

Creating Vibrant Communities through Ecologically Sound Food Production

Alex Kaufman, PHD Candidate, Faculty of Environment and Resource Study, Mahidol University, lex_int@yahoo.com

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Abstract

The unbridled pursuit of economic growth through industrialization forces rural dwellers to overexploit natural resources as a means of paying for the basic requisites, once freely available in the community. The cost of this overexploitation of the land is the degraded capacity to provide essential natural services, namely healthy food and clean water to both rural and urban communities. In effect, rural areas serve as a ‘supermarket’ which provides nourishment for the inhabitants of the city and fuels industry. Furthermore, boosting food production through commercially intensive agriculture, aquaculture and livestock rearing creates a loss of community identity, culture and traditional livelihoods. The mending of this rural-urban divide requires holistic methodologies based in eco-agriculture, protecting biodiversity and the development of integrated bioregions. This paper critically examines the impacts of modern food production on ecosystem services and quality of life in rural and urban areas.

Introduction

The current economic paradigm prescribes growth based development as the main instrument to bring billions out of poverty and hunger in developing countries. In rural communities the right to food production is essential to livelihoods and quality of life. Food production and preparation serves critical economic, spiritual, and cultural functions in Asian society.

There are a growing number of non-governmental organizations responding to the inequities of the global food trade through the support of community-based agriculture programs. However, these outside efforts to assist rural communities often clash with the objectives of government initiatives and agro-industry. At a governmental level, the countries of Bhutan and Thailand have implemented policies which boldly respond to the impacts of globalization on local food production. These countries have recognized that maintaining rural livelihoods requires a localized form of sustainable economic development. His Majesty King Jigme Singye Wangchuk of Bhutan initiated the policy of “Gross National Happiness” as a means to

improve quality of life through equitable socio-economic growth, preservation of culture, and environmental protection [1]. King Bhumidol Adulyadej launched the “Sufficiency Economy Philosophy” to promote moderation, self-sufficiency and a reasonable form of economic development in Thailand [2]. These two policy initiatives constitute a noteworthy response to the failure of Western models to improve the well-being of rural inhabitants.

Modern economic development in its current form creates a loss of community identity, culture and traditional livelihoods through a transformation of rural livelihoods. As modern society absorbs rural communities, local residents are forced to extract natural resources and engage in monoculture, aquaculture and other means of paying for basic requisites, once freely available in their community. The constant demand for resources to sustain city life and provide input for industry erodes the self-sufficiency of local communities and degrades the environment. This situation creates an ever increasing flow of natural resources, from rural to urban areas, stimulated through policies and regulations realized by urban dwellers. In effect, rural areas serve as a ‘supermarket’ which provides nourishment for the inhabitants of the city and fuels industry. Moreover, the cultivation of monoculture and other commodity food products means decreases the prevalence of community trade as large retailers tend to dominate the marketplace.

Private sector investment and government subsidies which intend to expand and increase food production further degrade the environment. Most of the commercial agro-industry depends on the promotion and sale of genetically modified seeds, manufactured pesticides, and fertilizers. This modern form of agriculture initiates a cycle of debt and dependence for small-scale farmers [2]. In addition, the rapid degradation of fishing grounds, rainforests and climactic changes are decreasing the self-sufficiency of small scale rural food production. The subsequent breakdown in local food production disintegrates communities and traditional livelihoods. Moreover, global studies show the importance of food as a catalyst for healthy rural communities [3].

More importantly, rampant growth diminishes the capacity of the rural areas to provide essential services, as crop land is degraded through massive inputs of fertilizers and pesticides. Water for irrigation purposes is combined with these chemical flows and contaminates rivers in both rural and urban areas. Contemporary agriculturalists take the multitude of ecosystem services, “natural services ...that support life on the earth and are essential to the quality of human life and the functioning of the world’s economies” [4] for granted.

