

## LOCALIZED FOOD SYSTEMS: THE WAY TOWARDS SUSTAINABLE LIVELIHOODS AND ECOLOGICAL SECURITY –A REVIEW

S. K. Sahu

Center for Environment Sciences, Department of Biological Sciences, Wivenhoe Park, University of Essex, Colchester,  
CO4 3SQ, United Kingdom  
Corresponding author email: .sksahu@essex.ac.uk

### ABSTRACT

The crisis of global agriculture and food systems is evident from FAO figures which indicate that; more than 850 million people currently face hunger and malnutrition. Some 815 million of these live in economically developing countries, of which 76% live in rural areas (FAO, 2004). The food insecurity in India is at an alarming situation reflected by a recent study by the International Food Policy Research Institute (IFPRI). According to the International Food Policy Research Institute India ranks 93 out of 119 developing countries on the latest Global Hunger Index (GHI) 2006. (IFPRI, 2006). The United Nations Special Rapporteur on the Right to Food, Jean Ziegler's suggest a similar situation. Nearly 50% of the world's hungry live in India. Around 35% of India's population, 350 million, are considered to be food-insecure, consuming less than 80% of the minimum energy requirement. In rural India wide- spread food insecurity is shown by the fall of food grain-availability to 152 kg per capita, which is 23 kg less than in the 1990s. The poorest 30% of Indian households, who spend 70% of their income on food, are able to eat less than 1,700 kilo calories per day per person. (Ziegler, 2005). This situation is inspite of an increase of 25 percent in world food production in the past 40 years during which time developing countries have increased their annual crop production from 420 to 1,176 million tonnes (FAO, 2000 in Pretty *et al.*, 2005) These impressive advances in productivity have not solved the challenges of food insecurity in many parts of world, and have resulted in socio-cultural, environmental and economic problems for present and future generations. Modern agricultural systems that one based on external input have eroded the very bases of natural resources upon which the production system depends. The impacts of chemicals used in agriculture are also important. These chemicals are not limited to crops and the fields but have affected the surrounding natural ecosystems in the landscape, and impact on soil, biodiversity, the food chain, pollinators, ground water and surface water. The fields under such intensive farming systems are under ecological crisis and the production level has started to decline. Furthermore, the majority of small holders with marginal lands and limited resources are unable to adopt expensive technologies. Under conditions of high production costs and collapsing prices for farm products the farmers are pushed out of options in the current system of agriculture. Many resource-poor farmers have been left with no choice and have committed suicide in India in the last few years. The search for alternative agriculture and food systems around the world has begun, and what Pretty (2003) calls a quiet revolution has started. This shows hope for the future by making the best of nature and of people's knowledge and collective capacities (Pretty 2003).The aim of this search are influenced by different factors in developed and developing countries. In developed countries aim is to protect the environment and natural resources for present and future generations. However in the developing world the globalised model of increased food production has not provided food security and has caused a significant degradation of natural and social assets.

### INTRODUCTION

**The challenge:** In order to achieve food security the questions of who produces the food and who has access to technology and knowledge and purchasing power are important. (Pretty *et al.*, 2005). The Who, How and Where questions about the food and agriculture are important in determining the effectiveness of the systems in solving the food crisis of the world in general and food insecure part of the world in particular. The limitations of the socially, culturally and ecologically alienated food production practices and technologies needs to be overcome by regenerating, locality specific, internal input based, practices and technologies that can lead to a

sustainable, democratic, decentralized ,and ecological food systems. The emphasis on farmers' role in the food system is important. The search for food security begins where the food is harvested and with the people who do the harvesting. Food security cannot be isolated from either ecosystems conservation concerns or economic and market considerations. If the food is the first link in the security chain, it is not the only link. Food security, properly conceived, leads communities to security in health, the environment and knowledge (Mooney, 1996).This inter-linkage needs to be explored while studying the localized food systems and the role and status of local communities in this chain is of paramount importance. The process and mechanisms towards real participation of the local communities in designing and

executing the food systems is a major challenge towards achieving ecological and livelihood sustainability at local as well as global levels.

**Cultivating Alternatives:** Many international, national and community level responses are coming up to address the food and nutrition needs of the people as well as restoration of the health of the environment. The concepts and approaches like- farming based on ecological principles- agro-ecology and food sovereignty are being experimented with by people at different levels across the world. The goal of these initiatives is broadly food, livelihood and ecological security.

