SUSTAINABILITY IN THE THREE DIMENSIONS OF SOCIETY- URBANIZATION, FOOD INSECURITY AND AGRICULTURE

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Abstract: In view of our present day knowledge concerning sustainability we usually are predisposed to follow the principles of sustainable development by the Bruntland Commission which have significant influence on present day issues of sustainability but the idea of earth and its entities being in symbiosis, in a matrix of interrelation was already there in our religious texts.

Pavan guru Pani Pita, Mata dharata mahat,
Divas raat doe daee dia, Khele sagal jagat. (Jap ji Sahib, Guru Granth Sahib Ji , 8)

In the holy book of the Sikhs Guru Nanak Dev says Air is vital force, Water the progenitor, the vast Earth is the mother of all, Days and Nights are nurses, fondling all creation in their lap. The Sikh Gurus showed the world, the way to appreciate the interdependence of living beings and their environment and the way to nurture this interrelationship.

Sustainability essentially involves maintaining non–reducing level of per capita well being over time. With coming of the **concept of sustainability the line of distinction existing between Human and society got vanished**, without this fragmentation there was a **paradigm shift to understanding the various dimension of human society and their inter linkages along with the challenges we face. This paper reviews current thinking, and outlines these challenges with regard to the three very important dimension namely urbanization, food insecurity and agriculture.**

Food production being the corner stone for sustained improvement in human well being and in reducing risks and shocks, without there being proper investment in our food systems, sustained improvements cannot be achieved. Despite there being a substantial increase in agriculture production yet the problem of food insecurity persists. Amongst the various reasons for growing food insecurity the key reason has been Urbanization and its consequential increase in population. **Cyclical representations via flow charts** have been used to give an outline of increasing food insecurity, where with increased food insecurity dependence on import increases, thereby reducing income level which in turn effects the access to food thereby leading to reduced nutritional intake, this results in migration of people from rural area in search of food, more importantly with this migration agricultural production further decreases and the cycle continues.

Sustainability in agriculture is gradually garnering support because in order to address the environmental concern as well as attaining food security, sustainability in agriculture is essential. It really is **important to identify the basic ideas, practices and policies that constitute our concept of sustainable agriculture**. Through this paper we have achieved in presenting the ideas, practices etc. of agricultural sustainability through **a diagrammatic form and fragmenting the concept of agriculture sustainability to: Agro- environmental Sources, Inputs System, Socio-Economic system and the various Farming Systems.** Effective agriculture forms a matrix or a framework around which the food security builds up but can this be done through a sustainable approach? The answer to this could be well explained through **1960's Asian Agrarian policy** for achieving multiple crop production level to increase food intake and increasing purchasing power, though there were sign of substantial gains in production level but late on it raised concern about sustainability due to excessive use of agro chemical inputs at the cost of environment.

Due to the outcome of certain social political and economic developments there is a growth of cities, changes in land use pattern. Urbanization has been connected with development process as an essential

strand in contemporary economic system. But **scholars have also contested that urbanization includes several factor of which social change is one factor**. This urbanization process goes together closely with growing urban poverty and food insecurity.

In this paper outline for ideas of urban sustainability incorporating the **concept of urban social sustainability, understanding the importance of urban ecology have been studied. Concept of urban farming is also important since it helps in reducing shocks in urban food supply thereby ensuring urban food security.**

Growth of cities may be part of certain problems but equally it can also become the part of solution. Concept of governance both climate governance and metropolitan governance are important as they form the basis for the integrated urban planning.

The concept of sustainable agriculture will remain ever evolving in the coming years. For the society it really is important to identify the basic ideas, practices and policies that constitute the concept of sustainable agriculture. Urbanization has had a big impact on fundamental changes taking place in contemporary food system. The rapid unsustainable growth of cities is adversely affecting the basic Urban Support Service system which hampers the basic health of individuals. This Along with migration from rural area adds to growing number of urban slum dwellers further worsening food security.

Keywords: Food security, sustainability, education, ecology

Food Insecurity

Introduction

Food is the essential of human well-being and human development. **Sustainability is when People, at all times, have access to sufficient, safe, and nutritious food for an active and healthy life. Food Security is determined by food stability, food availability, utilization, food access and linked to livelihood security.** Food security assessments include indicators of food availability and access, and nutritional status.

Increased food production is the cornerstone for alleviating global food insecurity. Despite the agricultural production being more compared to the demand but still in some areas there is acute malnourishment .The key reason for mounting pressure on food security are climate change, urbanisation, globalisation, population increases, disease, as well as various other factors responsible for changing patterns of food consumption. In developing countries these factors are concentrated. Together they impede people's access to sufficient, nutritious food; chiefly through affecting livelihoods, income and food prices.

Definition of Food Security

According to the definition of the **Food and Agriculture Organization (FAO) World Food Summit in 1996**, food security requires that ***"all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life."***

An Asian Perspective on Food Security

(Source: **Food Security and Economic Growth: An Asian Perspective – C. TIMMER)**

In his paper Timmer points towards the strategic approach for sustainability adopted by Asian governments.

(a) Growth element of macro economics: The period upto 1997 saw high rates of savings and investment along with sustained level of capital productivity along with high investment in human capital.this was the growth that reached the poor termed pro –poor growth(world bank 1993) (b) Stabilization of food prices: this ensured that the economic environmental shocks or the short run fluctuation does not reduce the access to food to the poor than what their income required. (Timmer 1991, 1996)

The above atrategies address the macro dimesion of food security and not the micro dimesion which work within the household and individual level. These include rural education, nutrition education etc.

Asian perspective on food security can be best understood by Rice cultivation in Asia. "Rice is different, and the difference has powerfully influenced economics and politics throughout much of Asia. The difference is manifested in three ways: (a) First, daily access to rice is essential for survival" (Source: C. Timmer), **substantial part of farming involves rice cultivation** . (b) Second, rice growers **acquired knowledge and skill of cultivation during favourable market condition** . (c) Third, stock buffering in Asian markets to immunize the consumers from fluctuating prices hence this requires that **government actively controls the flow of rice inter border**.

