GroWorld – Urban Permaculture

Towards symbiotic relationships and sustainable futures

Sanjeev Shankar

FoAM, Belgium

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Abstract

This paper presents the results of a study aimed at providing a global perspective of urban farming and permaculture with special focus on Belgium and India. The study combines site visits, field observations, literature surveys and semi-structured interviews with inhabitants in urban and rural parts of these regions. Results have demonstrated the complexity of the problem, and of the diversity of techniques required to bring about effective change. It has also brought out the unique role of the cultural context in providing realistic solutions for collective action, and how an understanding of the local place can influence the development of strategies for a sustainable future. What began as an inquiry into ways in which we can transform our cities into green visions and develop purposeful links with ecology, has led to reflecting on different aspects of human interaction, self regulation and the need to promote ingenious action. This journey has highlighted the importance of local solutions and self reliance; of ethics, awareness and accountability; of long term responsible action and conservation. Travelling through rural and urban spaces has underlined the need to integrate tradition with technology. It has also brought out the importance of collaborations and *symbiosis* as a necessary ingredient for future meaningful interactions. In a world which is becoming increasingly interconnected, we've finally reached a tipping point where being "green" or sustainable is not a choice, but a necessity for one and all.

1. Background

"If radical changes are not made to how we produce and distribute our food, the world's people cannot be fed over the next half-century and we will be left with a world which nobody wants to inhabit. Business as usual, is not an option." (Robert Watson, director of Assessment of Agricultural Knowledge, Science and Technology for Development, 2008)

The uncontrolled growth of urban centres around the globe has had a critical impact on ecology. Cities have become synonymous with urban sprawl, inflation, pollution, resource shortage and a growing economic disparity. The problem is compounded by commodification of basic essentials, changing food habits, increased consumption patterns, deteriorating soil quality, overt dependence on industrial techniques and a serious disconnect with other life forms. Each year, we lose 20 billion metric tons of topsoil and create two million hectares of new desert. Most nations are staring at a future of resource wars, increasing droughts and imminent food crisis. In addition, the globalization of business has resulted in unseen scales of resource consumption triggered by the competition-growth-speed imperative.[1] This combined with the greed and ignorance of politicians has only aggravated the crisis. We can all do much more to address these issues.

Some of the questions at the core of this study are:

- Is there an ecological limit to economic growth?
- Do we have the right to consider human beings as more valuable than other life forms?
- Is there an option to treating forests as sacrifice zones for urban growth?
- Can we afford to treat nature like an object, which is manipulated, commodified and sold?
- How can we imagine a fertile future for everyone?

This study explores aspects of human environment, its relation to ecology and our attempt for sustainable growth. It explores ways in which we can transform our cities into productive, healthy, edible and playful green visions. While, it is important to bring ecology into urban environments where most people spend their time, many are still grappling with the problem of a balance between survival, growth, and conservation; and this is a global concern.

2. Method

Setting up a multi-layered project of this nature comes with the realisation that we are all part of a culture which is accustomed to constant change. It is difficult to witness the forces shaping this change while we are in the midst of it. We must therefore find ingenious ways to become detached observers of our own cultural context. Sometimes, taking a step back can prove effective. The project consisted of four phases: (1) background research, (2) contextual enquiry, (3) analysis, interpretation, experimentation and feedback, (4) consolidation and extraction of directives.

2.1. Background Research

This phase included on-line and literature surveys about permaculture, traditional agricultural methods and organic farming. The permaculture design course by Bill Mollison and two books, 'An Agricultural Testament' by Sir Albert Howard and 'Permaculture: Principles and Pathways beyond Sustanability' by David Holmgren have been crucial.

