# Permaculture as a Tool for Implementing the UN Decade of Education for Sustainable Development


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## Introduction

The system of Permaculture design is an appropriate and well-defined model for teaching and implementing the goals of Education for Sustainable Development (ESD). When the United Nations declared the years from 2005-2014 to be a Decade of Education for Sustainable Development (DESD), the field of ESD was launched into a period of heightened global awareness and growth. Through a comparison of the core principles of Permaculture and ESD, thereby weaving the two systems together, it is hoped that the benefits of applying Permaculture towards the goals of the DESD can be made clear.

*Permaculture* is a conjunction of the words 'permanent' and 'culture', a point that hints at its founding principles. It is mainly a design system that, through the careful observation of nature, seeks to combine traditional wisdom with modern ecological knowledge to aid in the development of sustainable human habitats. It was developed in the global environmental context of the 1970's to be a compact, dynamic system of thought, drawing on a wide variety of design techniques, that could be easily taught and applied to any climate or cultural setting.[1] In the time since its founding, Permaculture has been refined and has become a highly regarded system with many potential applications for addressing critical, present day issues related to sustainability and education.

In light of the recent UNESCO World Conference on ESD in 2009 and the subsequent Bonn Declaration, the direction of the DESD has been constructively evaluated and redefined drawing renewed emphasis to the need for culturally sensitive, community level action and projects that draw on international support to meet critical local needs.[2] With this in mind, Permaculture as a system is particularly well-suited for community level action, addressing the needs of the impoverished while incorporating 'quality education' into the process of project development and implementation. This point can be made evident through an examination of Permaculture teaching methodologies, related movements, case studies, and current projects.

Though much work has been done developing and implementing Permaculture systems, it has received little recognition in the academic setting. Given its potential applications and the needs of the time, this situation is unfortunate. It is hoped that by illustrating the relationship between Permaculture and ESD in light of the Bonn Declaration, that high-policy level recognition will be afforded to this valuable and timely tool – in affect improving our ability to work collectively towards a resilient, sustainable future across all areas of society.

This argument is made through the following sections and discussions:

(1) The identification of the core principles, practices, and techniques of Permaculture. This is necessary as: a basis for comparison to ESD and for reference in latter sections.
(2) A brief discussion of the history, definition, and principles behind ESD, clarifying the field in the context of the broader environmental education movement.
(3) Conveying Permaculture as a form of ESD, using the definition of ESD from section (2) as a framework for comparison. Considers Permaculture as a tool for implementing the DESD and includes a discussion of key educational issues and general Permaculture teaching methods.
(4) Considers the recommendations of the 2009 Bonn Declaration and the place of Permaculture in relationship to this most current of ESD and DESD documents.
(5) A look at Permaculture as applied to communities afflicted by poverty considering case studies, applicable teaching methodologies, and relevant techniques.

1 Mollison, B. (2002). *Permaculture: A Designers' Manual*. Sisters Creek, Tasmania: Tagari Publications., p. ix
2 UNESCO World Conference on Education for Sustainable Development - Conference Proceedings, Bonn Declaration. (2009, 31 March – 2 April 2009). Paper presented by the UNESCO World Conference on Education for Sustainable Development, Bonn, Germany.

(6) Future of Permaculture, its connection to related environmental education movements, and closing thoughts.

## Section I: Fundamentals of Permaculture – A Summary for Educators:

In addition to the definition provided in the Introduction, the following concepts are at the core of Permaculture design as defined by some of the key founders and much of the Permaculture community. It is hoped that this concise discussion can provide a sufficient introduction to Permaculture design for environmental educators and serve as a sufficient point of comparison for the rest of the article:

- Permaculture Ethics:

  The three ethics are the backbone of Permaculture and are what all considerations in design are weighed against. They are often depicted as a triangle with each of the ethics being co-dependent on the others. While outside the scope of this writing, it is important to note that the Ethics were carefully considered in their creation and drew on traditional wisdom and contemporary knowledge for their selection[3]:

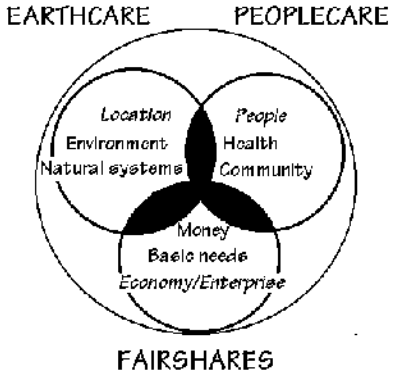

*Illustration 1: Integration of the Permaculture Ethics, www.self-willed-land.org.uk*

  1) *Earth Care* – This is a notion of "enlightened self-interest"[4], that humans must care for the Earth, with all of its living systems, because of our dependence on them for survival. While favoring an anthropocentric approach, Permaculture considers human well-being to be inexorably tied to the diversity and resilience of the ecosystems in which we live.
  2) *People Care* – Permaculture systems must care for people as well as the Earth. This does not call for a regression of society to a past state, but to incorporate smart design principles into the culture so as to meet the needs of people while utilizing resources renewably.
  3) *Fair Shares* – Each person is afforded their needs without compromising the other two ethics. This means that no fellow human, the Earth, its creatures, or its ecosystems should suffer unnecessarily for the sake of the others. It is a balancing principle, where excess is freed for use by other parts of the system or future generations.

- Permaculture Principles:

  These are the guiding points when developing a Permaculture system. They are the application of the Ethics and guide the design process. Not every element in a Permaculture system needs to fulfill all of the Principles yet to violate one would have to be carefully considered to guarantee sustainability. There are various ways to list these Principles but one of the most widely recognized are the '12 Permaculture Design Principles' as defined by one of Permaculture's founders, David Holmgren in his *Permaculture: Principles and Pathways to Sustainability*[5]:


*Illustration 2: Principles and Ethics, http://permaculturepriciples.com/*

  1) *Observe and Interact* – Observe and be harmonious with nature so as to design systems that are sustainable and work with and not contrary to natural cycles.
  2) *Catch and Store Energy* – This includes Earthly and human generated energy including solar, wind, hydrological, labor, compost, photosynthetic, etc.. The aim is renewability.
  3) *Obtain a Yield* - Future needs cannot be met at the expense of present needs. It is the idea

3 Ibid. Mollison, B. (2002)., p.11
4 Whitefield, P. (2000). Permaculture in a Nutshell. Hampshire, England: Permanent Publications., p.5
5 Holmgren, D. (2010). *Permaculture : principles & pathways beyond sustainability*. East Meon, Permanent Publications.

that "one cannot work on an empty stomach." This is fundamental to sustainability.