These invaluable services to agriculture and humanity can be separated into three major categories: supporting, provisioning and regulating functions. Supporting services can be

defined as the processes necessary to sustain agricultural endeavors: nutrient cycling, soil formation and primary production. Provisioning services include food, water, wood, fiber and fuel for human communities. Regulating services are composed of climate control, disease regulation, flood abatement and water purification [5]. These supporting, provisioning, and regulating functions drive the world's food production.

This paper surveys the impact of the Green Revolution and the transformation of indigenous farming communities through commodity-based food cultivation. Second, it reviews rural-urban relationships over the limited natural resources necessary to sustain high levels of food productivity. Third, it argues for a shift to organic farms, polyculture and other holistic methodologies which sustain ecological integrity. Finally, a case study of the Sufficiency Economy movement in Thailand sets the stage for a scenario of ecologically sustainable bioregions composed of vibrant, healthy, and self-reliant food producing communities.

The Green Revolution

The same technology which international donors selected to avert the hunger and famine predicted by scientists and development experts in the 1960s [6] has adversely affected indigenous agricultural practices and food quality. This scientific movement termed the Green Revolution, "... was prescribed as a techno-politic strategy that would create abundance in agricultural societies and reduce the threat of communist insurgency and agrarian conflict" [7]. The Green Revolution was delivered to the developing world at a great cost to the quality of soil, water and structure of the community. These programs concentrated on large scale mechanized agriculture and intended to provide food security. Unfortunately, the main beneficiaries were the wealthy elite farmers supported by government policies and international aid programs [6].

Although the technological approaches employed since the advent of the green revolution increased our ability to support greater numbers of humans, it is well understood that industrial agriculture has negatively impacted the ecosystem's ability to provide essential natural services [5]. The Green Revolution focused on ecological productivity meanwhile reducing societal well-being and ecological integrity through mono-cropping. Furthermore, the practice of monoculture disrupts biodiversity by diminishing ecosystem stability and resilience [4][5]. In contrast, the agricultural practices of vernacular societies were ecologically sound and largely self-sufficient.

Learning from Indigenous Societies

In the Way [8], Edward Goldsmith applies the term vernacular to denote a

“society and to various features of such society that are self-organizing and self-governing, rather than being organized externally by the state and its institutions, or commercial operations. The term is usually applied to a social group’s local dialect or architecture. More appropriately something that springs out of a local culture. Vernacular societies mythologized life in the animal kingdom and managed their livelihood according to a code of conduct rooted in nature” [8].

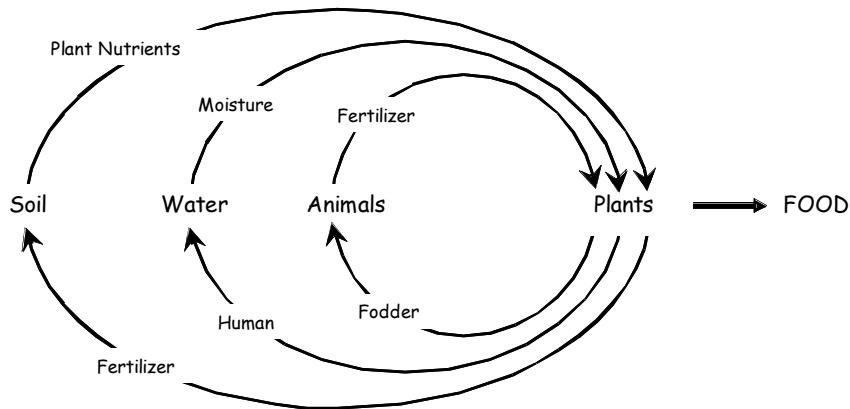
The vernacular or indigenous societies were greatly influenced by its interdependence with nature, as linked to the four basic requisites for human survival: clothing, shelter, food, health or medicine [9]. The Tukano Indians of Columbia, for example, understood that excessive demands on their natural environment could bring about the collapse of their society. The Tukano identified with the forces of the earth through their mythology, based upon their observations of the flora and fauna of the jungle [10]. For the hunter-gatherers the environment was the provider of all things necessary for life and thus took on a powerful, mystical and centralized role. These communities obtained their basic requisites from their surroundings, and developed a symbiotic relationship with ‘Mother Earth’. Their intimate relationship with nature, led these communities to cherish and use their resources wisely.

