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## SMALL FARMERS, AGROECOLOGY AND FOOD SOVEREIGNTY IN ETHIOPIA: AN ANTHROPOLOGICAL APPRAISAL

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**Abstract:** *The small farmers of Ethiopia play a very significant role not only feeding the large segment of country's population but also contribution to food security. Africa accommodates approximately 33 million small farms constituting 80 percent of all farms in the continent. The majority of African farmers are smallholders, with two-thirds of all farms out of which 90 percent of farms are below 10 hectares. The small farmers of Ethiopia constitute a significant segment of this group in the continent who practice low-resource agriculture based primarily on the use of local resources and modest use of external inputs. The small farming system on highlands of Ethiopia sustain diversified farming systems and produces multiple crops covering grains, fruits, vegetables, fodder, and animal products in the same field or garden . These farmers have upheld the keys for food sovereignty and sustainable agriculture of the country. The small farms of Ethiopia are more productive and resource conserving compared to modern agriculture and large farms evolved on the foundation of small farms. Traditional multiple cropping systems sustained by small farmers since centuries has provided as much as 20 percent of domestic consumption of the region. The productivity in terms of harvestable products per unit area of polycultures developed by small farms is much higher than productivity of large farm under a single crop with the same level of management. This paper based on desk research and critical synthesis of research work done by different scholars on food sovereignty and small farmers highlights how these farmers take better care of natural resources, including reducing soil erosion and conserving biodiversity. This paper also critical examines the inverse relationship between farm size and output that can be attributed to the more efficient exploitation of land, water, biodiversity, and other agricultural resources This study recommends that there is an urgent need for promoting strong rural economies in rural regions of the country empowering and renovating productive small-scale farming.. This scale down the tide of out-migration from rural regions and create adequate employment opportunities and strong foundation for food security against threats of climate change and drought.*

**Keywords:** *Food security, employment opportunities, polycultures, resource conserving, small farms, low-resource agriculture*



## 1. INTRODUCTION

Ethiopia is one of the prominent agrarian countries in African continent. Agriculture plays a very important role in economy and livelihood of a significant section among nations and nationalities of this country. Agriculture generates not less than 45.5% GDP, 94% of national exports and 85% of employment generation in this country (NBE, 2002). In entire continent of Africa, small farms constitute 80% of all farms represented by as many as 33 millions small farmers. A greater majority of African farmers are small and holders with high representation of women farmers. The small farms of Ethiopia are more resource conserving and productive. Different studies have indicated that traditional multiple cropping systems contribute to 20% of world food supply. The small farmers of Ethiopia are involved in diversified farming system that produces vegetables, fruits, grains, fodders in the common field. The small farmers are best resource managers in terms of efficiently managing fuel resources and generating more yields for unit of out-put compared to big farms. The small farmers have efficiently used agricultural resources, biodiversity, water and land and converted inputs into outputs for promoting productivity of small farm (Altieri, M.A, 2009). In agriculture sector, the small farmers contribute high labour inputs and traditional crop diversity and farm productivity. But, they have failed to improve farm technology and promote high level of farm economic and capital formation in agriculture. These farmers have been trapped in vicious circle of poverty, food insecurity and low farm income. There is an urgent need to introduce improved technology and enhance farm productivity so that the quality of life of small farmers, being custodians of sustainable agriculture mechanism, can be empowered and facilitated with enhanced farm income, improved capital formation, increased saving rates and ultimately accelerated prosperity of farm sector.

The traditional small farming system is mother of modern agricultural reforms and treasure house of different agricultural approaches.

**Table 1. Different types of farming practiced by small farmers of Ethiopia**

Deferent Types of Farming systems	Resources and environment
Integrated farming system	<ul style="list-style-type: none"><li>- Waste and garbage elimination</li><li>- Recycling of inputs among farm activities</li><li>- Effective use of small land</li></ul>
Organic farming	<ul style="list-style-type: none"><li>- Renewal of soil fertility</li></ul>



	<ul style="list-style-type: none"><li>- Health impact on producers and consumers</li><li>- Quality control of products and production process</li></ul>
Nature farming	<ul style="list-style-type: none"><li>- Natural ecological balances</li><li>- Elimination of chemical residues</li><li>- Complete nutrient cycle within farm</li></ul>
Agro forestry	<ul style="list-style-type: none"><li>- Application of soil nutrients from forest</li><li>- Preservation of forestland and biodiversity</li><li>- Watershed and recreational values</li><li>- Solution to deforestation problem</li></ul>
New Theory farming	<ul style="list-style-type: none"><li>- Optimal utilization of production and resources</li><li>- Effective land and water use</li><li>- Self-sufficiency and reduction of social impact</li></ul>

The traditional small farming system of Ethiopia covers a wide range of crop production and food security strategies. The new theory of farming has been introduced by incorporation of new schemes floated by Government during last couple of years. The cumulative effects of these farming approaches aim at promotion of community level food and livelihood security, prevention of degradation of mountain ranges and overexploitation of natural resources. The traditional small farming system minimizes the impact of farming on environment and empowers farmers to be autonomous and gain control over their livelihood. The small farming system promotes practices that address numerous environmental and social issues apart from providing valuable economic opportunities to different stakeholders in the entire food system (Kibret, H., 1998).