4) *Apply Self-Regulation and Accept Feedback* – In application both to a design and to systems as a whole, that sustainability is built on a pillar of cyclical feedback and regulation.
5) *Use and Value Renewable Resources and Services* – Notes the difference between using resources renewably, such as sustainable timber, and passively, as a tree for shade.
6) *Produce No Waste* – Waste is merely an unidentified resource. If an output cannot be reused by the system then it should avoid being created, such as exhaust from a car.
7) *Design from Patterns to Details* – If possible, avoid essentializing and micromanaging every individual function. Complex systems can evolve from simple ones which work.
8) *Integrate Rather than Segregate* – Can be summarized as: "Each element performs many functions, each important function is supported by many elements".[6] Provides resilience.
9) *Use Small and Slow Solutions* – Systems should preform on the smallest practical scale and allow for energy to permeate the system. Examples are local economies and repairing tools.
10) *Use and Value Diversity* – The recognition that stability comes from diversity of form and function. Allow for evolved, dynamic system complexity to support the other Principles.
11) *Use Edges and Value the Marginal* – It is when elements interact the the most interesting results occur, the outputs that become the inputs of another element, large or small.
12) *Use and Respond to Change Creatively* – Make use of change in a deliberate and co-operative way, recognizing that certain events are out of ones control. Be flexible.

- Zone and Sector Analysis:

  Zone and Sector analysis is used in Permaculture to define the interactions between physical and energetic factors in a system. In a design, a center (such as the home) is often defined and decisions are made relative to this center. Once mapped and integrated, Zones and Sectors provide an intuitive sense of 'flow' within the system. These considerations are fundamental to the harmonious interaction of humans with the environment:

  - *Zones* – are usually, roughly concentric rings beginning with Zone 1, being the closest to the home or center, and Zone 5 being the furthest away. A gradient is created between the most intensively managed areas and the most 'wild', also representing the the relative impact of the design on the nearby environment. An example is a kitchen garden that would be in Zone 1, and a forest preserve that would be in Zone 5. The size of the zones is often relative to the size of the site.
  - *Sectors* – are the energies that flow in and out of a system in time and space. These include precipitation, solar path, and wind direction through the year, as well as water sources, unregulated external factors such as noise or pollution from nearby human activity, and other weather conditions. Knowledge of these factors are prerequisites for design.

- Techniques of Permaculture Designers:

  There are a wide range of methods used by Permaculture designers to implement and achieve their aims within a *whole, interconnected system*. These draw on local and traditional knowledge, modern ecological and engineering techniques, and real-time observation during project development. It is impossible (and unnecessary) to create an exhaustive list because new tools are incorporated and developed often as Permaculture seeks open-mindedness, flexibility, and the incorporation of any technique that fits within its principles.[7] Some common examples are:

  - *Swales* – a tool for encouraging water catchment, groundwater stores, and managing runoff.
  - *Guilds* – an agriculture tool of complementary, co-supporting plants such as the "three sisters" of Native American traditions.

6 Holmgren, D. (2001). *The Essence of Permaculture*. Retrieved from www.spacountry.net.au/holmgren, Accessed: 2 July 2011
7 See *Appendix I* for further examples and resources.

- *Water Catchment Systems* – to make use of water from precipitation within the design.
- *Forest Gardens* – the use of stacked, perennial tree and shrubs to maximize space and yield while minimizing effort in the upkeep of a system.
- *LETS Systems* – an acronym for Local Exchange Trading System, this is a alternative to using national currency, noting that Permaculture is not only an agricultural tool.
- *Keyhole Patterning* – uses physical patterns in nature to model elements of the system, for example 'keyhole gardens' with the internal structure of a snowflake to maximize 'edge effect'.
- *Local Building Materials* – can utilize ancient mud building techniques and the reuse of discarded materials such as tires to create sustainable, high-comfort living structures.

➢ Key Ideological Considerations

- *Cultural Sensitivity* – fundamental to Permaculture is an integration with existing, local culture. Spirituality, holistic health, art, traditional knowledge, systems ecology, and various philosophical traditions are openly integrated and considered in the system making it quite appropriate to the diversity of global culture.
- *Economics and Development* – though markedly against globalization, Permaculture designers often appreciate the model that the World Bank uses when looking at sustainability and capital. This includes four types of capital: Economic, Human, Social, and Natural.[8] This takes into account material and non-material factors that can contribute to a sustainable society. That said, local economies are central to Permaculture thought and are considered are requirement for resilient community design.
- *Appropriate Technology* – appropriate, locally fabricated tools are central to the Permaculture design process. As implied by the Principles, using what is available is necessary for working with the local environment to achieve goals. This point is particularly significant for impoverished communities.
- *Whole Systems Thinking and Integration* – while a particular technique (water catchment, mud building, etc.) can be commonly used by designers, the tool itself is not "Permaculture"; it is the integration of the technique into a whole system that makes it Permaculture.[9]

➢ Local Participatory Design and Planning Methodology:

Participatory community design and education has become a hallmark of Permaculture and, as noted, is fundamental to its core philosophy. Designers have incorporated techniques from urban planning, landscape architecture and social science research. Some such tools are:

- *Design Tools* – formalized methods for design, development, and analysis:
  1) B.R.E.D.I.M. – used by industrial engineers and standing for Boundaries, Resources, Evaluation (and re-evaluation), Design, Implementation, and Maintenance. This standard, formulaic design technique is used to aid in producing maps and design documents of a professional nature with little technical background.
  2) Random Assembly, Flow Diagrams, Input/Output Analysis – are a few of the many creative tools used by Permaculture designers and educators to illustrate the Principles and generate 'outside the box' thinking within a design project.
- *Participatory Tools and Education Techniques* – a variety are used but not limited to:
  1) PASE sheets – short for Plant, Animal, Structure, Energy surveys for community needs.
  2) Planning For Real – uses scale models, designed by Neighborhood Initiatives in the 1970's.
  3) Creative Spaces – a community participation toolkit from the Architecture Foundation.
  4) Workshop Models – that provide on-site, short-term education and the opportunity to train for and implement practical, needs based design projects.

8 Radej, B. (2006). Assessment of Structural Funds. Effectiveness on Sustainable Development - Pomurje Regional Case Study. Ljubljana
9 Bell, G. (2004). *The Permaculture Way*. Hampshire, UK: Permanent Publications., p.32

The aforementioned discussion is once again, very brief and could have been articulated in numerous ways. The main ideas presented here are however well-representative of the general philosophy of Permaculture, are well accepted by the Permaculture community, and should provide a sound basis for further discussion and comparison.