A brief review of the available materials on the concepts of Agroecology and Food sovereignty are discussed here with an objective of assessing the present understanding on the issues related to the concepts.

**Agroecological Approach:** Agroecology emerged largely as a response to the environmental and socio-economic crisis of the contemporary world food and agricultural systems. It brought a new perspective for the analysis of the food and agriculture system and development of alternatives to address many challenges of ecological and socio-economic sustainability. This chapter will try to capture the agroecological analysis of the crisis of food and agricultural systems followed by important components of the agroecological experiences in different parts of the world, and finally assess the constraints and way ahead envisaged by different authors and commentators.

**Scopes and Definitions:** The evolution of the agricultural sustainability concept traversed from initial focus on environmental concerns during 1960's to incorporate economic aspects marked by Club of Rome's recognition of the link between natural resource over-exploitation and economic crisis in the 1970's. The concept further broadened to embrace social and political aspects in the next decades, being reflected in declarations of international commissions and conventions such as the World Commission on Environment and developments such as *Our Common Future* and the Rio Earth Summit (Pretty, 2006). The impetus behind the search for sustainable agriculture in different parts of the world was guided by the intensity and perceived importance of the threats of ecological, social and economic nature to the long term sustenance of agriculture itself. Addressing the problems of 'technology induced environmental degradation' and overproduction has been the main motive in industrialized countries, whereas in developing countries the pressing need is to make agricultural development match the needs of the marginalised section of the society which has historically been left out of the realm of 'development'(Altieri, 1989). In both the situations search for sustainable livelihoods remains the common fundamental thought.

The misunderstanding about the relationship of the ecological crisis and the crisis of hunger and poverty, that 'neither part of this double crisis can be addressed without worsening the other' has also been critically challenged (McAfee, 2006).

Agroecology has been defined in a variety of ways primarily reflecting the focus of different factors in different definitions. Alierti *et al.*, (1998) defines Agroecology in terms of study of agricultural systems from an ecological and socioeconomic perspective that offers ecological concepts and principles for the analysis, design and management of productive, resource-conserving agricultural systems. Francis *et al.*, (2003), define agroecology at the level of food systems including its ecological, economic and social dimensions emphasizing 'wholeness and connectivity of the systems' to address the resources, constraints and suitable solutions of different places. Both these definitions stress upon ecological foundation of the agricultural production systems and its interaction with the socio-economic issues in the society.

The agroecological approach has been influenced by the concept of sustainability incorporating the concepts of 'resilience and persistence', sustainability in agriculture systems deals with many economic, social and environmental issues (Pretty, 2006). Despite being controversial and diffuse the concept of sustainability is important because it raises important concerns related to agriculture, looking at it as the consequence of interactions of socio-economic and natural systems (Reijntjes *et al.*, 1992; UNDP, 1995)

Different practices and models like ' biodynamic, community based, eco-agriculture, ecological, environmentally-sensitive, extensive, farm fresh, free-range, low-input, organic, permaculture, sustainable and wise-use' have been evolved and used to mean increased sustainability but it is an issue of debate, whether all of these practices qualify as sustainable. Agricultural sustainability can be approached through multiple ways comprising technologies, practices and ecological management suited to local circumstances having applicability in different situations (Pretty, 2006).

**Agroecological Perspective on the crisis:** To overcome the shortcomings of the narrow emphasis on agronomy and macro level economics of the contemporary agricultural system, Agroecology brought multi-criteria and multi level analysis into perspective. Narrow focus on the components of agricultural production and their instant environmental impacts fall short of dealing with the intricacy of improving today's food systems (Francis *et al.*, 2003). Agroecology has emerged as an interdisciplinary approach because agricultural systems are economic, political, cultural, historical, ecological, agronomic and environmental at the same time.(Gauthier and Woodgate, 2001) The main ecological concerns

comprise of addressing negative impacts on environment and health, natural resources degradation, biodiversity loss and recently the role of agriculture in relation to global climatic change. The social and political perspective brings many issues broadly related to 'equity' in technological transformations. Participation of local communities, collective actions, the role of local institutions and culture in sustainable agriculture development are the issues at local level while a pro-poor policy environment are the main concerns at higher levels of policy making (Pretty, 2006).