Removing the special status of rice cultivation will help by making it more as an economic commodity

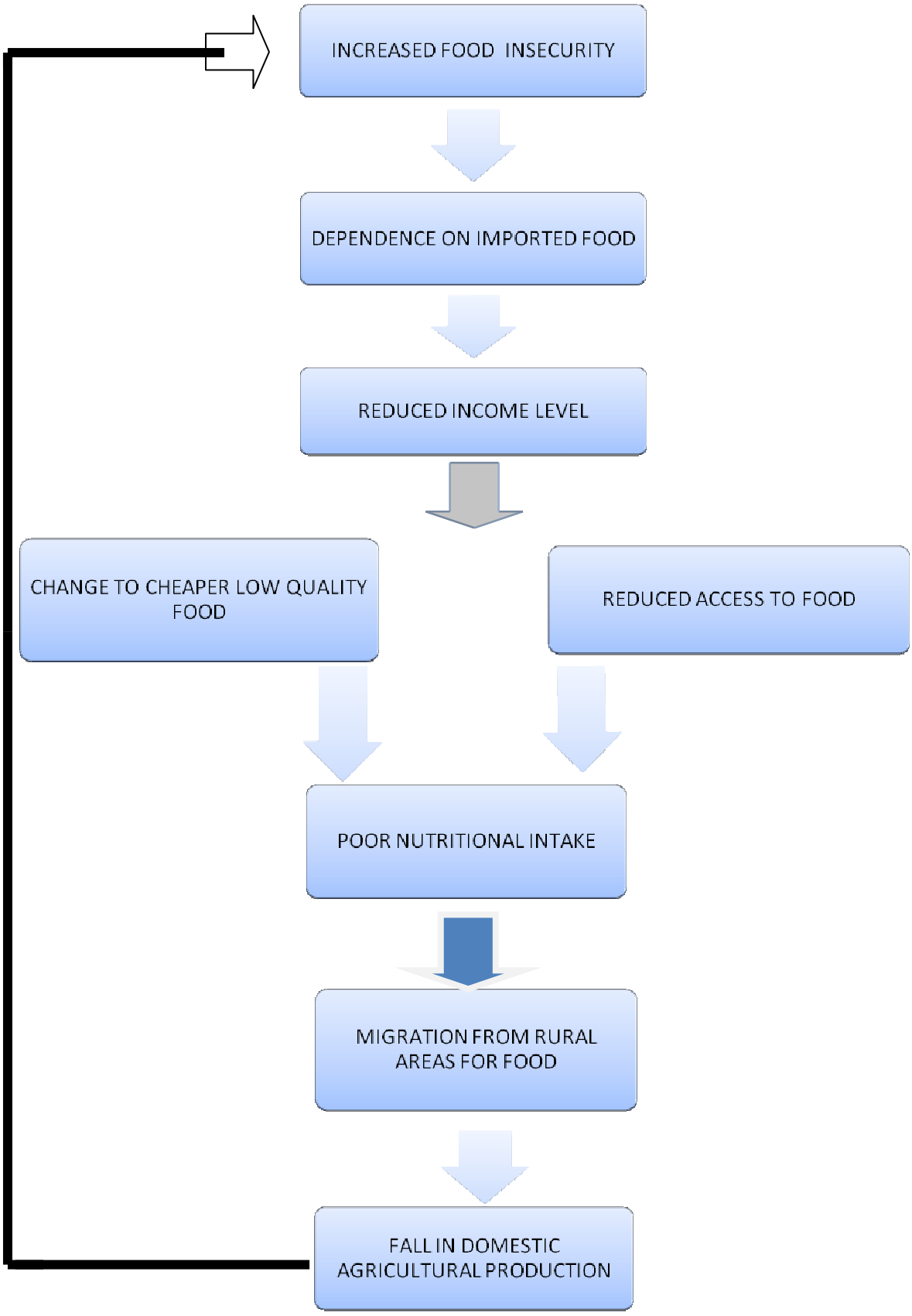

Figure 1: Cycle No: 1

FOOD SECURITY AND INDIVIDUAL'S SOCIO-ECONOMIC STATUS:

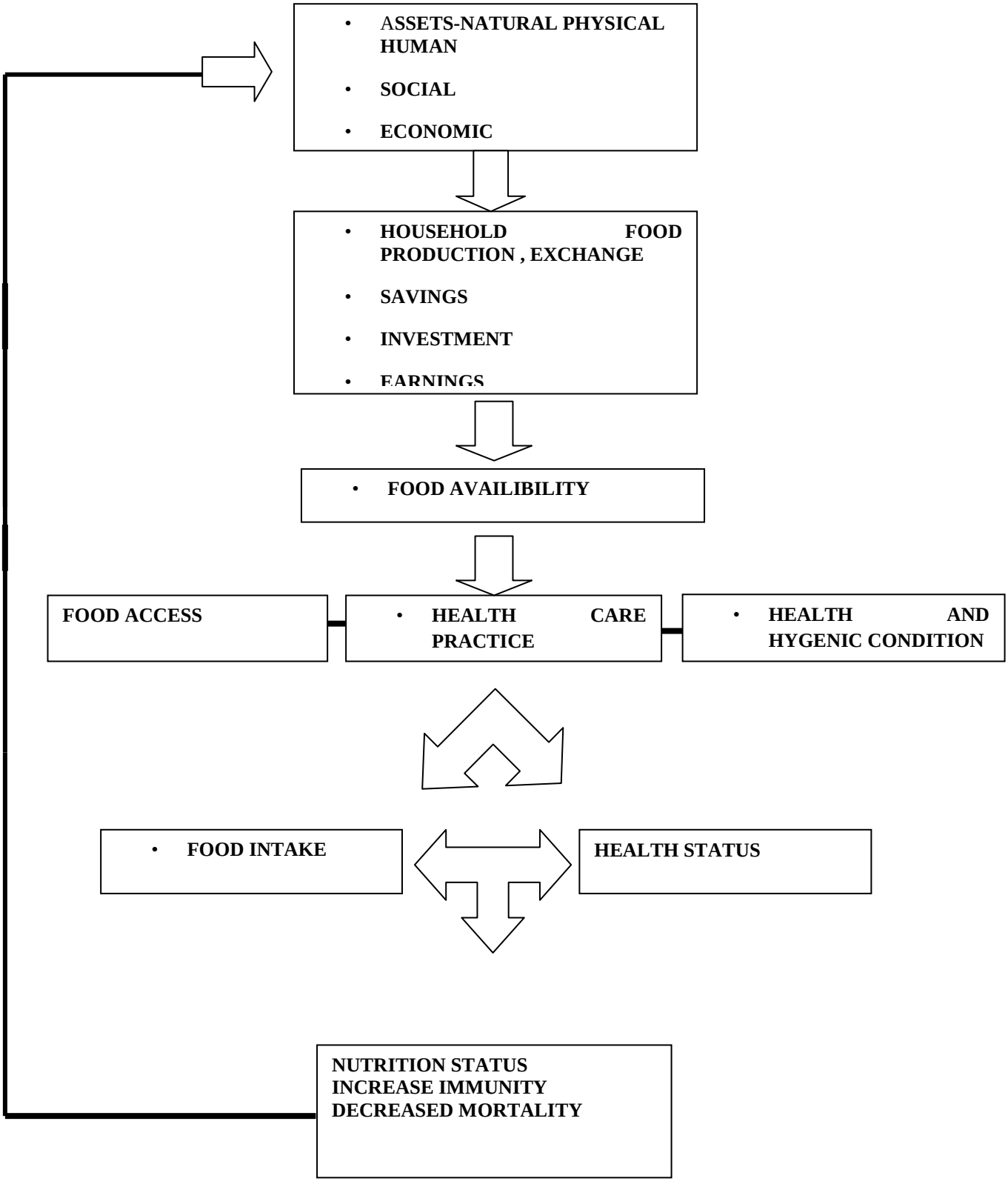

Figure 2: Cycle No: 2

and reducing the political influence. Greater investment is being done with the coordinated international efforts to open free trade in rice market so as to stabilize the price. This will ensure more prosperous future for Asia by providing greater food security.

Explanation to cycle No: 1

The above cycle is a vicious cycle with each part strengthening the other .The very first stage i.e. increased food security is supplemented by various factors, key reason for mounting pressure on food security are- climate change , urbanization, globalization, population boom, diseases, other changes in food consumption pattern etc. With greater food insecurity since the domestic food supply is already affected; there will be ***increased dependence on imported food. Since the imports increase consequently the individual household gets affected because in the same income level a substantial portion is spend on imported food purchase.*** *This would result in change in livelihood activities .When there will be increased dependence on imported food this* ***would result in reduced income level*** *(effect to livelihood- reduced expenditure on non-essential items and lead to sale of non-productive assets).*

Reduced income level will have two fold effects. ***Firstly, shift to cheaper / low quality food because of reduced buying power Secondly, there will be a reduced access to food*** *(effect to livelihood- increased number of poor people resorting to begging for achieving a bare minimum of livelihood).reduced access to food and use of low quality food will consequently result in* ***poor nutrient intake because the daily nutritional requirement will not be met .***

All the above part will contribute to ***increased migration from rural areas*** *in search of availability of food (effect to livelihood- there will be increase in rate of school dropouts in the case of children accompanying their migrating parents).****Migration from rural areas will lead to fall in agricultural production****, this in turn would lead to even greater increase in food insecurity and the cycle would continue.*

Explanation to cycle no-2

The above figure is a cyclical representation of individual as an element of food security chain. This cycle considers both the growth aspect as well as the developmental aspect of society. At society level both physical and economic factors are contributing assets. The first box is the assets table or the contributing factors- physical, social, economic for instance persons physical attributes contribute to the farmland production. With more food production the purchasing power increases hence the earning increases so also does the saving and investment. Certain ***livelihood strategies including production, investment, saving etc. provide basic services and infrastructure****. This subsequently* ***leads to food availability in the market the outcome of which is better food access, health care practice and hygienic condition to live.*** *As a consequence of better food access and hygienic condition,* ***the food intake increases and improves the health status of individual which supplements the body nutrient stores and increases immunity thereby decreasing mortality.***

Urbanization and Food Security

Origin of urban food supply

As regard to the urban food supply the rural and international imports (mainly staples) represents majority of food supply. One important aspect of urban food supply is that it is highly vulnerable to climate variation and international trade policy. These environmental and economic variations become a shock to the urban food supply.

Other than the rural and international imports the urban and peri-urban production (high value commodity) also contribute to the urban supply chain and these may includes fresh vegetables fish meat, dairy etc. Processing and packaging and transport in urban area is challenging to food security as well as contributing to carbon footprints. This usually is due to the contribution of these processing and packaging to urban wastages; hence it becomes a challenge to the sustainability. Due to this very reason there are Issues of increased infectious disease and water borne illness in urban areas of developing world. Moreover, with imports from rural areas, growing of high value commodity and limited production and cash incomes make urban area population more vulnerable to price shocks.

Hence essential of urban food security: (i) Availability; (ii) Utilization; (iii) Access.

Availability

(a)Production –peri-urban , rural imports, per prepared from vendors. (b) distribution- processing packaging, urban market retail chain /formal market.