## Section II: Education for Sustainable Development – History, Definition, and Disambiguation

The concept of 'sustainable development' was first endorsed by the Brundtland Commission in 1987 in their seminal report, *Our Common Future*. From that time came the drafting and development of Agenda 21 defining the different components of the UN sustainability agenda, which was accepted in 1992 at the Earth Summit Conference in Rio de Janerio. Chapter 36 of Agenda 21 was titled "Promoting Education, Public Awareness, and Training," and is recognized as the source of the principles defining ESD as well as its first formal recognition on the international level.[10] In addition, each chapter of Agenda 21 included education as a vital implementation strategy for achieving the goals of sustainable development.

Agenda 21, Chapter 36 recognized four major "thrusts" for achieving ESD and that have become standards for the definition of ESD in the field.[11] These are as follows:

1) *Improving Access to Basic Quality Education* – Representing a change in the level of education that is provided in many countries (not limited to impoverished communities), this includes literacy and skills as well as improving the availability of schooling and reducing dropout rate. There is an additional focus on gender, social, and racial equality throughout education systems. A primary link is made to the role of ESD in the agenda of the UN Education for All program.
2) *Reorienting Existing Education Programs* – Education as it is currently practiced is not going to achieve the goals of ESD. A sustainable future will be built based not on the quantity but the content and quality of the education received. UN documentation states that this can be achieved through: "Questioning, rethinking, and revising education from pre-school through university to include more principles, knowledge, skills, perspectives and values related to sustainability in each of the three realms – environment, society, and economy – is important to our current and future societies."[12]
3) *Developing Public Understanding and Awareness of Sustainability* – A citizenry that understands the goals and vital importance of sustainability is the only way that it can be achieved. This should manifests through daily behaviors, supporting political action in the direction of sustainability, and consumption practices that support corporate social and environmental responsibility. A consistent and realist media message is necessary to achieve this as well as the identification of appropriate educational tools for various environments.
4) *Providing Training* – All areas of society, business, industry, government, educational, and community organizations need to train their leaders in a sustainability practices. This includes the development of specialized training programs for various sectors. Essential to this thrust is capacity building at all levels of education, from pre-school to higher education and developing culturally appropriate programs for the sustainability needs of various regions.

Ten years later, after much work in the field, at the Johannesburg World Summit in 2002 the UN

10 United Nations Educational, Science and Culture Organization. (October 2005). *United Nations Decade of Education for Sustainable Development (2005-2014): International Implementation Scheme*., p.26

11 Earth Summit: UN Program of Action from Rio. (1992). Agenda 21, Chapter 36. Rio de Janerio, Brazil: United Nations Department of Economic and Social Affairs: Division for Sustainable Development. From http://www.un.org/esa/dsd/agenda21/res_agenda21_36.shtml

12 Ibid. UNESCO (2005)., p.29

declared the Decade of Education for Sustainable Development. This result from Johannesburg signaled a recognition of the importance that education has to play in working towards a sustainable future. The DESD was set to start in 2005 and UNESCO was charged with making a plan for implementation. The resulting document, the *UN-DESD: International Implementation Scheme of 2005* (IIS) outlines the goals, key issues for action, and plan for implementation of the DESD. Details of these are as follows:

In addition to the "triple bottom line" of sustainability – social, economic, and environmental welfare for current and future generations – the IIS identifies and renews the "four thrusts" as the underlying goals of ESD and the DESD. In addition, three points are noted to "set the stage" for the DESD and its implementation. These are:

1) *Sustainability Issues* – such as water resources, climate change, migration, urbanization, and HIV/AIDS are identified as especially pressing. Individual national, regional, and community considerations need to be made and flexible educational programs made available to meet those needs.
2) *Values* – considering national and community cultural preferences are recognized for their importance within the framework of implementation. Yet, "The goal is to create a locally relevant and culturally appropriate values component to ESD that is informed by the principles and values inherent in sustainable development." This means that the core of the sustainability mission needs to be maintained, but accomplished with an eye for local, cultural sensitivity.
3) *Linking to other International Educational Priorities* – such as the Millennium Development Goals, Education for All, and pressing human rights programs.

Partnerships across society are defined by their scale and include groups ranging from international to community-level, large corporate to local outreach organizations, and developed and developing nations. Concerning implementation, for all levels, seven strategies for moving forward are identified:

1) *Vision-building and advocacy* – to encourage an understanding of what it means to live within environmental limits, peaceful, and in equitable and just ways.
2) *Consultation and ownership* – through open communication, public participation and organizational commitment to the values of sustainable development.
3) *Partnership and networks* – connections between all levels of society from government organizations to the grass roots, incorporating a wide variety of perspectives.
4) *Capacity-building and training* – by drawing together educators and experts from a wide variety of fields. Teacher educators and pre-service teachers are noted in particular.
5) *Research and innovation* – Leveraging available knowledge as well as innovations "to be implemented in thousands of local situations"[13] and "to address sustainability in locally relevant and culturally appropriate fashion"[14] are highlighted.
6) *Use of information and communication technologies* – utilizing fewer natural resources, promoting global dialog, and making resources widely, and openly available.
7) *Monitoring and evaluation* – at all levels to assure effectiveness qualitative and quantitatively. Integration with existing evaluation initiatives is considered a vital component.

In addition to the aforementioned, infrastructure and practice recommendations are made to stakeholders. The IIS concludes with a call for the necessary funding to implement the DESD.

As part of the goals of the IIS, a mid-term evaluation of the DESD was mandated. This took the form

13 Ibid. UNESCO (2005)., p.20
14 Ibid.

of the *Bonn Declaration of 2009* made at the UNESCO World Conference on ESD held in Bonn, Germany. The conference itself covered a wide range of topics concerning ESD on the community and international level. The *Conference Proceedings*[15] can therefore serve as a reflection on the state of the field of ESD at the time of publication. The document concludes with the *Bonn Declaration,* evaluating progress made towards achieving the goals of the DESD and making recommendations for the second half of the Decade, the details of which will be addressed in a later section.

Before proceeding however, it is necessary to consider ESD in the broader context of Environmental Education (EE). Indeed, EE and the international movement surrounding it is the parent of ESD. The framework for EE on the international level was laid out in the *Tibilisi Declaration* in 1977. This document is seen as the foundation EE work, pedagogy, and projects since its inception. One of its primary contributions to the field is the widely recognized "objectives" of EE and indeed, any project that wishes to relate its program to EE (including ESD) considers them in its course.[16] They are:[17]

1) *Awareness* – and sensitivity about the environment and its challenges.
2) *Knowledge* – and understanding about the environment and its challenges.
3) *Attitude* – and concern for the environment and for maintaining its quality.
4) *Skills* – to mitigate environmental problems
5) *Participation* – by using knowledge and skills of the environment and towards its problems.