## 2. MATERIALS AND METHODS

This paper focuses on critical dimensions of traditional small-scale farming and its contribution to food security and conservation of agro diversity in Ethiopia. This paper has been developed on the basis of synthesis and rigorous content analysis of a good number of published research papers and thesis. The researcher has adopted a well-designed content analysis matrix of key research questions, key hypotheses and thematic areas related to small farming, sustainable agriculture, food security and central focus of these research issues. The findings of past research studies have been sorted out and grouped under themes and sub themes. The studies have shown small farmers grow many plants which are landraces and more genetically heterogeneous than formal modern varieties. These plants have grown from seed passed down from generation to generation. These landraces offer greater defenses against vulnerability and enhance harvest security in the midst of diseases, pests, droughts, and other environmental stresses. The studies have validated that crop



genetic diversity continues to be maintained on farms in the form of traditional crop varieties, mostly as major staple crops. The findings of the studies answer the research questions that the small farmers promote genetic diversity as safety net to meet future environmental change or social and economic needs. The traditional farming system upheld by small farmers enhances productivity and reduces yield variability apart from the penetration of transgenic crops into centers of diversity. The small farms reserve the hidden potentials of preserving resistance to drought, competitive ability and performance in polycrop systems, storage quality, etc. The specific research questions are designed to validate how traditional agro ecosystems and the prevalence of complex and diversified cropping systems sustain the stability of peasant farming economy and allow crops to reach acceptable productivity levels in the midst of environmentally hazardous conditions. However, the research findings of past studies are correlated with assumptions on small farming dynamics covering traditional agro-ecosystems that are less vulnerable to catastrophic loss and their interrelationship with a wide variety of crops and promotion of polycultures exhibiting greater yield stability and less productivity declines during a drought compared to monocultures. This paper outlines a wide range of key research questions and hypothesis to design advanced research on reforming small farm sector towards mainstreaming sustainable agriculture in rural regions of Ethiopia.

### **3. RESULTS**

The agricultural policies of Ethiopia have focused on empowerment of small farmers in terms of promotion of food security, investment in agricultural research and development, modernizing farming practice by introduction of improved seed variety and breeds along with supporting formation of farmers associations and cooperatives. The creation of commodity exchange programme and farmers access to market strengthening value chain and addressing social challenges exposed to small farmers through capacity building initiatives have added new dimensions to this policy reformation. The cumulative components of these innovative support programmes have created a platform for boosting up sustainable agriculture on highlands of Ethiopia by involvement of small farmers. The dimensions of sustainable farming need to be explored through different planned approach and renewing hidden potentials of small farmers as discussed below:

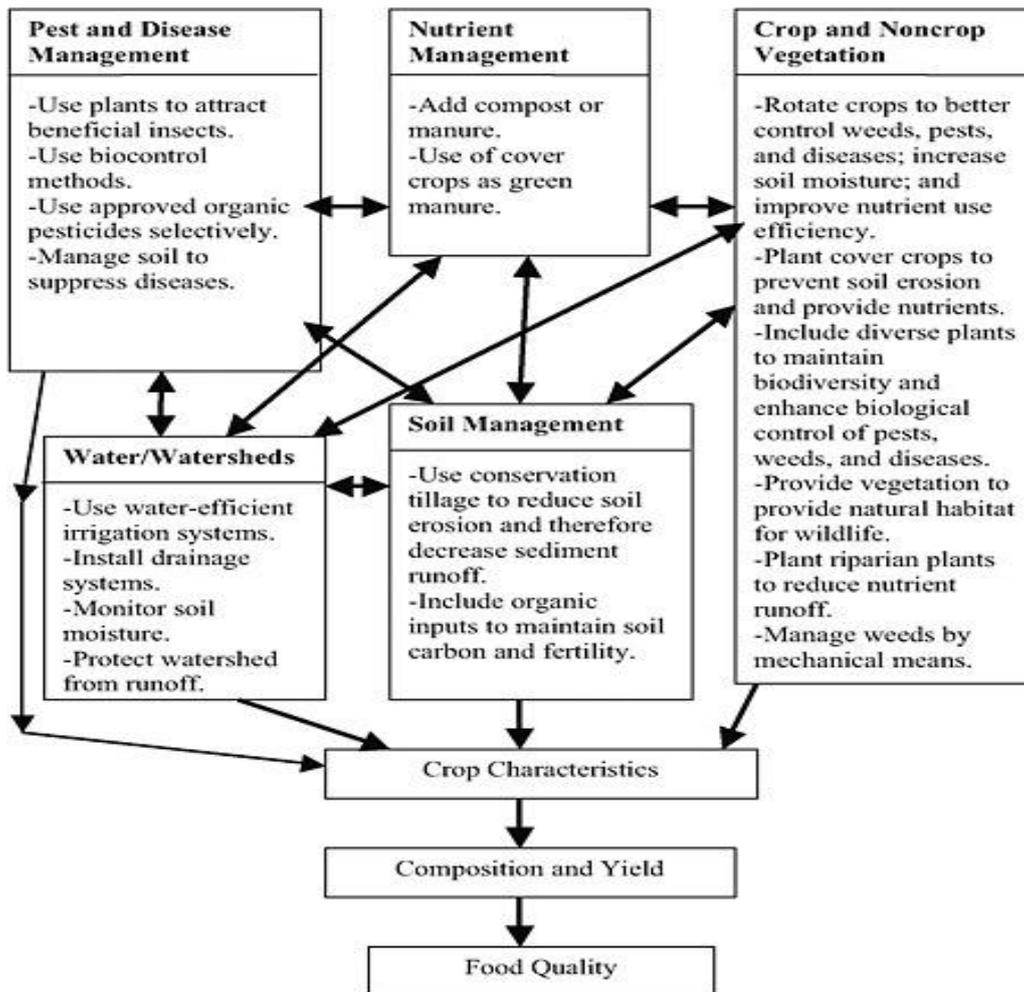


### **3.1 Issues and challenges of Small farmers in Ethiopia**

The small farmers always face financial crisis to meet household requirements of food, social obligations, observing festivals and rituals and house constructions. They are very often severely financially affected by loss and mortality of live stocks. In the event of structural violence and break down of safety nets, they fail to adapt non – agricultural occupation and alternate income generation activities. Besides, the availability of off farm income sources is limited. A section of them foster mistaken perception that credit or loan taken by them shall be waived and they will not be required to repay the loan. Such dependency perception and misunderstanding have multiplied their credit status and poverty situation. Poor technical skill and inappropriate participation in decision making process have deprived them off linkage with market networks and adaptation of new agricultural technology. Their role in participation in market oriented agriculture required for reducing poverty and environmental degradation has not been appropriately explored. There is an urgent need to support small farms in promoting biological process in agriculture such as optimization of nutrient cycling and efficiency of their use. Secondly these farmers being ignorant, illiterate, lack knowledge and skill for promoting livelihood and management of natural resources. Thirdly, they are not facilitated with forward and backward linkage between production and market and between natural resources and production. They have not been provided appropriately with support services for understanding and identification market opportunities where they will explore for marketing their harvest. All these setbacks contribute significantly to dwindling of sustainable agriculture and traditional crop diversity upheld by small farmers of Ethiopia since years together.

### **3.2 Contribution of Small farmers towards Sustainable Agriculture**

Modernization of agriculture in different regions of Africa has affected traditional high diversity agriculture sustained by small farmers since generations together. The key of food security lies in the hands of small farmers and their dynamic contribution towards in situ conservation of crop genetic diversity. (MoFED, 2002) The modern agricultural reforms covering industrial and organic farming have foundation deep rooted in small farming system for renewing sustainable agriculture in Ethiopia.



**Fig.1 Mechanism of small scale farming for sustainable agriculture and food security**

The small farmers of Ethiopia are not only custodians of sustainable agriculture but also indigenous experts of promoting environmental stewardship and social as well as economic equity. As sustainable communities they have been maintaining farm productivity, food security and usefulness to society indefinitely since time immemorial. Modern agricultural practices have borrowed valuable insights for balancing between environmental health and socio economic growth from community based farming and natural resource management practiced by small farmers of Ethiopia. The small farmers of Ethiopia have adopted an integrated system of animal and plant production practices that not only address human food and fiber needs but also sustain quality of ecosystem and natural resources cementing the base for agricultural economy and food sovereignty. The small farmers of this country have utilized the local resources of land, water, and other resources, as well as local varieties and indigenous knowledge or centuries and made most efficient use of non-renewable resources. They have nurtured biologically and genetically diverse smallholder



farms with internal strength and a built-in resilience that has helped to sustain economic viability of farm operations apart from enhancing the quality of life of farmers and community as a whole.. The indigenous institutions have strictly enforced customary rules to maintain sustainable production system without damaging resources base environment. The small farmers are experts in maintaining soil nutrients by raising fields, terraces, growing a number of crops in the same field agro forestry systems, etc. The small farmers have sustained their creativity in indigenous agricultural strategy that forms microcosms of traditional agriculture . The modern agriculture needs to be founded on a new model that conserves biodiversity, thrive without agrochemicals, and ensures year-round yields. This new models of agriculture covers forms of farming that are more ecological, biodiverse, local, sustainable, and socially acceptable. This model is deep rooted in the ecological rationale of traditional small-scale agricultural system with huge potential to feed all members of the community as a whole. The small farmers of this country have been feeding nations and nationalities since generations together. The food sovereignty of the land has been ensured through productivity and sustainability of such agro ecosystems that have upheld by small traditional farming system. The food sovereignty in small farming system has been determined by multiple factors such as farmers' access to land, seeds, and water, local autonomy, local production-consumption cycles, local markets, energy and indigenous technological sovereignty,