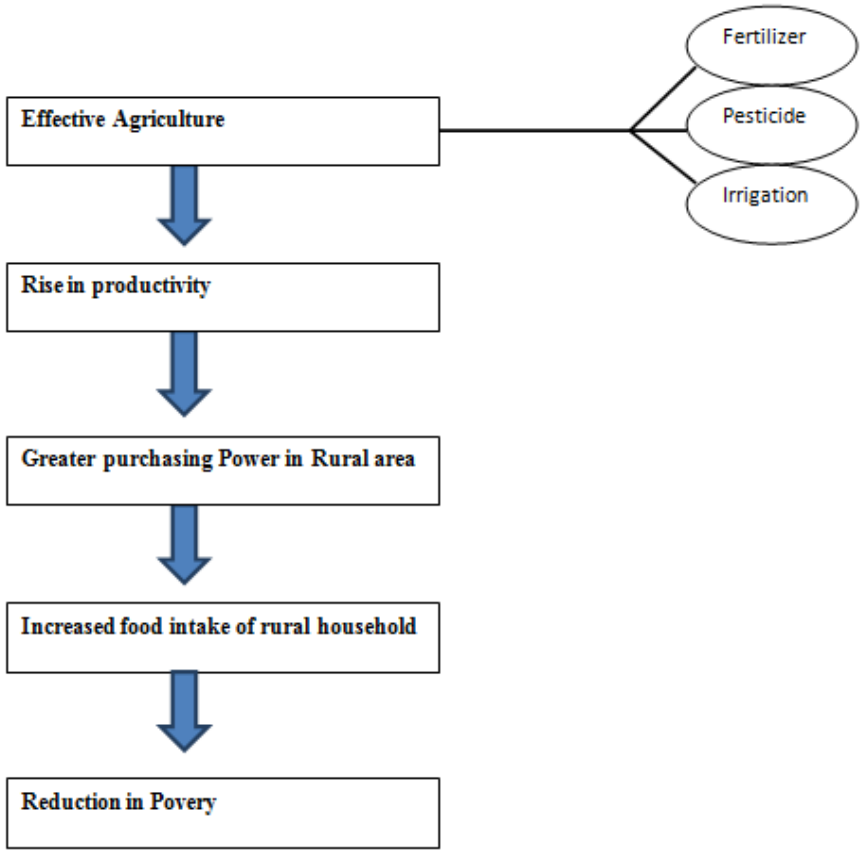

Figure 3: Agriculture Sustainability

Utilization
(a) Nutrient requirements; (b) Nutrient intake; (c) Dietary diversity.

Access
(a)Cost of the diet/ affordability; (b) Planning ; (c)Stable availability and utilization over time ; (d)Resilience to economic and environmental shocks.

Since more emphasis on **the production of biofuels and livestock** is being given there is a consequential **decrease in agricultural productivity.** There are more than 50,000 edible plants but **more emphasis is being made on production of maize, rice and wheat. This certainly is a challenge to attaining global food security**. Moreover with the humanity entering the "Urban Age" the number of cities due to process of urbanization has increased, this certainly has affected the food availability as urban population indulges more in non-agricultural activities. In developing economies the **urban food supply and distribution lines are insufficient; this leads to problem of food availability.** Moreover, in the developing countries **lack of employment opportunities and low disposable income affect food access,** fluctuation in food prices affects food access reason being that most part of the income will be spent on procuring food resources. There is a need for innovative policies and agricultural practices for increasing the food productivity and recognition of **agricultural multi- functionality.** This will ensure supply shocks are withstood and risks are anticipated.

Also there is a need to invest in cities and urban food program for more **equitable and resilient food system.** These food programs ensure the food system equity i.e. **nutritious food is accessible to all and easy market access**. Such programs are to be designed which **strengthen livelihood of the urban**

poor and a proper rural-urban linkage can ensure that essential food/ staple food supply is maintained.

Agriculture

Introduction

Agriculture is one of the most important economic sectors of Asian Countries. It contributes significantly to the gross domestic product (GDP) and employs a large section of the population. Agriculture provides the bulk of various goods required by the non agricultural sector as well as numerous raw materials for industry. The direct and indirect share of agricultural products in exports is quite high. Sustainable food production, protection of ecosystem and climate policy is only achievable through effective agriculture. Poverty is also known to be impacted by agriculture. The forest land when changed to agriculture land, leads to occurrence of soil erosion and other causes which leads to substantial disturbance in coastal ecosystems. This happens because with clearance of forest land for agricultural purpose there is a consequential elimination of the natural carbon sink (forest) the damage is then mitigated to other components of ecology including the coastal ecosystem. So there is need to improve and bring technology in agriculture to save ecology from degradation and to elevate poverty. The Asian 1960's criterion was based on Figure 3. For instance 1960's in Asia, there was a rise in the productivity of rice. The increased productivity of rice led to an increased purchasing power in rural areas. It also improved the food intake of rural households. Hence rural economy helps to reduce poverty quickly by inducing high real wages. All the components which were used in 1960's showed gains in agriculture productivity but it raised the concern about sustainability. The excessive use of pesticides, insecticides and herbicides and chemical fertilizers has bad impact on soil fertility. No doubt production was increased manifolds but it was at the cost of environment.

Sustainable Agriculture

The 1990's era saw a growing movement that questioned the role of the agricultural establishment, especially with reference to Green Revolution in promoting practices that contribute to a variety of socio-economic and other problems. Within the mainstream agriculture this movement of sustainable agriculture has found huge support. Sustainable agriculture addresses environmental and social concerns, and it offers innovative and economically viable opportunities for growers, labourers, consumers, policy makers and many others in the entire food production system.