In current discourse however, the program of Tibilisi is criticized for being more participatory than forward looking considering environmental problems, as well as generally narrow in scope.[18] Agenda 21, Chapter 36 is viewed as a major turning point in this situation with the laying out of the principles behind sustainable development.[19]

In addition to EE, there are a number of key terms related to the field of ESD that have a similar purpose but are often argued as being distinct. These are Education for Sustainability (EfS), Education for a Sustainable Future (EfSF) and Sustainability Education (SE). Together EE, ESD, EfS, and SE are used most often in research and work surrounding sustainability and education. While EE has already been addressed in the context of ESD, it is important to recognize the role EfS and SE have in this work. SE is considered to be an overarching title for all work relating to sustainability and education regardless of the focus. EfS is considered to look more at local values than the others and to be more open to 'development' as defined in a local context, while EfSF is rather similar to ESD but without the focus on development. However, for the most part, these terms are interchangeable with only mild differences in focus.[20]

In this authors perspective and in the context of this writing the field of ESD does have an issue with a focus on 'development'. This is arguably an inappropriate term for the needs of society; however, due to the UN preference for this term and the aim of this writing to bring Permaculture into the fold of international recognition, the decision was made to use ESD as opposed to one of the other (perhaps more ideal) terms.

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15 *UNESCO World Conference on Education for Sustainable Development - Conference Proceedings.* (2009, 31 March – 2 April 2009). Paper of the UNESCO World Conference on Education for Sustainable Development, Bonn, Germany 2009.

16 These terms often come in another recent form of: Knowledge, Issues, Skills, Perspectives, Values. These are often identified with ESD but for the purpose of this writing and simplicity the original, source terms are used.

17 The Tibilisi Declaration. (January 2007). *Connect, the UNESCO/UNEP Environmental Education Newsletter, III*(1).

18 Scott, W. (2009). Environmental education research: 30 years on from Tbilisi. Environmental Education Research, 15(2), 155-164.

19 Tillbury, D., & Wortman, D. (2004). Engaging People in Sustainability. *Commission on Education and Communication, IUCN.* Gland, Switzerland., p.11

20 Sterling, S. (2003). Whole Systems Thinking as a Basis for Paradigm Change in Education: Explorations in the Context of Sustainability. University of Bath, Bath, England., p.309

## Section III: Permaculture within the Framework of Education for Sustainability

The goal of this section is to weave together the fundamental principles of ESD, the DESD, and Permaculture. The value of doing so, as stated, is to provide a way for those familiar with ESD at the policy and academic level to integrate Permaculture into their considerations for research, funding, and curriculum design. Though it is difficult to pin ESD down to a finite set of goals, it is hoped that the aforementioned definition of ESD in the previous section can suffice for this purpose.[21] A secondary function (though equally important) is to demonstrate Permaculture's ability to implement the goals of the DESD based on the UNESCO implementation scheme. This includes notes on Permaculture teaching methods to convey practical applicability. As is shown, the correlations between Permaculture and the DESD are direct, making Permaculture a valuable toolset to be used for building a more sustainable society.

As was summarized, programs relating to ESD in the context of the DESD can be generally defined and considered for implementation as follows:

1) The triple bottom line of sustainability – economic, social, environmental.
2) Four thrusts of ESD.
3) As specified by the DESD, the three additional factors – sustainability issues, values, other educational priorities.
4) The five objectives of EE.
5) and Seven strategies for implementation of the DESD.

*The Triple Bottom Line*

The '3 Ethics' of Permaculture relate to these almost directly. The idea that all three are interconnected and necessary to create a Permaculture system is similar to that of the need to have a triple bottom line in sustainable development and ESD:

- ***Environmental Sustainability*** – correlates to the 'Earth Care' ethic of Permaculture. Recognizing a need to support the Earth and its environment in is fundamental to creating healthy human habitats and to create a sustainable society.
- ***Social Sustainability*** – correlates to the 'People Care' ethic of Permaculture. Any sustainable system needs to care for peoples needs. This also recognizes that there is more to human life than merely meeting basic needs and that culture and self-expression, a connection to that which makes life enjoyable is necessary for sustainability.
- ***Economic Sustainability*** – correlates to the 'Fair Shares' ethic of Permaculture. Indeed, for many this is not just one of the bottom lines, but *the* bottom line. It is recognized within ESD that economics is but one of a contingent of important issues, as is so in Permaculture. There is a fundamental recognition that resources are limited and people and the rest of the planet deserve their due share. While Permaculture leans towards an open, local based model of economics, as was mentioned in the definition section, LETS systems are a common tool utilized as well as a variety of other instruments, market and non-market oriented.

*The 'Four Thrusts' of ESD*

The four thrusts of ESD are the underlying definition of the field and are repeatedly mentioned in the academic and international literature on the subject. By connecting the 'Permaculture principles' and related points to these thrusts the relationship between Permaculture and ESD should be clear:

- ***Improving Access to Basic Quality Education*** – There is no aspect of Permaculture that

21 Key definitions that can be found in the earlier sections are in italics.

directly relates to teaching reading or math, though it does indeed provide practical opportunities for both in such a way that combines practical application and a base for learning fundamental skills – in essence providing a hands on, practical method for creating a living school, one that provides for needs, connects one with nature, and creates opportunities for basic education. This perspectives is supported by UNESCO in approaching this thrust:

> "Unfortunately, simply increasing basic literacy, as it is currently taught in most countries, will not advance sustainable societies. Indeed, if communities and nations hope to make progress towards sustainability goals, they must focus on knowledge, skills, values, and perspectives that encourage and support public participation and community decision-making. To achieve this, basic education must be reoriented to address sustainability and expanded to include critical-thinking skills, skills to organize and interpret data and information, and skills to formulate questions. Basic education must also include the ability to analyse issues that confront communities and should enable individuals to make lifestyle choices that do not erode the natural resource base or impinge on the social equity and justice of their neighbours."[22]

This relates to the whole-systems thinking aspect of Permaculture which is fundamental to the system. Stability and seeking a relationship with the environment is fundamental to sustainability and to the educational model behind it.