2.2. Contextual enquiry through site visits and interviews

The study began with a visit to Brussels and Amsterdam to discuss the project scope and get acquainted with the urban dynamics of these cities. The focus then shifted to New Delhi and through a series of exchanges with the inhabitants, numerous patterns about an urban dweller started emerging. Here, attention was given to the urban kitchen gardens and Chandni Chowk, a thriving and extremely dense fifteenth century settlement. Visits to Centre for Social Development Studies, Tata Energy Research Institute, Centre for Science and Environment, and the Indian Council of Agricultural Research were next. Thereafter, the focus moved to south India with visits to the Gurukula Botanical Sanctuary in Kerala, a place dedicated to conservation and preservation of native plants; Beulah organic farm in Tamil Nadu, which specialises in organic produce; the Rain forest retreat in Karnataka, which is an eco-lodge located in an organic spice plantation and the Krac-A-Dawna bio-dynamic farm, a pioneer in collective action in the state of Karnataka in south India. After returning to Brussels, comparative patterns were explored in Gilbert's eco garden in Moucron, Belgium.

2.3. Analysis, interpretation, experimentation and feedback

The study has been aided by input from Ms. Suprabha Seshan, director of Gurukula Sanctuary; Dr. Sujata and Anurag Goel, founders of the Rain Forest Retreat; and Juli and Vivek Kariappa from the Krac-A-Dawna farm. The research has since proceeded through follow up discussions with Maja Kuzmanovic, Evelina Kusaite, Cocky Eek, Theun Karelse, Steven Pickles and Nik Gaffney and concluded at the GroWorld design session in Brussels. The findings of the research were also presented at the Media Ecologies workshop at St. Erme in France. Practical, hands on experiments were complemented with long term speculative ideas as part of permaculture-kit designs. These were shared on an open source platform and were open to suggestions and feedback from visitors.

2.4. Consolidation, directives and suggestions

The study was then condensed into an action plan and a set of broad directives for future work. These work at multiple levels from product driven ideas as part of the permaculture kits to long term cultural shifts necessary for our future. Complete details of the report are available at http://libarynth.org/research_report_sanjeev-shankar

3. Permaculture

Originally coined in the mid seventies by two Australians, David Holmgren and Bill Mollison, 'permaculture' or ‘permanent agriculture’, has gone beyond looking at strategies to create sustainable food growing methods to become a worldwide movement encompassing all aspects of how we as human beings can live harmoniously in relation to our Earth and it’s finite resources. It is an integrated, evolving, multidimensional and creative design response to a world of declining energy and resource availability, with emphasis on design processes drawn from nature. Through an experiential learning process, it cultivates a desire to solve problems, to experiment and to design. While permaculture offers us a graceful and ethical dimension, the following principles make it universally applicable. How one interprets and implements these is open for questioning, refinement and improvisation.

- Careful observation and thoughtful interaction where the landscape is treated as a textbook.
- Catching and storing energy in the landscape (water, soil, trees, seeds, built environment and culture).

Energy storage in culture refers to appropriate governance and economy.

- Obtaining a yield to create a system of self reliance. This involves organising control mechanisms and feedback loops that help the system adapt and stabilize.
- Applying discipline, self-regulation and accepting feedback. Keeping a constant check on our needs and wants.
- Using and valuing renewable resources and services
- Trying to producing no waste. Celebrating the concept of recycling.
- Design from patterns to details. Constant search for improvement and innovation.
- Integrate rather than segregate. Aiming for an inclusive approach.
- Using small and slow solutions. Leaving no trace.
- Using and valuing diversity
- Using edges and value the marginal
- Creatively using and responding to change

Further, in a situation of descent, *ethics* become indispensable and through their culturally evolved systemic nature lead us to create a more inclusive view of who and what constitutes "us". The three broad maxims or principles which cover these are:

- Care for the earth
- Care for the people
- Set limits to consumption and reproduction, and redistribute surplus[2]

An ancient Indian saying, "Vasudhaiva Kutumbakam" which translates to "The entire creation is one family", is an apt dictum for us.