Concept of Sustainable Agriculture

The concept of sustainable agriculture will remain ever evolving in the coming years. It really is important to identify the basic ideas, practices and policies that constitute the concept of sustainable agriculture. This will be essential in setting the priorities and suggesting for the pattern in moving towards sustainable agriculture. In Asian countries sustainable agricultural productivity has to be thought about in terms of raising yield levels until population stabilizes and malnutrition is alleviated the reason for this being reduced per capita availability of agriculture land . Under these circumstances sustained production level without harming the ecosystem is considered sustainable productivity. According to the FAO sources, Agriculture is sustainable when it is ecologically sound, economically viable, socially just, culturally appropriate and is based on a holistic scientific approach. **Reijntjes, Haverkort and Water Bayers, in Farming for the Future (1992**), define Sustainable Agriculture: **"Low External Inputs and Sustainable Agriculture (LEISA) as the agriculture which makes optimal use of locally available natural and human resources such as soil, water, vegetation, local plants and animals, human labour, knowledge and skills and which is economically feasible, ecologically sound, culturally adapted and socially just".** Sustainable agriculture in loose sense defines a range of strategies to address problem with agriculture. Some of these problems are: (a) Loss of productivity due to soil erosion, (b) Mismanagement in use of agro-chemicals particularly pesticides and fertilizers, (c) Pollution of surface and ground water due to agricultural practices and inputs, (d) Diminishing supply of non-renewable energy sources, and (e) Decreased farm income owing to low commodity prices and high production costs.

Essentials of Sustainable Agriculture

Essentially the sustainability is with regards to profitable and efficient production with equal emphasis on improved farm management systems and conservation of soil, water, energy and biological resources. With this also comes the greater productive utilization of biological and genetic potential of plant species. Those farm inputs and off-farm inputs having potential to harm the environment have also to be reduced. It also emphasis on the incorporation of natural processes of certain natural processes.