Agro-industrial models of agricultural development believe 'overpopulation and food scarcity' cause hunger and 'low agricultural productivity' is the main reason behind food insecurity and propose uniform technologies and agrochemicals as a solution. This view, which puts emphasis on 'aggregate global food production/consumption', often ignores 'distribution and disparities', at the local and regional level. Agroecological thinking on agriculture development raises the issue of proneness of the agro-industrial model to increased inequality and production stagnation and decline (Alierti *et al.*, 1998). Francis *et al.*, (2003) argue the reason of hunger and malnutrition of 800 million people in developing countries to be not only utter food scarcity, but related to multifaceted issues of who is the producer of food, how and where the food is produced, the distribution of and access to food. It is argued that 'inequality', is the most important 'driving force' behind hunger while 'misuse and over-exploitation of natural resources' are the most important reasons of lack of food. It is argued that the role of agricultural and rural development policy in relation to its effect on 'inequality in the distribution of and access to resources and food' and on 'sustainability of resource use' are important in evaluation of the agricultural systems. McAfee (2006) cites Sen (1990, 1991) to explain the reason for hunger and malnourishment in the situation of food production growth rate being higher than population growth, as 'poverty and unequal control of food-producing resources'.

The benefits of the green revolution have been extremely uneven in distribution, generally benefiting rich and large farmers rather than the resource poor farmers. The strategies have failed to address the inequality and sustainability issues in the development processes (UNDP, 1995). The green revolution helped the resource poor farmers in most parts of the world very little. The large farmers with better lands were the gainers while the resource poor farmers the losers, often widening the income gaps. Shiva (1991) supports the view of the many analysts who reject the argument that green revolution technologies were scale-neutral. Apart from these technologies being 'inappropriate for poor farmers', they were inaccessible to them due to their exclusion from the credit, technology, information

services, resulting in intensified social differentiation and concentration of wealth in many rural areas' (Alierti 2005). Lipton and Longhurst (1989) have been cited in Altieri (2005) arguing that, even where small farmers with access to 'irrigation and subsidized agrochemicals' adopted the HYVs, the disparity remained. The technologies have neither reached nor they been suited to agroecological and socio-economic conditions of the resource poor farmers of developing countries (Chambers and Ghildayal, 1985).

Gliessman (2006) equates the 'relationships of inequality' as the 'barriers of sustainability' in agriculture systems, by promoting policies and practices primarily motivated by economic consideration replacing the one based upon 'ecological wisdom and long term thinking' on the one hand and furthering already existing disparities between countries and different economic classes within countries.

The green revolution technologies have failed to 'maintain the momentum' of yield improvements, showing the declining trend in world cereal yield growth rate from 2.4% in 1970s to 2% in 1980s and less than 1% in 1990s (Fernandes *et al.*, 2005).

Francis *et al.*, (2003) describe production and profit maximization as the two goals of the modern agriculture, based on 'intensive tillage, monoculture, irrigation, application of inorganic fertilizers, chemical pest control, genetic manipulation of domesticated plants and animals, and factory farming of animals' used all in 'concert' in which food production is an 'industrial process'.

The spread of monocultures in large areas in the green revolution lands has been one of the reasons behind increased pest and disease outbreaks. Increased nitrogenous fertilizer application, narrow genetic base of the new varieties and misuse of pesticides are other contributory factors to the problem (Conway, 2005).

Commenting on the economic viability and efficiency of contemporary agricultural systems many commentators (Alierti, Shiva, 1995) question the basis of evaluation itself. Some argue the dominant economic paradigm is biased in favour of large scale agro-industrial production systems. Focusing only on the productivity in agriculture, severely constrains the analysis of current systems and the design of future alternatives by ignoring the large investment in energy and materials that are connected to the processing, transportation, and marketing along the food chain. In the industrial food system, the waste products cannot be recycled back into the production cycle. Agroecology and analysis of agroecosystems, based upon ecological principles and distinctiveness of local areas, can provide methods for broadening the analysis to include all components of the food system and their interactions (Francis *et al.*, 2003). Evaluation of agriculture systems based on two dimensional criteria by accounting for yields per acre or

hectare ignores the third and fourth dimensions, namely effect of agricultural practices on soil and effect on production potential over time (Fernandez *et al.*, 2002). Gliessman (2006) warns that unsustainable forms of agriculture deteriorates the condition for agriculture to feed the world population in the long term. Apart from degrading the natural resource base upon which the agriculture depends it also forced 'farmers and farm workers' whom he believes to be 'in the best position to be steward of agricultural land' out of the production process. These 'real and serious' negative impacts are not included in the cost-benefit analysis making the modern agriculture system appear 'economic'. The expansion of monocultures is influenced by political and economic forces, rewarding such systems by 'economies of scale' and making 'national agricultures to serve international markets' (Altieri and Nichols, 2005), designating the modern global food system as 'unsustainable'

