandated a certain number of women participants from the outset.

As Flood and Romm's (1996) work in relation to theoretical pluralism suggests, consideration of diverse approaches and views is not based solely on ethical principles of engaging marginalized individuals but also on the practical benefit that access to a greater pool of knowledge and perspectives can bring. It is also important to be aware that "*learning to acknowledge the value and specificity of our own experience, while seeking ways to appreciate other perspectives inevitably entails making mistakes*." (Cornwell, Guijt & Welbourn 1994, p. 117).

Being open to diverse views and approaches also brings considerable challenges at the epistemological level. The cautions against pragmatism, offered by Flood and Romm (1996) for instance, are particularly relevant to development practice in that there is a tendency for action to be based primarily on trial and error and experience and there is limited reference to, and reflection on, the underlying theories at play. The practice of rural development and the participatory and social learning approaches described above also operate within a sector which is dominated by particular theories of development which drive the broader context in which development projects receive funding and are evaluated. Rihani (2002) referred to these dominate theories as the linear paradigm, which includes the assumption that there is a common end-state of development and that economic development corresponds directly to human development. In many ways these theories contradict the appreciation and application of diverse views and also clash with the other attributes of a CST approach to rural development. Although there is evidence of a broadening of views in the "mainstream" development sector, these challenges remain.

AREAS FOR FURTHER LEARNING – HOW TO ACT TOWARD SUSTAINABLE LIVEABILITY?

This paper has both outlined the contribution that critical systems thinking can make to rural development practice and offered an argument for an explicit recognition of key critical systems thinking derived attributes which can foster sustainable liveability through the creation of virtuous cycles. The numerous examples given throughout the paper of existing development practices which support virtuous cycles demonstrate that, despite the doom and gloom often surrounding us, there is much reason for hope.

The four attributes, drawn from the literature and illustrated with some examples from the authors' own practice offer a promising framework for further development and promotion of acting and learning toward sustainable liveability. In essence, these attributes offer as a way to facilitate an integrated approach to sustainability by fostering recognition of interconnectedness, ethical practice, critical reflection and genuine valuing of diversity. Above all, the attributes and the discussion surrounding them seeks to link underlying theory with action, so that action can be better informed and more readily improved. However they are a starting point and much remains to be explored. Areas for further learning include[7]:

[7] These areas for further learning, particularly the first, are the focus of the doctoral research on which this paper is based.

- Identification of tools to further assist in the translation of these attributes into action. For example, a tool for development practitioners could be developed from a modified version of Ulrich's (1987) critical system heuristics which is adapted in light of the four attributes suggested above and the complexity of the sustainability and liveability challenge.
- Further validation and development of these attributes by comparing them with the characteristics of rural development projects which exhibit virtuous cycles of sustainability and liveability.
- Initiation of stronger dialogue between the systems science, critical systems thinking, sustainability and development fields to enable more mainstream application of the synergies between them.
- Exploration of the ways in which the links made between critical systems thinking and development can infiltrate development theory and support policies which foster virtuous cycles of liveability and sustainability.
- Exploration of the limitations of critical systems thinking and the ways in which it can draw on other theories to improve it's framework for helping us learn toward sustainability

This paper began as a proposal to rural development practitioners to consider the ways in which critical system thinking could enhance their practice. It concludes with an invitation to anyone interested in the issues and possibilities raised to contribute to the ongoing development of these ideas and the ways in which they can translate into learning and acting toward virtuous cycles of sustainability and liveability.

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