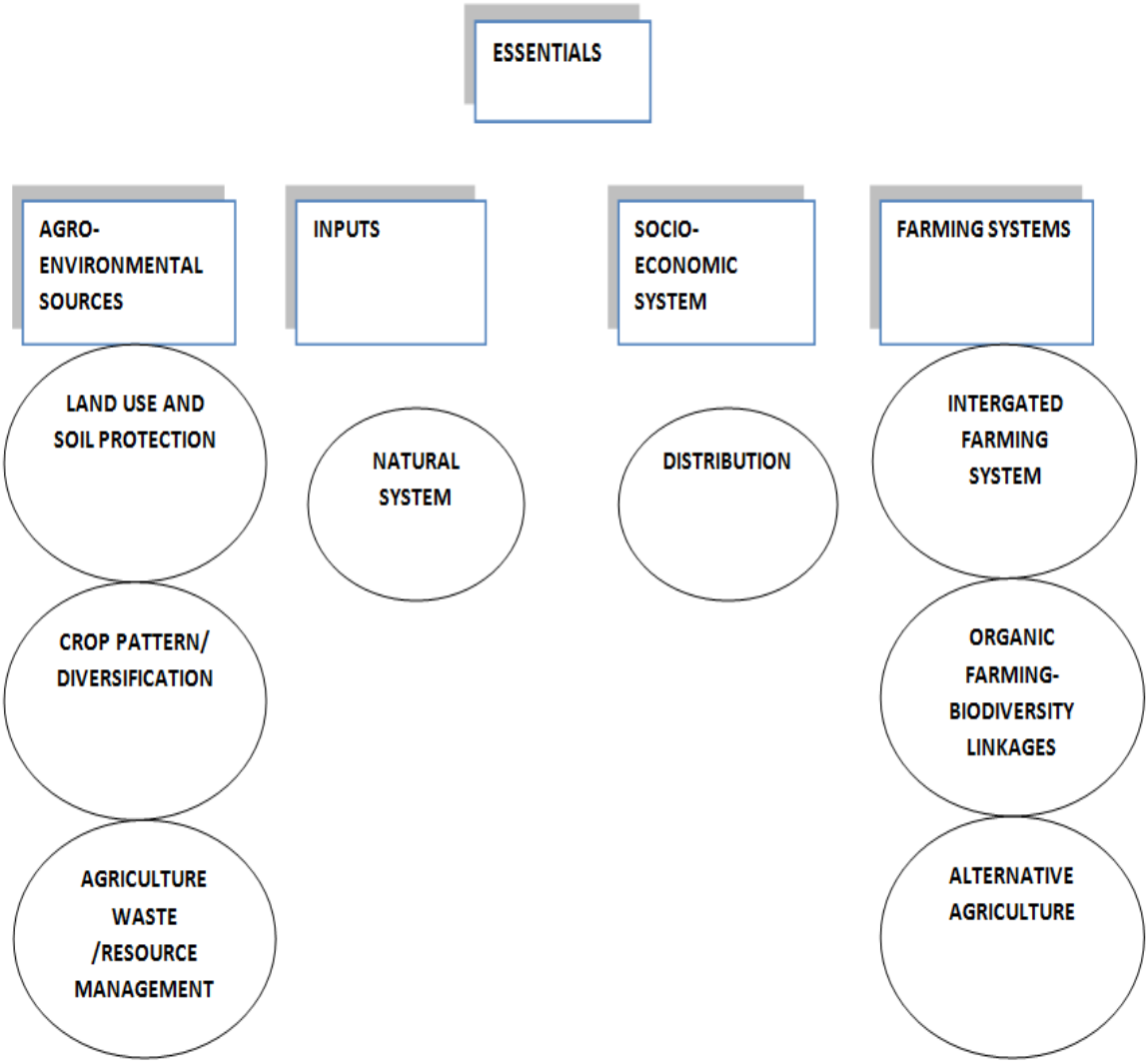

Figure 4: Essentials of Sustainable Agriculture

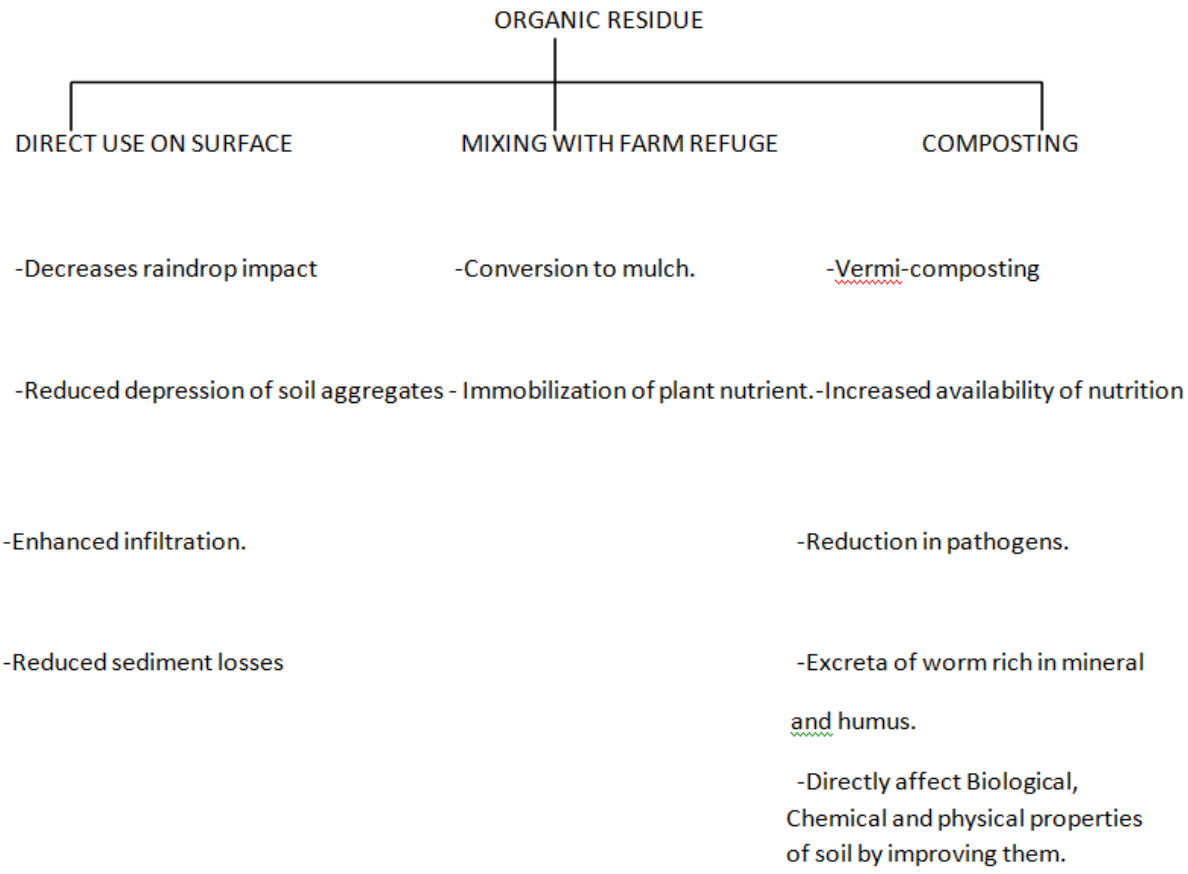

Figure 5: Description of Organic Residue

Agro- Environmental Sources

In order to realize sustainable agriculture, maintaining the soil health and quality is important. Agricultural sustainability is way of growing or raising food in ecologically and ethically responsible manner i.e. adhering to those agricultural practices that do not harm the environment.

Land Use And Soil Protection

The dynamics of land use pattern is usually governed by bio- physical (includes topography, geology relief features, altitude etc.) and socio- economic features (includes land holdings, nature of land holding, population etc.). Agro- ecological zoning- is a land resource grouping, grouped in terms of different climate, land form pattern having a certain range of potential and limit for land use .This helps by laying down certain recommendation /plans for sustainable use of land by increasing the production or limiting the further degradation. The accelerated soil erosion contrary to the natural soil erosion is a serious problem. There are preventive and engineering measures to control accelerated soil erosion which include crop management, soil management and slope management and run-off management respectively. Agriculture productivity is dependent on soil productivity and soil productivity is one index of soil health integrating many factors controlling soil health. Soil health is determined by integration of components of soil including biological, physical and chemical and their interaction. At the micro level soil quality can be compared under various micro segments under biological physical and chemical components. Considering the site of land the climate of the area the present and past cropping pattern nature and content of inputs used assessments are to be prepared.

Crop Pattern and Diversification

Reduced erosion, improved soil health, minimization of farm risks and more importantly the increase in yield are most essential for agriculture sustainability. Crop production can be achieved through proper crop diversification techniques crop rotation, mixed cropping, double cropping, inter-cropping and also inclusion of crop with biological nitrogen fixation. Choice of crop based on farming as system is most essential part. Crop rotation is the practice of changing what is planted in a particular location on a farm from season to season. Intercropping is a method of planting two or more crops of differing characteristics in close proximity to reduce weeds; to encourage plant diversity in order to avoid insect and pest infestation; and to provide shade, nitrogen fixation, or other benefits to the plants being grown. Multiculture practices as stated above such as crop rotation and the use of cover crops can increase yields by reducing pests, improving soil health, and increasing water retention. Large area of cropland subject to monoculture is susceptible to more damage by one kind of pest due to lack of genetic diversity in mono cultured farm. Multiculture reduces vulnerability to a wide array of pests, including weeds, insects, fungi, and other organisms. Studies have been done suggesting the improvements in crop water productivity i.e. "The amount of food produced per unit of water consumed is sure to improve both food security and water sustainability in many parts of the world. Scientists with the University of Minnesota's Institute on the Environment (IonE) and the Institute of Crop Science and Resource Conservation (INRES) at the University of Bonn, Germany, conducted the research. On irrigated cropland, water consumption could be reduced enough to meet the annual domestic water demands of nearly 1.4 billion people while maintaining current production. Specific solutions for improving crop per drop does vary by location and climatic zone over time, however it is a straight measure and answers to achieving sustainability and food security." (Source: Sciencedaily)

Agriculture Waste Management

Agriculture waste is the residue that is generated through diverse agriculture activities. These may include and not limited excesses during plantation, harvesting of field crops, processing of the produce, dairy etc. With revolutionalization of farming culture and techniques it has resulted in multi-fold increase in crop production as well as consequential increase in crop residue and allied waste. This situation can be addressed by the effective utilization of this farm waste as a resource. Agriculture based economies have availability of such agricultural and allied waste in abundance Hence methods for effective utilization of the waste considering that these waste contain nutrient value by way of re using or recycling are to be incorporated.