- ***Reorienting Existing Education Programs*** – As the definition of ESD notes, it is vital to consider the quality as well as the quantity of education. In the context of sustainability this is particularly relevant where basic skills must combine with a more holistic approach to community building. This is supported by the '3 ethics' of Permaculture as fundamentally as it is by the founding principles of sustainability. In addition the focus of Permaculture to *integrate rather than segregate* can be applied here; combining what is available and what is needed in a whole systems approach to developing education programs. In addition, as supported by UNESCO: "This should be done in a holistic and interdisciplinary context, engaging society at large, but carried out by individual nations in a locally relevant and culturally appropriate manner."[23] Permaculture thrives in this way; likely its greatest strength is to be focused on local solutions, *appropriate technology*, and *responding creatively to change*. A paradigm shift focusing on the local was a founding tenet of Permaculture and a guiding force in its current development.
- ***Developing Public Understanding and Awareness of Sustainability*** – At the essence of sustainability is the ability to act as a global citizen, responding to change in one's community and taking ownership for the role one plays in building a sustainable future.[24] Permaculture, through teaching its principles and developing locally appropriate projects creates a way for people to learn the fundamental behaviors behind sustainable development in an intuitive way. The fusion of the principles creates a whole-systems, nature aware approach to living. A key that is missing from much of the literature on sustainability is a focus on the need to address primary needs, in working towards sustainability. Permaculture accomplishes this through logical principles, gathered from *observing and interacting* with the environment, and creating projects that serve vital functions in both developed and underserved circumstances.
- ***Providing Training*** – As was stated, Permaculture focuses on easily taught concepts based in empirical observation of the world. At the core of this is creating a sense of ownership by the community for the projects engaged in, working on something valuable to the practitioners, and *obtaining a yield*. Permaculture workshops are available worldwide, engaging people of

22 Ibid. UNESCO (2005)., p.29
23 Ibid. UNESCO (2005)., p.29
24 Dobson, A. (2007). Environmental Citizenship: Towards Sustainable Development. Sustainable Development, 15, 276-285.

varying income levels, and providing information applicable to all regional contexts.[25] Permaculture courses leading to a Permaculture Design Certificate (PDC) is the standard supported by the international community. This course can be completed in an intensive over 2-weeks or through long-term, hands on projects. One with this certification can develop projects, engage the Permaculture community for assistance, speak the "language" of Permaculture, and apply other live skills to the Permaculture principles and ethics to combine for effective change. For example, a carpenter with a PDC can engage a project with whole-systems thinking and sustainability in mind to build more effective projects, similarly for an architect, an engineer, or a teacher building curriculum. In this way, Permaculture serves as a tool for augmenting the work of other fields towards sustainability while existing as a stand alone method for learning how to fully engage such projects.

*The 'Three Additional Factors' in approaching ESD for the DESD*

As stated in UN documentation for the DESD there are three additional factors that have been added to the four thrusts that re-shape ESD for current needs and perspectives. The way Permaculture connects to these factors highlights how it has grown since inception and why it is appropriate for current applications:

- ***Sustainability Issues*** – As one develops an understanding of natural systems, a deeper sense of connection to nature and a sense of the implications of ones actions, the ability to act on behalf of the environment and towards a more sustainable lifestyle becomes more likely. The broader goals of sustainability are supported by starting small. UNESCO corroborates this claim: "More comprehensive educational tools focusing on the skills inherent in critical thinking and rational decision-making are necessary to build a citizenry capable of thinking through some of the more complex sustainability issues that face communities and nations."[26] The Permaculture focus on whole-systems thinking, meeting basic needs, and working with the natural environment to achieve goals exemplifies this – D*esign from Patterns to Details, Use and Value Renewable Resources and Services,* and *Use Small and Slow Solutions.*
- ***Values –*** The goal as specified by DESD documentation is: to create a locally relevant and culturally appropriate values component to ESD that is informed by the principles and values inherent in sustainable development. This is the fundamental concern of Permaculture. The essence of the '3 ethics' is to have a universal quality to it, one that can be open to local culture. In addition, the principle *Use and Value Diversity* is more than within a biological system, but between different community groups. An aspect of Permaculture teaching is its focus on context. Projects all over the world appear to seamlessly integrate local culture, appropriate technology, and traditional knowledge with the main precepts, framework, and goals of Permaculture. This is addressed even further in a later section on the Applications of Permaculture to Impoverished and Challenged Communities, where case studies and teaching methods are examined further.
- ***Linking to other International Educational Priorities –*** Here the focus is to recognize the way ESD integrates with other international programs, particularly Education for All and the Millennium Development goals of the UN. Permaculture relates directly to many of the underlying goals of these initiatives: a focus on feeding people, equality of opportunity, building sustainable communities, raising people out of poverty through developing self-reliance – in addition to quite a few measures to implement these goals practically. It is this quality of Permaculture that makes it so valuable towards ESD and the DESD, an ability to see and act on the need to integrate many great social dilemmas into a single solution framework.

25 See Appendix I for examples of these resources.
26 Ibid. UNESCO (2005)., p.29

*The Five Objectives of Environmental Education and Permaculture Teaching Methods*

It is important to align Permaculture with EE to demonstrate the broader connection between it, ESD and the field of education. These five can be viewed as steps leading from unawareness to action. That Permaculture relates to them displays an ability to implement its theories and lends insight into its teaching practices. In addition, an important part of this connection is the commitment Permaculture makes to whole-systems thinking, a growing trend within the field of EE:[27]

- ***Awareness*** – Typical teaching methods of Permaculture begin with looking at the needs at hand. A connection in then made between these needs and looking at pragmatic ways that these can be addressed. The idea of *Observe and Interact* is related to this. Asking learners or community members to look at nature, to look around and consider the problems they personally face and consider that there may be a relationship. Part of this is the commitment Permaculture makes to whole-systems thinking, which is a focus in this stage of its educational model, and can be used to raise awareness of issues and their potential solutions. This is in line with methods for ESD and the pedagogy of EE.[28]
- ***Knowledge*** – Part of Permaculture is to work with the tools and resources that are already available. Though not usually considered in EE, traditional knowledge is key here. Permaculture seeks to integrate local knowledge, first augmented by observation, and then bring in additional knowledge through its curricula. This can lead to the incorporation of earth science, chemistry, biology, and various other basic sciences because of practical need in project implementation. It also supports hands on, project based learning as a method for connecting knowledge gained to real world experiences.
- ***Attitude*** – Permaculture again leverages whole-systems thinking the change and nurture positive attitudes towards the environment. The principle *Obtain a Yield* is fundamental to this, showing that action leads to results. The idea here is that small gains, well-demonstrated and participated in, can nurture attitudes that lead to further action therefore encouraging the acceptance of new mental models. This is supported by research linking EE and systems thinking in varied learning environments.[29]
- ***Skills*** – This is at the core of Permaculture to ensure practicality in the learning objectives. Key skills are incorporated in the teaching methods of design courses and project implementation. Some of these are noted in the definition section (1), but also include gardening skills, region specific skills and land / resource management techniques, and as needed basic construction and project implementation methods. All such skills are flexible and consider the specific culture, project, and available resources. Much of the information in Permaculture manuals and time in design courses is devoted to learning skills and gaining background that will allow for the successful implementation of the principles and ethics.
- ***Participation*** – As one respected author writes, "Permaculture is a process of looking at the whole, seeing what the connections are between the different parts, and assessing how those connections can be changed so that the place can work more harmoniously. This may include introducing some new elements or methods... But these changes are incidental to the process of looking at the landscape as a whole."[30] Permaculture is in essence an applied form of whole-systems thinking and is inherently participatory, creating a sense of personal place in the

27 Cassell, J., & Nelson, T. (Fall 2010). Visions Lost and Dreams Forgotten: Environmental Education, Systems Thinking, and Possible Futures in American Public Schools. Teacher Education Quarterly.