Post production processes involves most of the energy use (perhaps >75%) (Johansson *et al.*, 2000). The energy use and waste generated at each step in the food chain, the potentials for cycling materials back into primary production need to be included in the evaluation of the food systems. Apart from energy and material flows, other driving forces in the system such as economics at the farm, national, and global levels, the environmental consequences of systems on all plant and animal species, and the social and health impacts of systems on people also needs to be looked into while studying food systems. An interdisciplinary, integrated approach is fundamental to effectively deal with the complex interactions in the food system (Allen *et al.*, 1991). "Since capital is so often subsidized by government policies, one should not consider the private profitability of using tractor and other capital inputs as a sole or sufficient justification for their use without analyzing the full range of social costs and benefits"(Fernandes *et al.*, 2005).

The implicit propositions in the contemporary agriculture model are 'too hegemonic', limiting the search of environmentally and socially beneficial alternatives, need to be re-looked, broadened and modified. These propositions are fundamentally that the only possible solution to the problems and constraints of pest and disease, soil fertility, water, and further yield increases are to be found through pesticides, chemical fertilizers, irrigation and genetic modification (Fernandes *et al.*, 2005). These implicit propositions therefore need to be re-looked broadened and modified.

Shiva (1991) argues that the neglect of other possible ways of agricultural development is linked to the dominant model of agricultural development. Continued obsession with the Green revolution way of methods, neglects alternatives that can increase food production without harming the environment (Fernandes *et al.*, 2005). The ignorance of farmers' knowledge and

participation, is responsible for an inappropriate technology development on the one hand and erosion of this knowledge on the other. Agriculture is seen as a 'mechanical process' converting inputs into outputs through 'fixed formula' while the 'biological nature of agriculture' is emphasized in polyculture systems. The technological solutions are mostly designed to serve the larger and simpler production system which does not suit to the needs of the majority of farmers (Fernandes *et al.*, 2005). The transfer of technology approach has largely neglected the traditional agriculture areas due to its prejudice in favour of 'modern scientific knowledge' and its ignorance towards farmers' participation and knowledge (Lappe *et al.*, 1998).

Stressing the interconnectedness of systems and arguing for an integrated 'food system' Gliessman (2006) concludes that protecting the 'long-term productivity' of the agricultural land and making the 'consumption and land-use pattern' more equitable for all, are the only solutions to the challenges of global agriculture systems. The long term productivity of the agricultural land needs to be maintained through sustainable food production, which is achieved through alternative agricultural practices based on an understanding of ecological processes at farm and broader levels. The sustainable food production will serve as 'foundation' for social and economic changes directed towards sustainability of 'food systems' as a whole.

The effects of changes in food trade policies, property right laws on producers and consumers of developing countries has also been a serious concern. The farm subsidies and export subsidies in the developed countries and dumping of these subsidized foods in developing countries are pushing farmers out of land and concentrating the land and other resources in fewer hands making way for a large scale globalised food market. (McAfee 2006)

**Agroecological developments:** Approaches like Farming Systems Research and, Extension and Agroecosystem analysis and development have used system framework for analysis, addressing both 'biophysical and socio-economic' aspects while taking agroecosystem or the region as the unit of study. These approaches have contributed to the improvement in methods for problem solving and evaluation of agricultural systems by incorporating new criteria like 'sustainability, equitability and stability' (Conway, 1986). To meet the 'twin challenges' of sustainable and highly productive agriculture a new approach based on amalgamation of 'resource conserving aspects' of traditional, local and small scale agriculture and 'modern ecological knowledge and methods' are needed, and Agroecology offers the knowledge and methodology for such a new approach (Gliessman, 2004).