3*.1. Urban Permaculture*

In urban situations, space is limited and various regulatory restrictions exist when it comes to gardening or having backyard animals. Some of the concepts that people have used in these settings range from kitchen gardens, roof top gardens, vertical gardens and guerrilla gardening methods. Although a permaculture garden might have a configuration like a forest in terms of stability and efficiency, it is infact rich in functional plants which have a strong relationship with each other and result in high yields. Further, cities in the west are governed by different dynamics than those in the east. Despite this, a common vision of "no loss" and an aspect of "community" drive these initiatives.

3.1.1. Kitchen gardens and community gardens

A source of vegetables, herbs, fruits and flowers, kitchen gardens are one of the most common, easily maintained and personal manifestation of our links with ecology. Small, inexpensive, dispersed, flexible and directly impacting the food situation at a family and community level, kitchen gardens are akin to a social phenomena and continue to be one of the most effective urban farming techniques across the globe. As an approach, a kitchen gardener finds the shortest and simplest way between the earth, the hands and the mouth! People in highly dense urban realms resort to containers made of waste plastic cans and bottles to grow their produce. These also appear in the form of floating gardens in Amsterdam or a mixture of left over egg shells and tea leaves used to grow garlic and onions in Delhi. Local improvisations are common. For example, fruit and vegetable peels are added to tea leaves, to create compost or water from boiling eggs is used as a source of minerals for plants. 'Tulsi', a native Indian plant, also known as holy basil is used for its medicinal properties and has a sacred place in many Indian homes. In New York, numerous vacant plots have been converted into city farms where communities grow their own food. These range from apples to pears. Further, by using grafting techniques, fences can be made entirely out of such plants. In Melbourne, these community farms also play the role of education centres, which is a wonderful way to introduce kids to aspects of food production. Elsewhere, in Davis, California, through the allocation of areas for directing rain water into catchment basins, *swail areas* have been created which over the years have now transformed into productive fruit farms.

3*.1.2. Rooftop gardens- container gardening, green roofs, hydroponics, aeroponics and aquaponics*

Rooftop gardens are a specific urban agriculture niche set within a broader system of city gardens. There are

essentially three options for rooftop gardens: container gardening, green roofs and rooftop hydroponics. Container gardening is a less formal, highly flexible, cheaper method of roof gardening which is commonly seen in cities worldwide. In places of extreme climate the container material must be chosen carefully.

The second option of green roofs, which uses the rooftop as a planting medium is a well established method for increasing green spaces in countries such as France, Germany and Austria. Though this involves upto two times more investment, it comes with its own set of advantages. These include greater storm-water retention, building insulation, improved air quality, reduction in heat island effect, reduced green house emissions, utilizing rain water, removal of heavy metals from runoff and the formation of patchwork urban ecosystems, by offering temporary habitats to birds and butterflies. Green roofs are constructed using a special root and water-proof membrane for the base layer followed by a root barrier, a retention/drainage layer, plus the soil layer and finally the plants. Herbs are commonly grown as they need minimal soil depth. Alpine plants or desert succulents are often used too as they can withstand harsh rooftop conditions like wind, erosion and extreme temperature. With a modular green roof system, roof infrastructure access and maintenance has become much easier as parts of the roof can be moved independently. In few eastern nations, roof gardens are build out of local materials and maintained by the communities themselves. This is seen in places like India, St. Petersburg and Senegal. In Senegal people have devised a local solution using bricks and wooden box beds. In India too, the use of locally available cheap materials to create roof gardens is most successful. The 'Doshi System' is offered as the most suitable method. It uses sugarcane stalks, collected from sugarcane juice vendors outside of his house, as biomass. This is lightweight, allows water drainage, and keeps soil in place. Elsewhere, people have used the method of embedding terracotta pots as a method of controlled and efficient water supply. The challenges facing widespread use of roof top gardens include initial investment, rooftop access, water supply, safety and roof load capacity. Despite this, the rapidly-advancing green roof industry which has been nurtured in Europe, and now brought to North America, must look at Asia and Oceania for new directions.