In contrast to modern society, early agricultural societies were highly conscious of food chains and dependent upon local ecosystems for the natural inputs required to sustain agriculture. Inputs such as fertilizers and pesticides were largely organic and their components were sourced within the community. Villager shared water, food products and other vital resources. Traditional lifestyles were dependent upon the notion of ‘the commons’ [11] as access to agricultural inputs from afar were a limiting factor. Water for irrigation purposes was highly valued and water conservation an ingrained practice as resources were limited to the surrounding environment.

These early indigenous practices were ecologically sound, and farming communities were largely self-sufficient [8][11]. Early societies practiced a ‘pure’ form of organic farming, as there were no fabricated chemicals available for agricultural inputs. Vandana Shiva [7] employs the term “internal input farming systems” to describe these self-sufficient farming units which utilize these so called waste products as valuable inputs (see Figure 1.). In this diagram, Vandana Shiva utilizes an ecological model to demonstrate a holistic and organic form of farming which continually circulates key nutrients.

Figure 1.

Internal Input Farming System



Source: [7]

The Internal Input Farming System demonstrates the cycling of products and services, through a continuous flow of energy and nutrients, as evident in all healthy ecosystems [4]. Indigenous communities were dependent on ecosystem services to run their farms and the surrounding forests for food supplements, medicines and housing. The common spiritual, religious and cultural practices of indigenous communities aided in the protection of these resources and their livelihoods were dependent upon the free services provided by nature:

“The sustainable use of tropical forests includes not just maintaining timber and conserving biological diversity, but also maintaining the ecological balance and functions of forests, such as soil quality, hydrological cycles, climate and weather, as well as maintaining supplies of other forest products essential to the livelihood of local people” [12,p.18].

Self-sufficiency and survival demanded a symbiotic relationship between human communities and their natural environment. The introduction of modern agricultural methods shifted indigenous communities from a symbiotic relationship with the environment to one of dependence on corporations for manufactured agricultural inputs, medicines and housing.

Bridging the Gap the Urban-Rural Divide through Ecological and Sustainable Natural Resource Management

The problems concerning natural resource management strategies in rural areas necessitate a broad examination of the factors which led to this dramatic social, economic and ecological transformation. Firstly, agro-industry degrades farm lands and leads to the transformation of

rural communities and landscapes through the diminished capacity of the land. Secondly, as industrial demands usurp community land or degrade the quality of ecosystem services, local people are uprooted from their traditional way of life. The distribution of natural resources in rural areas is no longer based on a long history of interrelationships to the watersheds, mountains and other neighboring ecosystems. Ownership and usage of resources are mandated by the power base in the cities. This inequitable formula evades the notion of a commons, [11] shared by a diverse set of stakeholders. The rural community is no longer a caretaker of ancestral lands, and the commons which once provided vital services to small communities becomes the domain of the city. A lack of natural resources stimulates the migration of rural inhabitants to the city in search of new livelihoods.

The problems which accompany the disintegration of local communities are well documented throughout the developing world. As progress and development reach the rural areas, communities are transformed physically, socially and economically. Research on the degradation of mangrove ecosystems in Ecuador reveals an indigenous perspective of their situation, “I do not know what will happen to us if the mangroves disappear, we shall eat garbage in the outskirts of the city of Esmeraldas or in Guayacuil, we shall become prostitutes ...” [13]. The mangroves serve diverse interests in the local communities: fishing grounds, aquaculture, charcoal, vegetation, medicines and disposable income.

The communities based around watersheds are economically, socially and culturally entwined with the natural environment. Watersheds areas serve diverse interests and their territory is commonly slated for a multitude of development programs. Fishing, mining, timber and hydroelectric projects are a few of the principal impacts on watersheds. The increasing concern over the negative impacts of dam projects on surrounding communities is exemplified by the turmoil generated around the Pak Moon Dam in Thailand. This project which intended to generate electricity for development purposes uprooted more than 1400 families destroyed the livelihoods of over 6000 fisherman. The Pak Moon Dam both failed to serve the needs of the surrounding communities and produced far less electricity than was projected by initial assessments [14].