Agroecological approaches are primarily applied on design and management of different components of an agricultural system and the ecology of the alternative management strategies but the process creates the basis for broader applications in a variety of ways. It can be used to analyse the agricultural development of a region and evolve more sustainable practices adapted to that region. It can help diagnose the problems and causes resulting from unsustainable practices. It provides a theoretical basis for sustainable agroecosystem modelling (Gliessman, 2006). Stable yield, soil and water conservation, biodiversity preservation and food security enhancements have been shown feasible in many agroecologically based initiatives in developing countries using agroecological technologies and locally available resources (Pretty, 1995).

The documentation of successful rural development initiatives based on agroecological approaches in developing countries show improvements in the efficiency of local resource use, improved nutrition and food security, additional cash income, water conservation, soil erosion control, increased farm level diversity, biological control of pests and biological nutrient management (Uphoff, 2002). The sustainable development initiative based on agroecology, in the hillside of Santa Catarina state tries to integrate the issues of production systems and the complex issues of human relations and understanding of sustainability. To address the 'socio-environmental crisis' of modern agriculture they evolved a sustainable development strategy based on 'agroecology and solidarity'. They see 'cooperation and solidarity instead of competition and individualism as the imperative of their agricultural development model.' Collective action and organic agriculture systems were their main strategy for sustainable development (Pinheiro, 2005).

The improvements in the sustainable agriculture in developing countries are taking place in a variety of ways, which the "SAFE WORLD" study made the basis for investigation and comparison. The improvements are:

- Improved use of locally available natural resources
- Farm system intensification
- Diversification through adding new regenerative components
- Efficient use of non renewable inputs and external technologies
- Social and participatory processes leading to group action
- Human capital enhancement
- Access to affordable finance
- Loss reduction and return maximization through value addition
- Direct or organized markets for value addition

The yield increase was found to be occurring through agricultural intensification by regenerative, locally adapted means, which were:

- a. Intensification of a single component of farm system,
- b. addition of a new productive element to a farm system,
- c. better use of natural resources (water, land) to increase total farm productivity,
- d. improvements in per hectare yield of staple crops through introduction of new regenerative elements like- legumes, IPM into farm system,
- e. Improvements in per hectare yields through introduction of new and locally-appropriate crop varieties and animal breeds."

Appropriate technology, social learning and participatory approach, effective relationship between implementing agencies and social capital present at local level were concluded to be the most important factors behind these sustainable agriculture initiatives (Pretty and Hine, 2001).

Agroecological approaches using technology development based on 'diversity, synergy, recycling and integration' and social processes emphasizing community participation and empowerment have helped yield increases, production stability and many ecological services in the developing world. This new approach gives 'social capital formation' the same importance as to the 'regenerative technologies' because the capacity of the rural communities to 'innovate, evaluate and adapt' are key to their livelihoods (Altieri and Nichols, 2005).

Adoptions of agroecological approaches have provided evidence of cutting down many purchased inputs while maintaining profitability in industrialized countries. A study of sustainable agriculture in 286 projects in 57 developing countries covering 37 M ha showed a spread of sustainable agriculture 'to more farmers and hectares', and average yield increase of 79% present strong evidence in support of the potential of agroecological approaches in sustainable agricultural intensification and production increases while rejecting the argument that only industrialized production system can feed the world (Pretty 2006). The contribution of sustainable agriculture to enhance natural, social and human capital in the form of 'positive side effects' also has been significant which is very important for the people in poor countries in terms of livelihood improvements.

#### **Examples of positive side effects associated with sustainable agriculture initiatives in developing countries**

- Improvements to natural capital- increased water retention in soil, water table improvements, reduction in soil erosion, organic matter enrichment

of soil and increased carbon sequestration, agrobiodiversity enhancement

- Improvements to social capital- local level social organizations, collective natural resource management, increased access to external agencies
- Improvements to human capital- increased local capacity to address own issues, reduction in malaria incidences in rice-fish system areas, gain of self-confidence in marginalized groups, improvements in women's status, improvement in child health and nutrition especially during dry season, reversed migration, and improved local employment.

Both increase and reduction in labour requirement have been observed with different sustainable agricultural practices. Extension of agricultural seasons has increased labour requirements resulting in improved wages for agricultural workers and migration reversals. Labour saving practices may result in loss of income opportunity for poor households. Evidence based on the adoption of agroecological approaches by small or large farmers is mixed; in some cases it has been primarily by large farmers while in others by small farmers. Improvements in the labour market, overall improvement in village economy and 'new equitable arrangements' through improved social capital are the factors associated with agroecological approaches, having potential livelihood improvements for the land less people in rural areas (Pretty, 2006).