The third option is of rooftop hydroponics, where plants are grown in a soil less medium (peat, sand, gravel, old rubber tires, rockwool, perlite or vermiculite) and fed a special nutrient solution which is monitored for pH. Though expensive, this highly controlled method can be practiced anywhere, even indoors, with the help of artificial lighting, and no digging or weeding is generally required. It is the lightest of the three options and may offer the possibility for faster plant growth (up to two to four times) and increased productivity (up to forty times). Hydroponics is found to be too complex and expensive in lot of eastern countries, though Singapore has used it efficiently. Other related methods include aeroponics, where a hydroponic nutrient solution is sprayed onto plant roots dangling in light-proof boxes; and aquaponics, which cultivates plants and aquatic animals in a symbiotic environment.

3.1.3. Vertical gardens

Vertical gardening is a comprehensive term referring to any manner in which plants can be grown on, up, or against the wall of a building such as a vine, as part of a window shade, as a balcony garden, or in a vertical hydroponic system. Vertical gardens act as good insulators and a source of food. They also increase the life of the structural wall behind, reduce storm water run-off, reduce the heat island effect of cities and improve the water quality. Unlike the roof gardening industry, there are no accepted standards for vertical gardens or green wall infrastructure and this has resulted in interesting customised methods including combining rain water harvesting with green walls. One of the most common methods in non-vine cases uses a basic metallic or wooden structure topped with a base layer to give it rigidity. This is covered with an organic material which enables capillary action for water to be transmitted. Numerous initiatives are underway to eliminate the soil load and this has contributed to the popularity of the hydroponic system which incorporates a recycling mechanism to use the same water and nutrient solution. The plants are rooted in rockwool: an inorganic material (made from igneous rock) which has very good moisture and air retention capacities. It is used to anchor the plant and to provide moisture, through contact, by the distribution of the liquid nutrient solution. Another material such as cocoa fibre may be acceptable too and is a superior rooting media.

3.1.4. Guerrilla gardening methods

Guerrilla gardening is an act of seeding useful plants in public spaces. A form of green pro-activism, primarily practiced by environmentalists, it is related to land rights, land reform, and permaculture. Activists take over ('squat') an abandoned piece of land which they do not own to grow crops or plants. Guerrilla gardeners believe

in re-considering land ownership in order to reclaim land from perceived neglect or misuse and assign a new purpose to it. Some guerrilla gardeners carry out their actions at night, in relative secrecy, to sow and tend a new vegetable patch or flower garden. Others work more openly, seeking to engage with members of the local community. Seed-balling is an interesting technique used here. Other pro-active methods include moss-graffiti and mayday actions.

4. Farming methods

Broadly speaking we have noticed two distinct approaches to farming. The traditional non-industrialized method of peasant farming is time consuming, labour intensive process on minute holdings with the dominance of food and forage crops within a framework of mixed cropping. With cereals as the main constituent and leguminous plants being common, a balance between livestock and crops is maintained here and nothing is wasted. Animal waste finds its way back as manure, while soil inversion ploughs are absent as the same work is done by the sun! This system is still practised in parts of Asia and central-south America. The second and more recent approach is common in industrialized regions. It satisfies three hungers: local rural population, urban population and that of machines which need raw materials. The land holding sizes tend to increase, crop rotations are rare and monoculture is the norm. There is little attempt to recycle waste or create natural manure, as artificial manure and pesticide use is common. Here, loss in soil fertility is highlighted with the growing menace of soil erosion and soil salinity.[3] Industrial agriculture boosts yields in the short term (as seen during the "green revolution"), but leads to the long-term destruction of land on which agriculture depends and of the social and environmental context with which it is intimately linked.