In the U.S. the benefits of watershed preservation have been well studied. In the Catskills region of upstate New York, conservation has clear financial advantages “...for less than \$2 billion the watershed can be restored fully, at a saving relative to a technological fix of at least \$4 billion – perhaps as much as \$10 billion if operating costs are included” [15]. In developing countries rural areas are suffering ecologically and financially as watersheds are rapidly degraded.

Self-Sufficiency and Urban Growth

Policy advocacy and government initiatives cannot continue to externalize the costs of city life, depositing toxic waste in impoverished communities or developing countries [16] cycles back to the city as polluted water and unhealthy food. Dangerous toxins are being emitted into our environment in the name of economic progress, under the authorization and supervision of leading scientists, academics and political leaders. The production of toxic chemicals, consumer products and related waste disposal all effect human health and their use requires stiffer regulatory measures. In the past, there was a seemingly unlimited supply of natural resources and the biosphere appeared resistant to natural disasters and all forms of pollution. However, with massive population growth and polluting technologies [5] it is becoming increasingly difficult to insulate ourselves from the negative feedback which results from our actions. We are slowly coming to understand that disturbing rural ecosystems means a decreasing quality of life in the city.

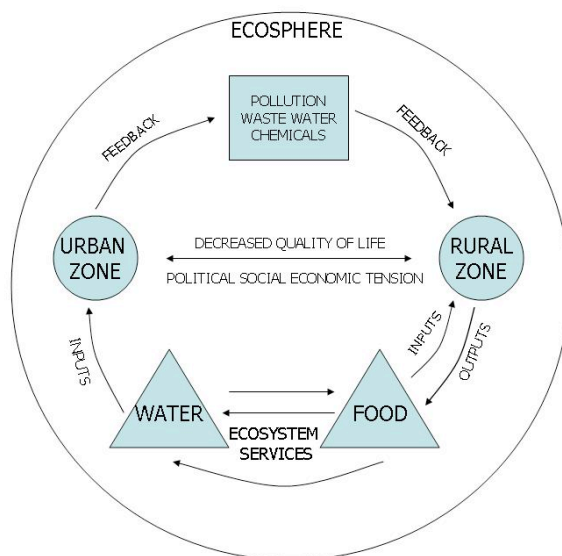


Figure 2, Rural-Urban Cycling of Resources: Holistic View

The diagram (see Figure 2) demonstrates the cycling of nature's products to urban areas, and the recycling of polluted waste, water and chemicals back to the rural areas. The political, social and economic tension generated by the continuous extraction of food and water from the rural areas leads to the disintegration of the community and rising conflicts over natural resources. These conflicts are arising mainly as a result of the socioeconomic impacts of

commercialized food production on rural communities. Moreover, rural dwellers lack financial resources and political power to challenge government decisions over the usage of natural resources in and around their communities.

Ecological Solutions for the 21st Century: Ecoagriculture, New Theory Agriculture and Bioregions

There is a growing awareness of the financial pitfalls and associated health impacts of wide scale industrialized food production. The degradation of ecosystem services through commodity-based farming has led to a new set of holistic solutions that focus on biodiversity protection, reduction of chemical inputs and the creation of diverse and interconnected farming landscapes. This holistic approach is not a new invention, but an approach that embodies a wide array of sustainable agricultural methods and management systems. 'Ecoagriculture' means to, "increase agricultural production and simultaneously restore biodiversity and other ecosystem functions, in a landscape or ecosystem management context" [17, p.103]. 'Ecoagriculture' embraces the conservation of biodiversity, building habitat networks for wildlife, productivity increases, minimizing pollution and mimicking natural systems. The growth of economically viable trees, shrubs, grasses and wildlife strengthen farm ecology and provide additional forms of livelihood for rural inhabitants.