**Constraints and way forward:** Alierti (2005), puts 'land redistribution' as an important precondition in order to have productive resources because along with increasing food production, 'making it available for those who need it most' is also very important in to deal with the issues of hunger and malnutrition. The mechanism for such actions under present circumstances is very unclear and seems difficult.

Gliessman (2006) believes that traditional agriculture, due to its orientation of 'local and small scale needs', cannot meet the demand of 'distant urban and global markets'. The question here is whether we need to question such a global model based on distant transportation of food or not?

The adoption of the 1991 Den Bosch declaration on Sustainable Agriculture and Rural Development by the 1992 Rio Declaration for accomplishment of objectives of food security, employment and natural resource conservation and environmental protection marks a significant progress towards building up policy environment for sustainable agriculture. The need of major agricultural, environmental and macroeconomic policy change was emphasized. But the actual implementation of the spirit of the convention at different levels has not been very encouraging and 'most agricultural sustainability improvements seen in the 1990s and 2000s have arisen despite existing national and

institutional policies, rather than because of them' (Pretty, 2006).

Pretty argues that although the progress made to date towards sustainable agricultural systems are not enough to make it clear but 'it will result in enough food to meet the current food needs in developing countries'. However he emphasizes that the indications of the evidence towards potential productivity increases through natural, social and human capital enhancements (Pretty, 2006). Based on evidences from agroecological initiatives around the world Pretty (2006) concludes that the developments in technological and social processes for sustainable agriculture are impressive but much more is needed to be understood and done in the fields of social, institutional and political reform to facilitate sustainable agriculture.

Altieri (1989) stresses that perceiving the sustainable agriculture technology fairly unbiased leaves the question of which section of the society is going to benefit while, what, how and for whom questions of the agricultural production are the fundamental questions of a 'socially equitable agriculture'. This leads to many issues which need to be investigated. "Examination of these questions should proceed even at the expense of recognising that political systems, other than the capitalist model, might represent the best hope of changing the structural basis that is perpetuating the environmental crisis of modern agriculture."

**Food Sovereignty:** The term food sovereignty is an umbrella term for particular approaches to tackling problems of hunger and malnutrition as well as promoting rural development, environmental integrity and sustainable livelihoods. (Windfuhr, 2005). A new policy framework known as food sovereignty is being evolved by social organizations around the world on the issue of food security. This framework gives importance to improving resource access rights as well as equitable trade policies, sustainable production practices, and establishing the right to food in their strategy to address the problem. Proponents of this approach are of the view that hunger and malnutrition are not caused by food shortage or scarcity: hunger is an issue of access to food, to an adequate income, or to productive resources that allow poor people to either produce or buy enough food. They explain the inequitable distribution of food, land and other productive resources as the main cause of hunger and malnutrition (Windfuhr et al., 2005). Brought into the international policy discourse during 1996, the World Food Summit by Via Campesina defines food sovereignty as-" the right of peoples, communities, and countries to define their own agricultural, pastoral, labor, fishing, food and land policies which are ecologically, socially, economically and culturally appropriate to their unique circumstances". It includes the true right to food and to produce food, which means that all people have

the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies” (NGO/CSO Forum for Food Sovereignty, 2002).

Food sovereignty provides an alternative ecological approach along with an alternative economic concept by focusing on ‘decentralised, diverse, and locally adapted farming systems’ and by integrating livelihood goals with protection of ecological goods and services. It prioritises food as a source of nutrition over ‘item of commerce’, viewing agriculture, food, and rural life with a different perspective. It calls for an alternative trade regime to avert the negative impacts on farmers, communities and economies of developing countries (McAfee, 2006). It is an ‘counter proposal’ to the dominant agriculture development model based on industrial agriculture, trade dependent food security, free market based international agricultural trade and monopoly of food corporations (Mulvany and Moreira 2008).

Many one way, monopolistic and unquestioned notions, misunderstandings of the dominant food and agriculture systems like-Trade as a solution to inequality and hunger; industrialised agriculture as the only way to feed the world; small and medium farms being less productive and un-efficient; negative relationship between farmers and environment; and that ‘farmers-centred agriculture’ are not scientific, are being seriously challenged (McAfee, 2006).