Resource Management

This diversity while providing opportunities also presents challenges in managing activities and values across landscape so that the benefits from all our resources can be enjoyed for generations to come. All of us face many natural resource management challenges, including water logging, soil salinity, and water quality decline and biodiversity loss. According to the World Commission on Environment

and Development (1987), a farming system or land use is sustain able, if it ensures that today's development is not at the expense of tomorrow's development prospects. As such maintaining healthy landscapes and sustainable use of natural resources requires efforts to prevent and reverse natural resource degradation.

Input

Inputs are essential for farming as these are required to be applied for better crop produce. Commercial farming for its success has a lot of dependence upon off-farm inputs (fertilizer, pesticide and farm machinery) and these off farm inputs are energy intensive and there are certain environmental concerns regarding their use in agriculture. Fertilizers are important in agriculture as they are necessary to meet the nutritional demand of the crop. They furnish the soil with Nitrogen, Phosphorus and potassium some of which is utilized by the crop and the rest is retained in the soil and is often washed off from the surface to water bodies or are lost to atmosphere. Clearly when the fertilizer exceed the safety limit they pollute the soil, atmosphere and water bodies. A pesticide is any substance used for controlling, preventing, destroying, repelling, or mitigating any pest. Pesticides have properties as attractants, repellents, chemo-sterilants, hormonal agents. After their application some pesticides still persist in soil and these may affect the non target organism (bees, birds, other wildlife, and natural enemies of insects) and in certain cases target organism may develop resistance to these pesticides .These excessive pesticide enter food chain and consequently injure top of the food chain including humans. With the use of farm machinery the effect is that it leads to labour employment neutralization. Machine also supplement to soil erosion as the machine blow up the soil during tilling making them prone to erosion.

Natural System

Integrated Nutrient Management is a principle revolving around the idea of using the different sources of nutrients like organic manures, chemical fertilizers, biological nitrogen fixation and other methods of nutrient saving in an optimum and effective manner. This aims at achieving sustainable productive potential of the soil without adverse effects on the environment. The emphasis on use of suitable variety, effective soil and water use along with effective cultural management for sustainable crop production on long term basis. Integrated Pest Management is the idea of controlling pest by using techniques in a compatible manner maintaining the pest population at a level below those causing economic injury keeping in mind the overall economic social and environmental values. Sustainable Water Management since water is an important natural resource required for crop production, human and animal need and for a number of atmospheric phenomena which are necessary for life. With increase in sectoral competition has resulted in decreased allocation of water to agriculture sector. This can lead to crisis situation since there is an increased demand of water in agriculture sector. Irrigation techniques though have resulted in increased crop yield but at the same time have resulted in mismanagement of water leading to water logging and wet desert etc. Drought is another extreme where the stress of water wipes out crop from the field affecting productivity. Therefore, there is a need to support the farmers by providing incentives, knowledge, efficient and effective tools and technologies to ensure sustainable agriculture.

Socio- Economic System

Socio economic system emphasises in investing in infrastructural building of efficient irrigation systems, investing in micro- irrigation techniques which will bring about good savings. Securing access to land and water resources is essential. There must also be provision for risk management as a tool for providing support in situations of environmental and economic shocks. Post harvest Management is essential as it helps in Income enhancement through better management of plant produce by ensuring good transport, grading, processing is becoming popular now-a-days. Farmers should be encouraged to adopt the best available threshing, storage and processing measures and also be encouraged to produce value added products from every part of the plant or animal. This will result not only in enhanced food quality but also help in reducing waste along the food supply chain. Proper market access can be provided by building infrastructure for safe storage of produce with reduced wastage. Farmer organizations may be supported to provide each farmer with access to financial mechanism and rewarding farmer for use of sustainable practices. **Investment in sanitary and phytosanitary measures** is important for providing quality food both for domestic consumers and for export. Barriers to international trade are often implemented as sanitary and phytosanitary measures (SPS). The SPS agreement was under the WTO imposes technical barrier on imports on that agricultural produce which has sanitary implications in the importing nation. A perfect example of SPS on agricultural produce is the Karnal Bunt (fungal

disease on Indian wheat), Iran has refused import of Indian wheat since 1996 due to presence of fungus in the grain.

Farming Systems

Farming system concepts involves putting together farming and its allied component, thus aids the integrated management of agriculture. The essential component may include soil, water, crop and cropping system, livestock, labour, capital and energy and their integration is the idea behind farming system. It is based on the idea that since the resources are finite they must be used judiciously to bring change in frame work both economic and social. With the utilization of locally available resources there is consequential reduction of energy cost hence it results in economically, socially and ecologically sustainable system.

Energy management is an important and essential input. Every effort will have to be made to harness biogas, biomass, solar and wind energies to the maximum sustainable potential. Solar and wind energy can be used in hybrid combinations with biogas for farm activities. New communication and computing technologies like remote sensing and other space satellite outputs are providing detailed geographic information useful for land and other natural resource management. Programmes for extension education and communication including the technique of "Social engineering" for farmers will certainly help popularize the sustainable agricultural practices.