India, with 66 percent rural population, is facing its worst food crisis since independence with 160,000 debt ridden farmers committing suicide in the last decade. Loss of soil fertility and decreasing productivity are sighted as some factors. Despite growing pressure from transnational corporations like Cargill, Monsanto, Syngenta, Wal-Mart and Carrefour, as well as Indian giants such as Reliance, Bharti and Tata who want to encourage intensive industrial agriculture; India would do better to look toward successful ventures in community-based natural farming, such as those undertaken by the Centre for Sustainable Agriculture in Hyderabad, Central India. These have dramatically boosted yields, allowed poor farmers to repay debts, and removed synthetic fertilisers and chemical pesticides from food production.[4] Other organic farming initiatives are emerging throughout India to reverse the tide. In India, the emphasis has always been on rural agriculture. The dominant rural demographic pattern will continue till 2050 and is an important difference between India and Europe, which has a reverse population distribution in terms of percentage of people residing in cites. However, the positive contribution that production within the cities can make, has hardly been acknowledged in India and must be drafted into a national policy. Further, agriculture is a livelihood strategy for the poor in urban areas and can assist poor urban consumers with cheap and healthy food. Other contextual peculiarities in India and Europe which affect the role and nature of urban farming and its impact on the overall situation include the nature of built habitat, character of communities, the level of awareness, role of media, banks and government, and the immediate needs and demands of its people. The type of diet, soil condition and land ownership systems are some of the other governing factors. In India, strong links are found between the cities and their immediate rural surroundings which have a wealth of traditional knowledge. Plants continue to play a crucial role in daily life and find use in religion, festivals and rituals related to marriage, birth and death. Within the city limits, urban villages produce food, milk, poultry and other services for the city. This relationship is seamlessly inter penetrative and works very well for both inhabitants and city in general. Because of this interdependence, the crisis is not so evident in Indian cities and prices have remained in check. In Europe, the urban-rural divide is stronger and the level of awareness is much higher. This has also translated into a sense of panic and serious concern to arrest the decline in quality of food and life in general. There is a search for alternative models of sustainability. Another crucial point of divide is the prevalent sense of family and community in India which makes community driven, hands-on collective action extremely feasible. In the west, where a strong sense of individualism prevails, hopeful signs of collective action are emerging with the use of technology as a cultural platform. It is creating bridges which can trigger consensus and generate action on critical issues. Guerrilla gardening method is one such manifestation. One can also see many connections between India and Nepal, Philippines, Cuba and few nations in Africa. Nepal, which has ninety percent of its working population directly dependent on agriculture for livelihood, has developed an exciting method of rolling permaculture which facilitates a gradual introduction of new farming techniques alongside traditional

ones. This checks a drop in productivity which is sighted as a hurdle in widespread acceptance of permaculture in other nations. In Zimbabwe, permaculture along with education, legal right awareness and land ownership details has contributed to women empowerment.[5] Cuba on the other hand, presents one of the most compelling success stories of permaculture and community driven responsible action. With the free fall of its economy in the nineties, there was an acute need for survival agriculture and every piece of arable land was used for organic agriculture. An urban agriculture movement resulted where every vacant lot in the city was converted into an orchard. Under urban gardening, idle plots of land were identified, cleaned and turned into gardens by the community. The people cooperating and caring about each other were the main factors for the turnaround. A unique model for all, Cuba has reinstilled faith in the power of simple steps taken at a community level.

5. Directions

The idea of sustainability is a constantly evolving journey. The insights and lessons learnt have gone far beyond farming and ecology. Since, the nature of farming and land is highly interconnected, it affects every aspect of our society. The researcher would like to conclude with the following directives:

5.1. To learn, to care, to share and to give

Simple solutions can originate from any source, independent of age, status, experience or academic background. The issue of education, literacy and awareness is crucial for the success of any venture. Current systems have failed in making a distinction between education and literacy. We are trained to earn money and get a job. We are not told about the purpose of our life and how we can be of genuine value for our communities. The Barefoot College in Rajasthan, India is an important example where villagers are involved in educating the young. Children are able to translate their knowledge into local situations making the communities much more sustainable. There is no need for them to migrate to cities. Poverty and illiteracy are the greatest challenges facing mankind and such initiatives can inspire us to make a meaningful difference. With special focus on preserving eco-systems, bio-literacy can generate an appropriate response from every stakeholder. It is important to bring out the connection between a fertile soil, and healthy crops, healthy animals and healthy humans. Costarica is a good example here. Once we "know" what we are going to "lose", our perspective on things will change and we will take the right steps even if it amounts to changing our habits. We will truly apply our right to choose at every level of decision making.