28 Ponto, C. F., & Linder, N. P. (October 2010). Sustainable Tomorrow: A Teachers' Guidebook for Applying Systems Thinking to Environmental Education Curricula: Association of Fish and Wildlife Agencies.

29 Karlsson, R., & Nasir, J. (2000). Systems Thinking for Sustainable Resource Management in Environmental Management Education. Paper presented at the 1st International Conference on Systems Thinking in Management.

30 Ibid. Whitefield (2000)., p.3

environment that can lead to further, sustained investment and participation in the global and local environmental future.

*The Seven DESD Implementation Strategies*

In the UN documentation for the DESD these seven strategies are noted as the key ways in which partners should strive to develop ESD. Previous to this an outline of partner size range (from community to national scale) is outlined and expectations for each level are addressed. In this comparison the community level is primarily considered because that is Permaculture's main area of strength and foundational target. This does not mean it cannot apply to larger scales, yet for the purposes of this writing the core is being addressed. That said, because Permaculture is ultimately a system for implementing projects as well as fostering the ethics of sustainability, it lends itself very well to these strategies:

- ***Vision-building and advocacy*** – The way Permaculture relates to this strategy and how it encourages "an understanding of what it means to live within environmental limits" has essentially been addressed in previous sections, yet a particular point can be noted strengthening the relationship: cultural sensitivity. Because Permaculture aims to integrate cultural values into its framework it allows for a flexible vision that holds to its core ethics. Peace is encouraged through the teaching of *Fair Shares* and considerations of whole-systems thinking in the community engagement and design process.
- ***Consultation and ownership*** – It is a fundamental practice in Permaculture to engage communities fully and only apply projects and methods that the community can have participation in. The framework of training courses often emphasize this by teaching students consultation methods, community participation, and a consideration of appropriate technologies.[31] Part of the *Earthcare* ethic is connecting people with the land and healing what is seen as a lost or broken personal connection to the environment through hands on projects, well-planned, that achieve results sustainability over the short and long term.
- ***Partnership and networks*** – Connecting the various levels of society, as this point calls for is a challenge. The Permaculture community works to build connections to institutions and large scale organizations but, with technology tools, is particularly apt at building connections across the grassroots level. Webs of communities across the globe is what the system is developing into, somewhat because of a perceived failing of large organizations to directly address local needs. There is nothing inherently wrong with this, given the potential of these distributed networks. Considering the incorporation of wide perspectives has been discussed already, but an emphasis on the Permaculture principle: *Use and Value Diversity*, and its implications further strengthens this relationship.
- ***Capacity-building and training*** – The main tool for training practitioners is the Permaculture Design Course / Certificate (PDC). This course has been taught across the world to thousands of people and quickly imparts the essence of Permaculture to future practitioners. Part of its success is in its ability to adjust to a variety of social, economic and cultural contexts, allowing for flexible teaching schedules, keeping costs at a level appropriate for the target community, and incorporating easy to implement, practical techniques into courses and projects. In addition, Permaculturists often hail from a wide range of backgrounds and professions including ecology, engineering, teaching, and various social sciences that have lent their expertise to the growing body of information and training available to practitioners.
- ***Research and innovation*** – Permaculture practitioners are always seeking to integrate new information and ideas, both those that are regionally flexible and locally appropriate. Innovation and responding to new challenges is at the core of the principle: *Use and Respond to*

31 Goldring, A. (1986). *Permaculture Teachers' Guide*: The Richmond Publishing Company., p.327-329

*Change Creatively*. In Jordan for example where renowned Permaculturist Geoff Lawton does a great deal of work and where a major Permaculture conference is due to be held in September 2011, this critical region is quickly becoming a target area for new ideas and skills. There peoples will be brought together from the entire region to further develop networks, provide training for new and experienced teachers, and work on area specific issues.

- ***Use of information and communication technologies*** – Training and providing skills through the Internet is fast growing globally and Permaculture is taking advantage of it. Recently, a global network of practitioners has been developed seeking to connect projects, practitioners, and information across boarders and beyond political limitations.[32] It is a hallmark of Permaculture that resources and information be made available openly. There are certainly copyrighted materials, but most information is open to the public. PDC's are widely available and usually priced appropriately for the target community and apprenticeships under experienced Permaculturists is not uncommon. Media tools have also become a staple, using YouTube and other Internet sites as essential resources and learning tools.
- ***Monitoring and evaluation*** – Is a key within Permaculture and whole-systems thinking in general. The idea of feedback mechanisms is used to control both physical (gardens) and non-physical (curricula, lessons) designs. The within Permaculture the principle *Self-regulate and Accept Feedback* notes this important relationship. This includes implementation, proceedings record keeping, reflection, and the input of outside projects and experts. It is possible to integrate Permaculture projects with existing monitoring systems through communications technology and local contacts or site. It is common that NGO's and peoples working in a given region have a great deal of knowledge about local issues, seed availability, educational challenges, funding opportunities, etc., that can be leveraged for all stages of a projects. This is one area that if well executed, could provide a great opportunity for Permaculture to integrate into broader UN goals.

*In concluding* this section, a point from the Tibilisi declaration is considered: "Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values."[33]

The DESD calls for this; Permaculture can accomplish it. These two fields can be integrated into one fold and should be actively implemented together in the broader international sphere to help build a safer, more peaceful, and sustainable human community. As the next section describes, in considering the current state of the DESD, there is a greater than ever context for this need.