In Thailand, a recent initiative under the Sufficiency Economy program in Thailand described as New Theory Agriculture (NTA) has supported many successful initiatives which fall within an 'ecoagriculture' framework. NTA farms are divided into the following ratio: 30/30/30/10, the first part is for growing rice, the second for vegetables, the third for water retention and or a fish pond, the remainder for housing and other uses [2]. The United Nations Development Programme [18] report on the 'Sufficiency Economy' documents several successful cases of NTA, in one particular example the Thai Impaeng Network supported one indebted farmer, Serm Udomna to switch from cash crops to growing rice and vegetables. Concurrently, Serm reforested the neighboring hillsides with local trees which enhanced biodiversity and provided medicine, timber, and firewood for his family and neighbors. Eventually, Serm was able to develop several sustainable sources of food production and pay off his debts.

'Ecoagriculture' benefits farmers through promoting natural pest-predator relationships, cycling nutrients, and creating ecosystems that are more resilient to environmental perturbations. Farms achieve self-sufficiency through ecologically sound food production. In summary, this new methodology places importance on creating healthy farms through the protection of biodiversity, minimization of chemical inputs, and improved land management [19].

The concept of bioregionalism first established during the 1960s in California advocated that communities be defined by a set of ecological criteria. Bioregions sustain ecosystem integrity as they are delineated by natural watersheds and co-existent biodiversity [20]. The successful bioregion is composed of a rich mosaic of diverse organic farms producing a variety of foods and other basic necessities. Bioregions promote cooperatives and local trade as a means of decreasing external inputs of commercial fertilizers, pesticides, and genetically modified seeds. Products travel shorter distances in bioregions and subsequently diminish global warming potential. Bioregional farms and cottage industry form strong regional networks which are largely immune to fluctuations in global commodity prices. Moreover, vital and healthy rural communities contribute to the quality of life in urban zones through the provision of healthy food, clean water and unpolluted air.

Conclusion

The current mode of development prioritizes growth over the integrity of the ecosystem. Sustainable development necessitates supporting rural and urban livelihoods through healthy and resilient ecosystems. Edward Goldsmith discusses the clash between the current mode of development and natural capital [8]:

“Ecology, with which we must replace it, is also a faith. It is a faith in the wisdom of those forces that created the natural world and the cosmos of which it is part; it is a faith in the latter’s ability to provide us with extraordinary benefits-those required to satisfy our most fundamental needs.”

Mainstream economics elevates the pursuit of consumption to a spiritual quest that extends well beyond our fundamental needs. Consequently, the mega-cities have become consumer-communities, functionally and spiritually detached from the natural world. The only way for rural communities to survive is to maintain their interdependent relationship with Mother Earth. However, the only means to do so is to dismantle the policies which enhance the growth of the mega-city and follow decentralized paths of economic development that embrace an ecological worldview. Balancing the growth of consumption and the demand for natural resources requires a multifaceted and holistic approach to development. Therefore, we must proceed with forms of economic development which reject mechanistic models, value ecology and see rural and urban zones as integrated and interdependent. If society is to move towards sustainable development, rural and urban communities should be empowered through appropriate technology informed by ecological models.

Holistic forms of agriculture, food production and regional development depend upon the conservation of biodiversity, to provide healthy and biologically resilient ecosystems. It is

evident that modern food production methods are not sustainable as they degrade the ecosystem services which are vital to preserving biodiversity and sustaining human communities. Proving the value of 'ecoagriculture' necessitates ecological accounting which measures the real costs of subsidized water, pesticides, and fertilizers. Modern agriculture and related government policies fail to quantify the increased costs of healthcare, waste management and pollutants which threaten rural and urban livelihoods. Agro-industry and commercial food production are reducing the ability of the ecosystem to provide services for future generations. In conclusion, when natural capital is accurately and equitably valued, the costs of a transformation to 'ecoagriculture' and bioregions will prove to be the least costly and healthiest option.

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