An important thread through this issue is the politics of information and communication; the question of, who can know what? Technology as an important participatory tool can be extremely effective even though prevailing tendencies have been to favour presentation over content; and replication over creation. An important example here is its use through 'e-choupals' in rural Indian villages to increase crop productivity ('choupal' is a hindi term for a village gathering place). Further, since ‘change’ can happen remarkably quickly in an electronically networked world; there must be sufficient and critical debate over the impact and need for such a change. We must constantly re-evaluate and revalidate our responses and ideas of 'growth' and 'progress'. Ethics are important in such a situation and should be openly discussed through value-based governance. In cultural contexts, links with tradition should involve the use of past processes of change rather than the maintenance of past structures and patterns. Having said that, if a pattern needs to disintegrate and be left behind, we must let new systems be born.

5.2. Towards long term view: a cultural anchor

"Jain monks are like grazing cattle; they never take too much from one place or person. They take small amounts and then move onto the next spot."[6]

We need to nurture a moral force: an anchor in every culture, which challenges convention. It could come from spirituality, religion, an inspiring story, a community or a genuine leader. Here religion isn’t about believing things. It is ethical alchemy, a form of investigation. It’s about behaving in a way that changes us and gives us intimations of holiness and sacredness.[7]

How can we transform the idea of control, dominance and self-importance to that of mutual respect and interconnection with other life forms? Anchors create an effective self-regulatory pattern in a system. India,

with its spiritual heritage is an example of this collective idea of balance and harmony with nature. It has, till recently, worked as a counterpoint to the ongoing movement of 'fast' by offering a 'slow and deep' mind set. Greening up our excessive consumption without changing our habits will not work. We must consume less and we must slow down. We must also look at authentic solutions for reversing population growth. Such initiatives underline our responsibility towards a long term sustainable view**.** From rural farming perspective, the negative impact of intensive industrial agriculture has been established. A conscious effort to step back and look at traditional farming methods is required. Organic farming is an important basic appropriate technology for rural areas, especially in the developing world and as such is a sub set of permaculture, which offers the most holistic method of farming and will move on from its current status as "alternative response to environmental crisis" to the social and economic mainstream of the post-industrial era. Whether it will be called permaculture or not is a secondary matter. From an urban farming perspective, personal kitchen gardens are most effective. If every individual in a city decides to have a personal garden, the impact can be huge. The future of food would depend on how we interpret, recontextualise and fuse traditional methods with lessons learnt from permaculture.

5.3. The power and spirit of "we"

A gradual shift towards a '*we'* and '*us'* based culture from a '*me'* and '*I'* based approach is required. This is a difficult test for humanity with the diversity of agendas amongst individual humans. Can nations indeed come together and treat certain issues as sacred? Ideas of 'social capitalism', 'social entrepreneurship' and 'co-ownership' are hopeful signs. How can we systemically integrate the knowledge which continues to remain fragmented in different intellectual disciplines? How can we create an overview? Technology can be a tool but the real answer to this is having a passionate *will*. There is a definite need for co-operation, dialogue and collaboration between different cultures and contexts to develop a 'greater' self reliant system. Urban communities should join hands with rural areas to create a prosperous countryside, which in turn would support our future. Collective communities like India, today face a reverse trend with a shift towards a capitalist, individual based, self serving attitude. There is a visible rush to embrace the global marketplace and the impact can be catastrophic. A collective change of mind and heart is needed. Whether this will happen or not depends on each single one of us.