Priority to local agricultural production, access of peasants and landless people to land, water, seeds, and credit, the right of farmers to produce food and the right of consumers to be able to decide what they consume, and how and by whom it is produced, the right of Countries to protect themselves against dumping, pricing of agricultural produce based on production costs, the community participation in agricultural policy decisions, the recognition of women farmers' rights and role in food and agricultural production are some of the elements in the charter of food sovereignty. ( Viacampesina, 2003)

Discussing the Bolivian experience, Mulvany and Moreira (2008) relate attainments of food sovereignty to equitable food system as well as enhancement in rural livelihood and agro-ecosystems.

The concept of food sovereignty is in direct confrontation to agricultural policy targeted towards increased trade and profit for agribusiness instead of food security. Despite many analyses, including those from FAO, regarding non-feasibility of meeting food need through agricultural trade for poor countries, the proponents of trade based agriculture model are continuing to ignore the alternative policies towards national and local level food self-sufficiency and food rights (Mulvany and Moreira 2008).

FAO views food sovereignty as an emerging concept needing more thought, accepts the critique on

Agreement on Agriculture (AOA) and Trade Related Intellectual Property Rights (TRIPS), and support the argument for development orientation in international trade. It differs with the food sovereignty approach’s focus on production and calls for focus on entitlements. It criticizes the concept of not sufficiently recognizing the food rights of landless and urban poor. (fao.org )

## REFERENCES

- Allen, P., V. D. Dusen, J. Lundy and S. R. Gliessman (1991). Integrating social environmental and economic issues in sustainable agriculture. *American Journal of Alternative Agriculture*, Volume-6, pp34-39.
- Altieri M., (1989). Agroecology: A new research and development paradigm for world agriculture, *Agriculture, Ecosystem and Environment*, 27, (1989) 37-46
- Altieri, M. P. Rosset and L. A. Thrupp (1998). The potential of Agroecology to combat hunger in the developing world. [http:// www. cnr. berkeley.edu/~agroeco3/the\\_potential\\_of\\_agroecology.html](http://www.cnr.berkeley.edu/~agroeco3/the_potential_of_agroecology.html) last accessed-22.02.08
- Altieri, M. A. (2005). Designing a natural resource management strategy for poor farmers in marginal environments [ciat-library.ciat.cgiar.org/paper\\_pobreza/005.pdf](http://ciat-library.ciat.cgiar.org/paper_pobreza/005.pdf) last accessed-20.2.08
- Altieri, M. A., C. I. Nicholls, (2005). *Agroecology and the search for a truly sustainable agriculture 1<sup>st</sup> edition*, United Nations Environment Programme.
- Chambers, R. and B. P. Ghadiyal (1985). *Agricultural research for resource poor farmers: the farmers first and last model*, Agriculture Administration, Volume-20, pp1-30
- Conway, G. (2005). The doubly green revolution, in Pretty JN (ed), *The Earthscan reader in sustainable agriculture*, 2005, Earthscan, London
- Conway, G. R. (1986). *Agroecosystem Analysis for research and development*, Winrock International Institute, Bangkok **fao.org-Error! Hyperlink reference not valid.**
- FAO, (2004). *The State of Food Insecurity in the world 2004*, FAO, Rome, November 2004
- Fernandes, E., A. Pell, N. Uphoff, (2005). Rethinking Agriculture for new opportunities in Pretty J. N. (ed), *The Earthscan reader in sustainable agriculture*, 2005, Earthscan, London
- Francis, C., G. Lieblein, S. Gliessman, T. A. Breland, N. Creamer, R. Harwood, L. Salomonsson, J. Helenius, D. Rickerl, R. Salvador, M. Wiedenhoef, S. Simmons, P. Allen, M. Altieri, C. Flora and R. Poincelot (2003). *Agroecology:*