## Section IV: Permaculture in the Context of the Bonn Declaration

The Bonn Declaration is organized as a set of sixteen points that address the current state of progress of ESD and the DESD. The first fourteen and sixteenth points are a restatement of the DESD, UNESCO's role in its implementation, and provide pressure for a greatly renewed effort towards achieving the DESD goals. Of particular note is that the Declaration claims that enough has been learned in the first 5 years so that action can be taken with confidence in the second half of the decade – research is good,

32 See Appendix I
33 Ibid. Tibilisi Declaration

but it is time to act![34] Here is where Permaculture can be highlighted. As a system of action and *Obtaining a Yield* with considerations of practicality, cultural sensitivity, and time, Permaculture fits well into the fold of the current trends in the DESD. One such example is point 5, which, as should be clear from previously discussed information, could easily be a working definition of the core ethics of Permaculture:

"*Through education and lifelong learning we can achieve lifestyles based on economic and social justice, food security, ecological integrity, sustainable livelihoods, respect for all life forms and strong values that foster social cohesion, democracy and collective action... Education for sustainable development is immediately necessary for securing sustainable life chances, aspirations and futures for young people."*[35]

This leaves point 15, "A Call for Action", the core of the Bonn Declaration, broken into two main subsections, "At policy level in member states" and "At practice level" with sub-points in each. This "Call" makes specific recommendations for what needs to be done in the future and which are the most evident changes necessary for the direction of the DESD. It is through this point that the correlations between Permaculture and the future of the DESD are made quite clear

The "At policy level" subsection has five sub-points (a-e) that restate the policy level implementation goals and strategies of the 2005 DESD Scheme discussed earlier in this paper, with the following key additions. Firstly is sub-point b) that calls for using the lessons of the past five years to act "by mainstreaming and expanding the learning and insights" already gained. It is a subtle point to turn the focus from theory to practice on a global and local scale. Sub-point c) notes a need for funding of projects that support ESD (of which Permaculture is one, should the aforementioned comparisons be clear and acceptable to the reader); while sub-point e) notes a need for cultural sensitivity at all levels of implementation, a point that Permaculture can aptly handle due to its inherently flexible qualities.

Though also an extension of earlier documentation, the "At practice level" section (sub-points f-r) is the only piece of the Declaration that provides true modification to the course of the DESD. Sub-points f), g), and i) restate the need for the incorporation of ESD programs into all levels of society, but with an added focus on non-traditional settings and large class sizes. The implication is for challenging and impoverished zones that have particular needs. As noted, the range of Permaculture projects around the world indicate that it can, and has been addressing this need. Sub-points j), k), n), o), p), and q) clarify the roles that youth, academia, institutions, and civil society must embody so as to implement the DESD. Of note is the need for multi-disciplinary projects, "organizational structures that facilitate flexibility", biodiversity conservation measures, community-level project potential, and student and local youth participation. A re-emphasis on local, flexible, and bio-centric concerns relative to the original DESD plan is clear. These qualities fit well with Permaculture ethics and principles, recognizing the inherent power of grassroots initiatives to affect change and sustainable communities.

Sub-point l) is of particular note to this writing, in full: "**Value and give due recognition to the important contribution of traditional, indigenous and local knowledge systems for ESD** and value different cultural contributions in promoting ESD." This is a very unusual point to make relative to earlier UN documentation. While traditional knowledge is often noted within points, it is not usually given its own, solitary, recognition. This is a clear recognition that modern knowledge and techniques must integrate with the traditional to achieve the goals of sustainability, a founding concept in

34 Ibid. UNESCO (2009), p.119, point 13 & 14
35 Ibid. UNESCO (2009)., p.118

Permaculture. Certainly, Permaculture is not unique in this focus, but it has skillfully complied a system that has effectively applied this means.

It is the commitment of point l), in combination with the analysis of the previous section, that solidifies the argument that Permaculture has an important role to play in implementing the goals of the DESD. This is particularly so for its potential applications to impoverished and challenged communities, one of the main focuses of the DESD and the Bonn Declaration.

## Section V: The Applications of Permaculture for Impoverished and Challenged Communities

In the most desperate and impoverished regions of the world, be they urban or rural, ESD can be particularly challenging due to the restrictions imposed by poverty.[36] A principal reason for this is that the goals of ESD require a learner to master various sciences and global-social issues, and to tie them together with a sense of personal place in and for the environment. Tools are therefore needed that can bridge the gap between these ends (science education, social awareness, systems thinking) and the daily requirements of human living (food, water, shelter, health, leisure, and community). As it has been argued, the system of Permaculture design is one such tool, a hinge between these two seemingly disparate goals, a form of applied education that can simultaneously address the needs of social, environmental, and ultimately economic sustainability.

UNESCO agrees with the need for such a tool; in the DESD Implementation Scheme of 2005 the following conclusion was made about ESD and the state of poverty, tying together the issues of poverty and environmental protection: "The recently published Millennium Ecosystem Assessment states that action taken to date is insufficient at best. More informed and strategic measures are needed to address the goals of poverty and hunger alleviation, improved human health, and environmental protection."[37]

With this assessment and previous discussions in mind, the following case study is an example illustrating the use of Permaculture and whole-systems design towards challenged and impoverished communities. It is hoped that such projects, which is only one of those in existence[38], can serve to solidify overall argument of this writing, that Permaculture and the goals of the DESD are inherently linked. The source of information about this project comes from an account in the Permaculture International Journal[39]:

Permaculture aid in the Balkans, UNHCR commissions Permaculture plan for refugee camps:
In late 1999, well-known Permaculturist, Geoff Lawton, was asked to use Permaculture techniques to develop a sustainable system in refugee camps in Macedonia. The program was supported by CARE Australia employee Andrew Jones, a student of Lawton, who asked the United Nations High Commission for Refugees (UNHCR) to consider rehabilitation plans for the 10 refugee camps in the region. With the UNHCR on board and a contract for 20 days to design a rehabilitation of the Cegrane refugee camp, Lawton went to work on the project with full support from the local government and aid organizations.

According to Lawton, his "first week's work was completely absorbed by the investigation and analysis of the local area, the culture and geography." This is standard Permaculture practice, to *Observe and*

36 Brint, S. G. (2006). Schools and societies (2nd ed.). Stanford, Calif.: Stanford University Press., Chapter 3, p.96
37 Ibid. UNESCO (2005)., p.26
38 See Appendix I for further study sources
39 Lawton, G. (December 1999 - February 2000). Permaculture Aid in the Balkans, UNHCR commissions permaculture plan for refugee camps. *Permaculture International Journal* (No. 73), 24-29.

*Interact* with the environment. Lawton observed many local, sustainable farming practices taking place in the nearby communities including companion planting, non-chemical production, layered fruit tree and garden plots, and the use of traditional skills. Apparently the local culture was rich with information applicable to sustainability, though it is noted that "modern" farming techniques and chemical pesticides were affecting the durability of this knowledge. These observations were vital for project development in consideration of cultural sensitivity issues.