5.4. Legally sacred

We all depend on nature's bounty for our survival and prosperity. Translating global agreements on sustainability and biodiversity into legislation and action at the national and regional level is crucial. Land must be safeguarded from the operations of finance. This calls for reforms in the legal system where the rights of other life forms should be safeguarded. We must declare forests and other life forms as life supporting systems- a green insurance. A gradual and determined approach for recovering the land and celebrating the farmer is needed and the benefits of this shared with everyone. When people develop pride in their work, they feel accountable and responsible, and this results in purposeful change. This is an important aspect for community driven bottom up change. Certain religious institutions in India, like the International society for Krishna consciousness, lay special emphasis on organic farming and have a successful model to train people in bio-dynamic farming in their national centre in near Bangalore.

5.5. Towards purposeful action

We all have a construct, a conscious grammar about ourselves and the world around us. The idea of language is central to this. We need words, numbers, and definitions; but, they are not the end. They are tools for feedback, for self regulation, for differentiation and for efficient distribution of resources. In our competitive urge for 'growth' reflected by larger numbers and ever changing definitions, we could lose the purpose of collective, purposeful action. An example to illustrate this is the growing divide between "urban" and "rural". Migration from rural to urban areas has been a global phenomenon for centuries. People in most parts of the world crave to be in an urban setting. It gives them a sense of pride and achievement apart from other tangible benefits. This contributes to continued unsustainable migration from villages to cities. There is a need to redefine the mental and physical construct of an 'urban' space and a 'rural' place and treat them as a unified whole. During interviews with inhabitants in Delhi, it was felt that most dwellers still treat the city as their work place where they have "located" themselves. Their "home" is in the countryside! This social phenomena of "locating" oneself

in a place rather than making it a home, is an important issue and needs to be addressed.

5.6. Towards diverse, self organised, self reliant homes

Diversity contributes to growth, resilience and evolution of a system. We need conditions that make independent ingenious ideas possible. In India, hopeful signs of grass root organisations which have successfully created local cycles of mutual cooperation in a self organised way have emerged.[8] These have actively disjoined their workplace from global competition and lived in harmony with nature. The Development Alternatives Group in Delhi, Barefoot College in Rajasthan and the Gurukula Botanical Sanctuary in Kerala are few examples. These initiatives have transformed villages into alternative models of sustainability displaying a strong sense of intelligence, humility and moral integrity. Through a community driven, hands-on approach, people have found a quiet solution to their future. Be it the children's parliament in Barefoot or rural women, who work as solar engineers and plant taxonomy experts in Gurukula, these places radiate with respect, joy and confidence. They feel warm, familiar, inclusive and inviting to everyone. Above all they feel alive, they feel like home. Through their work and character these people have added exceptional value to the place. The results have been slow but the impact is deep and unquestionable. The day each human being realises the responsibility they have and the impact they can make, we as specie will be truly worthy of being on this planet.

The researcher would like to end this chapter with a note of gratitude for every living entity which has made this journey meaningful. We stand united in our respect for life, for beauty and for the spirit of living.

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Howard, A. (1940). An Agriculture Testament. Oxford University Press.

GLOSSARY:

1. Heat Island Effect: The term "heat island" refers to urban air and surface temperatures that are higher than nearby rural areas. Heat islands form as cities replace natural land cover with pavement, buildings, and other infrastructure. The effect is further increased in areas with tall buildings and narrow streets

2. Seed Balling: A simple and effective method for re-vegetation of degraded landscapes, particularly in semi arid areas using seed balls.

LINKS:

http://libarynth.org/research_report_sanjeev-shankar

http://libarynth.org/urban_permaculture_kits

http://www.gbsanctuary.org/

http://www.barefootcollege.org/

http://www.devalt.org/

http://www.csa-india.org/

[1] From Liberating Voices! A Pattern Language for Communication Revolution

[2] From Permaculture-Principles and Pathways Beyond Sustainability

[3] From An Agriculture Testament

[4] From a recent report released by the Assessment of Agricultural Knowledge, Science and Technology for Development

[5] From LEISA_a magazine on Low External Input and Sustainable Agriculture

[6] Transcript from a conversation with a Hindu priest in a Temple in Delhi, India

[7] Karen Armstrong-author of The History of Myth

[8] From Liberating Voices! A Pattern Language for Communication Revolution