- The Ecology of Food Systems, *Journal of Sustainable Agriculture* 22 (3). Pp 99-118
- Gliessman, S. R. (2006). *Agroecology: The ecology of sustainable food systems*, CRC Press Inc.
- Gliessman, S. R. (2004). *Agroecology and Agroecosystems*, in Gliessman (ed) *Agroecosystems Analysis*, American Society of Agronomy, Madison, WI. Pp. 19-30
- Gauthier, R. G. Woodgate (2001). *Coevolutionary Agroecology: A policy oriented analysis of socioenvironmental dynamics, with special reference to forest margins in north Lampung, Indonesia* in Gliessman SR, 2001, *Agroecosystem Sustainability*, CRC Press
- IFPRI. (2006). Cited in India ranks 93 out of 119 countries on Global Hunger Index, in [www.infochangeindia.org](http://www.infochangeindia.org)
- Johansson, S., S. Doherty, and T. Rydberg, (2000). *Sweden Food System Analysis*. Proceedings to the First Biennial Energy Research Conference: Energy Quality and Transformities, September 2-4, 1999, University of Florida, Gainesville
- McAfee, K. (2006). *Sustainability and Social justice in the global food system: Contributions of Yale workshop* in Cohn Avery et al(ed), *Agroecology and the struggle for food sovereignty in the Americas*, IIED, London
- Mooney, P. R. (1996). *The Parts of Life, Agricultural Biodiversity, Indigenous knowledge and the Role of the Third System*, Development Dialogue, Special Issue. 1996-1-2, Dag Hammarskjold Foundation, Uppsala
- Mulvany PM and M. A. Moreira (2008), *food sovereignty a farmer led policy framework*, [http://www.future-agricultures.org/farmerfirst/files/T3b\\_Arce\\_Mulvany.pdf](http://www.future-agricultures.org/farmerfirst/files/T3b_Arce_Mulvany.pdf)
- NGO/CSO Forum for Food Sovereignty, (2002). 'Food Sovereignty: A Right For All' Political Statement of the NGO/CSO Forum for Food Sovereignty. Rome, 13 June 2002 of Food Supply Systems, Agricultural and Development Economics Division, The Food and Agriculture Organization of the United Nations, Roam
- Pingali, P., Y. Khwaja (2004). *Globalisation of Indian Diets and the Transformation*
- Pinheiro, S. (2005). *Sustainable rural life and Agroecology, Santa Catarina state, Brazil*, in Prett JN (ed), *The Earthscan reader in sustainable agriculture*, 2005, Earthscan, London
- Pretty, J. N. (2003). *Agriculture: Reconnecting People, Land and Culture*, Earthscan, London
- Pretty, J. N., J. Morison and R. Hine (2005). *Reducing poverty by Increasing Agricultural Sustainability in Developing Countries*. In: *The Earthscan Reader in Sustainable Agriculture* (ed. Pretty J.), Earthscan, London
- Pretty, J. N. (2006). *Agroecological approaches to agricultural development*, [www.rimisp.org](http://www.rimisp.org) last viewed- 20.2.08.
- Pretty, J. N. (1995). *Regenerating Agriculture: Policies and practice for sustainability and self reliance*, Joseph Henry Press, Washington
- Pretty, J. N. R. Hine (2001). *Reducing food poverty with sustainable agriculture: A summary of new evidences*, Final report from the "SAFE WORLD", University of Essex
- Reijntjes, C. B., Haverkort and A. W. Bayer (1992). *Farming for the Future*, Macmillan Press Ltd. London
- Shiva, V. (1991). *The violence of green revolution*, Zed Books Ltd. London and Third World Network, Malaysia
- Shiva, V. (1995). *Biodiversity based productivity: A framework for an alternative economic assessment of sustainable Agriculture*, Research Foundation for Science Technology and Ecology, New Delhi
- UNDP (1995). *Agroecology: Creating the synergism for a sustainable Agriculture*, UNDP guidebook series, United Nations Development Programme, New York
- Uphoff, N. (ed) (2002). *Agroecological innovations: Increasing food production with Participatory development*, Earthscan, London
- Viacampesiana (2003). [http://viacampesina.org/main\\_en/index.php?Option=com\\_content&task=view&id=47&Itemid=27](http://viacampesina.org/main_en/index.php?Option=com_content&task=view&id=47&Itemid=27)
- Windfuhr, M., J. Jennie (2005). *Food Sovereignty, Towards democracy in localized food systems*, The Schumacher Centre for Technology and Development
- Ziegler, J. (2005). *The Right to food*, Report of the special Rapporteur on the Right to Food, Commission on Human Rights, sixty second session, United Nations Economic and Social Council.