Alternative Agriculture

Alternative agriculture presents a system which is alternative to the common practice and provides opportunity to increase yields by virtue intensification. Among the various components of alternative agriculture some are practices of agro forestry, social forestry, sericulture, plantation, apiculture, cash crop, medicinal plants, live stock, poultry, aqua culture and bee keeping. Due to limited returns, small land holdings, seasonal agriculture farmer tend to practice alternate agriculture.

Urbanization

Urban Sustainability

Urban cities have become the centres of world economy and substantial part of population live in these cities. It has rightly been said that humanity has entered the "Urban Age". Objectives of sustainable development in urban area not only involves achieving sustainability in development and planning of urban settlement but also the general guiding principles of sustainable development including the environment and resource utilization. Urban sustainability provides safe and healthy environment which means and includes healthy living environment, proper drainage and sanitation , waste disposal, adequate economic base for society and other important social and cultural goals that meet the goals of sustainability. Due to several associated risks that urbanization has specifically on the human health it brings several challenges to urban sustainability. A wide spread rural migration to urban areas causes risk to human health due to certain dietary and social changes. The reason for this being that the societies in rural areas have entirely different social culture and habits compared to those in urban areas with the migration from rural areas to urban areas it leads to heterogeneous population which results in emergence of new culture or a new form of human behavior.(Louis Wirth 1938)

In urban areas the ever rising effort to raise standard of living resulted in exhaustion of the ecology that it exists in. Ecology is the realm of natural sciences since it is understood as study of relationship between the living and the external world. Whereas urbanization is associated with social sciences since the centre of urbanization is change in human society. Ecology in urban areas has definitely been affected by the prosperity of the human society and the consumptive actions of human and human behavior. The rapid pace at which the growing pop is exploiting the locally available resources is a threat to ecology. Since ecosystem is natures self building process and human is its very essential part, hence the ecology has direct equation with the development of human and its well being. Human behavior in one area can affect the health and well-being of people in same area as well as those in other areas. For urban sustainability a healthy and secure urban environment is a pre-requisite. Understanding this human spatial relationship with the ecosphere i.e. the nature is essential for sustainability.

Urban Farming

The very essence of urban farming is to promote and inspire the urban farmers to grow food more sustainably. Irrespective of the size of the farm land the most important element of urban farming is efficiency. Urban farming contributes towards social-economic upliftment in the urban areas of developing world the reason being that it has two fold effects firstly, it supplements the income and food production and secondly, in some communities it acts as any sort recreation and relaxation. Urban farming relieves the rural agricultural production for export

oriented purposes by attaining substantial self sufficiency. Since urban areas are prone to food supply shocks, hence farming in urban areas contribute to food availability to urban population. More importantly it increases resilience to adverse shocks by maintaining food production. Urban agriculture is in fact a response to increasing urban poor population crisis. Hence becomes very essential to community building. Sustainability in urban farming is achieved though recognition of environmental degradation in cities, emphasis is on relocation of resources to better serve the population by way of various schemes of sustainable agriculture.

Local Climate Governance

Whether the contemporary political and administrative systems can handle the challenges emerging from climate change is the big question. Local governance is restricted in various fronts on formulating and implementing the plan of action. The climate protection strategy based on common good of the people is often objected for the adverse consequences and lack of scientific certainty it holds, hence there is a tendency to delay the action. These restricted level of local action also surface due to dilemma of the authorities with regards to either economic development or climate change mitigation. But most importantly these findings have implications on urban sustainability. Hence the existing governmental systems/institutes are not adapting to the environmental flux and thereby are not going beyond the traditional governance structures. Climate governance involves both planned strategies for mitigation e.g. Land use planning and public transport, as well as adaptive policies e.g. mobilization of locals for societal transport. Climate governance essentially means the modes by which the stakeholders implement policies to mitigate the impact on climate and furthermore adapting to the effect of such climate change. Amongst all the stakeholders much emphasis is on local government as major stakeholder. For easy understanding of modes of local governance **Bulkeley and Kern 2006** have identified modes of local climate governance: **Firstly**, mode of self governance where the applicability is on the government itself e.g. going beyond the national building standards and regulating energy use by municipal buildings , purchasing green energy. This also involves self assessment and certain amount of accountability and transparency. **Secondly**, through enabling and supporting the other stakeholders. This framework involves an element of decentralization of planning structure and is also effective due to the participation, recognition and inclusion of local stakeholders. Example – Access and command of resources for low income groups, advice for energy efficiency, campaigns on green transport, dedicated funding of environment program, providing green jobs etc. **Thirdly**, the local government act as service provider i.e. they provide basic environmental services waste collection, safe water supply, public transport services, dealing with environmental disaster etc. **Finally**, governance by authority e.g. Identify and analyze environmental issues, select program focus and defining institutional structure and planning, incentives and regulations, evaluation, laying down efficiency and emission standards, City planning etc.

Effective governance of urban cities is challenge to the economic productivity and human well being. Local level of governance does not have full access to key areas of decision making. Moreover with regards to adapting, since there is a need for larger research effort for adaptive framework hence the local government tend to overlook this aspect.

Urban sustainability is the most neglected domain and up to what extent the local governance can address the challenges of sustainability is most important question. Shaping cities towards a healthy future could assist in achieving sustainability goals. There is a need for agenda setting and planning to encourage leadership and garner stakeholder support.

Conclusion

The concept of sustainable agriculture will remain ever evolving in the coming years. For the society it really is important to identify the basic ideas, practices and policies that constitute the concept of sustainable agriculture. Urbanization has had a big impact on fundamental changes taking place in contemporary food system. The rapid unsustainable growth of cities is adversely affecting the basic Urban Support Service system which hampers the basic health of individuals. This Along with migration from rural area adds to growing number of urban slum dwellers further worsening food security.

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