At the end of the observation period Lawton presented his design proposal to UNHCR, the Macedonian minister for urban development, and the various aid organizations involved. This became an opportunity to convey the principles of Permaculture to those attending and to argue for the project's relevance to long-term education opportunities and sustainability. The proposal was well received and Lawton was requested to present a design by the end of the week.

With the assistance of the Permaculture Research Institute in Australia, which provided contacts and local plant information, Lawton developed a plan that incorporated road design into a groundwater catchment system, as well as farm forestry, animal forage, straw-bale building, food processing, composting, and local market economics into an overall sustainable system "which not only enhances the environment, but also gives the local people great benefit, as they can use it as a demonstration and teaching model."[40]

The completed proposal was then presented to the UNHCR, the Macedonian government, and aid organizations and was well received. The project received funding for 27 months, including the employment of 40 unemployed locals. During the this time five Permaculture Design Certificate courses would be taught each with 50 students, including local peoples and aid workers.

As Lawton notes: "The real success in this operation has been the realization by large aid organizations just how much Permaculture has to offer as a holistic design system for emergency aid and development aid, to leave a sustainable result for local peoples." Noting the many educational opportunities provided, the cross institutional collaboration, and considerations of local issues, this project is certainly an example of the far reaching possibilities that Permaculture can provide to DESD type initiatives.

In addition to this study, there are quite a few resources in the Permaculture catalog for teaching and development in various cultural contexts. Appendix I and the Bibliography have further examples of these resources. Together with the expertise of the global community and the framework of Permaculture, a tool to address major issues surrounding impoverished and challenged communities is available to the world. It requires commitment and an openness to changing business as usual, to accept that the new paradigm, the avaunt guarde, is in these movements that tie together the modern and traditional, scientific and intuitive, and the grassroots and international levels of action.

## **Section VI: Final Thoughts, Conclusion and Reflections**

Accepting and engaging our integration with the cycles inherent in nature is fundamental to developing sustainably, counteracting the negative impacts of globalization, and preserving global cultural diversity. With this in mind, it has been argued that Permaculture is a practical tool that is available for creating projects that "meet the needs of the present without compromising the ability of future

40 Ibid. Lawton (2000) p.27

generations to meet their own needs,"[41] and has the ability to educate towards achieving this aim.

The goals and philosophies of this education, in context of the DESD should be towards:

- Creating opportunities to understand and integrate with the cycles of energy and resource use in nature...
- In ways that can be directly applied to meeting basic human needs...
- Recognizing that this balance is vital to achieving the global mission of environmental and social sustainability.

As one author comments in considering how to turn environmental awareness into action: "Raising public awareness to result in action at a grassroots level needs effective skills repackaging of information on an issue of concern so as to make it meaningful to the target groups but linking it to the bigger picture as well. This usually involves developing the ability to encourage the community-at-large to begin to reflect on and question fundamental norms guiding a community's actions."[42]

Permaculture and associated movements can help to achieve this, but **these movement requires higher academic standing, recognition, and an ability to apply for funding through projects directly associated with their names** (Permaculture, Gaia Education[43], Ecoliteracy, Transition Towns, etc.). This is vital for the success of these cutting edge projects. They are taking the risks necessary to create change, looking outside of the old paradigms, learning in new and re-discovered ways, and helping to move us toward societies that encompass a broad, holistic framework.

The DESD is nearing its close and there is still much work to be done. A focus must be on transition. Permaculture and related movements can teach the world much about how to make this transition possible. There is no future unless current infrastructure is used, creatively and skillfully, to build a culture with behaviors and values that focus on locally oriented, sustainable ways of life. With this in mind and in conclusion, this work calls for a deeper look at the connections between the goals of international programs such as those developed by the UN and the work of grassroots movements. To achieve sustainability, especially in impoverished and challenged settings, an ability to meet basic needs must correlate with the greater mission. The tools are available, now the work has to be done.

41 United Nations General Assembly. (1987). *Report of the World Commission on Environment and Development: Our Common Future, Chapter 2: Towards Sustainable Development*. Retrieved 2 July 2011.

42 Hadad, I. (July 2005). *Translating Environmental Awareness into Action*. Paper presented at the 7th Hitachi Young Leaders Initiative.

43 Recognized by USESCO as an DESD project – Ibid. UNESCO (2009)

## **Appendix I:**

Further Resources for Permaculture and Sustainability Education

*Permaculture*

The Permaculture Association
http://www.permaculture.org.uk/
A major global organization based in the UK that supports Permaculture education and research.

Permaculture Institute
http://www.permaculture.org/
The largest US based Permaculture organization supporting outreach, research, and cooperation in the domestic Permaculture community.

Permaculture Activist Magazine
http://www.permacultureactivist.net/
The widest circulating print periodical for Permaculture; based in the US.

The Permaculture Research Institute
http://permaculture.org.au/
Based in Australia, the home of Permaculture, it is one of the largest organizations promoting research and outreach on design, news, conferences, and research.

The Worldwide Permaculture Network
http://www.permaculturegloba l.com/
Seeking to become the hub of Permaculture on the Internet, this network is likely the future of empowering the Permaculture community with the strengths of social media.

*Other Curricula Models and Associated Sustainability Education Movements*

Gaia Education Sustainability Education Curriculum
http://www.gaiaeducation.org
Mission Statement: Gaia Education promotes a holistic approach to education for sustainable development by developing curricula for sustainable community design. While drawing upon best practices within ecovillages worldwide, Gaia Education works in partnership with universities, ecovillages, government and non-government agencies and the United Nations.

Transition Culture
http://www.transitionculture.org/
Resources for the Transition movement. Free movies, curricula, and resources are provided concerning lifestyle transition and related educational projects. This organization is one of the prime bodies working in this area and has achieved wide recognition for its educational accomplishments.

The Center for Ecoliteracy
http://www.ecoliteracy.org/
Smart by Nature, the Center's framework and services for schooling for sustainability, is based on two decades of work with schools and organizations in more than 400 communities across the

United States and numerous other countries. The Center is best known for its pioneering work with school gardens, school lunches, and integrating ecological principles and sustainability into school curricula.

The Cloud Institute

http://www.cloudinstitute.org/

"Inspiring young people to think about the world, their relationship to it, and their ability to influence it in an entirely new way." This organization works to inspire educators and engage students through meaningful content and learner-centered instruction.

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Cover Image: From the Gaia Education Curriculum Handbook, digitally accessed 8/12/11, www.gaiaeducation.org.