### **3.3 Small Farmers and Food Sovereignty in Ethiopia**

Small holder farmers in Ethiopia contribute significantly towards conservation of agricultural biodiversity in terms of ensuring food security and sovereignty since couple of decades. They are the custodians for sustaining agricultural ecosystems against threats exposed by formidable nexus of market forces and expansion of urbanization and industrialization. A wide number of schemes have been introduced for agricultural transformation which has isolated a significant section of small farm holders from traditional cultivation and forced them to adapt part time farming as territory occupation in addition to adapting other non-agricultural occupations as primary and secondary ones. They have adapted diversified household livelihood strategy as coping mechanism towards changes introduced by industrialization and globalization. The challenges and threats exposed to small farmers in Ethiopia are numerous and complex. The population of small farmers is dwindling today.



The labour intensity is main strength of the small farm sector which has contributed towards conservation of agricultural biodiversity and genetic diversity on this land since time immemorial. The labour force accumulated in this sector exhibit shift from subsistence agricultural sector to growing industrial sector. They have been handicapped to preserve gene pool of traditional variety of crops and agricultural biodiversity which they have preserved since generations together. Another strength of small farm sector is that crop genetic diversity sustained by this sector promotes long term food security. In entire continent of Africa, the agricultural biodiversity is concentrated in the areas where the population of small land holders is dominant. The cultivation of diversity of crops is only possible by the efforts of small land holders at all parts of the globe. Because, high diversity farming is only carried by more labour intensive farming in small farming sector. The small farmers in Tigray region are reported cultivating several varieties of same crops. These small farmers in their locality also cultivate different varieties of crops. They invest more time and effort to cultivate different varieties of crops with different sowing dates and harvest time. The indigenous technologies and innovations such as water conservation and terraces form support mechanism for sustaining high diversity agriculture. The dependence on family labourers in small farm sector not only minimizes supervision problems but also promotes sustainable agricultural opportunities. The small farmers in Ethiopia are repository of indigenous knowledge of different crop varieties and their relationship through microhabitat variation. These factors ensure high diversity agricultural base. The small farmers of Ethiopia uphold rich indigenous knowledge interlinked with local culture relating to different phases of agricultural operations such as seed germination, flowering leaf and whorl development. Local knowledge based experimentation very much match with validation of laboratory test and scientific experimentation (Desalegn, R.,2003,2006,2008). The promotion of food security and sustainable agriculture in Ethiopia lies in the hands of small farmers. Ethiopia is one of the least developed countries in Africa which takes rank of 171 out of 182 countries in UNDP Human Development Index for 2009. Agricultural diversity and sustainable agriculture upheld by small land holders reserve the key for unfolding economic growth and food security of the country. Ethiopia has vast agricultural potentials which remain to be explored in terms of optimum utilization of labour force, cultivation of land of fertile area and utilization of unexplored water resources. Ethiopian government has



created an innovation model in the world in terms of agricultural modernization and promoting food security through optimal utilization of small farms. Ethiopia has experienced the devastating drought in 1984 which has disrupted the economic and agricultural sector of the country. The nations and nationalities of the country have extended their support to Federal Government of Ethiopia to encounter food insecurity and create greater access to sufficient, safe nutritious food. The challenges of food security and climate change have created insurgencies and widened the poverty trap for people of the country. This country has created remarkable landmarks in terms of progress and reduction of people living below poverty line from 77.6% (2012) to 66% (2013). (CSA ,2007)..

Apart from modernizing the agriculture. The intervention aims at envisaging strategy of ambitious policy commitments along with supportive programmes around agricultural development. The government of Ethiopia has floated numerous schemes to address issues and challenge of small holder farmers. Ethiopian Agricultural Transformation Agency (EATA) has been established by Ministry of Agriculture, Government of Ethiopia to promote agricultural research and development, increase market linkage, promote improved seed varieties and breeds, and bring about qualitative improvement in farming practices of small land holders. This agency has created a platform for producing wheat crops by improved seeds involving multiple producers and agents. The small farmers have been encouraged to become social entrepreneurs through grass root seed marketing and distribution programmes. The inputs provided through supporting programmes will promote platform for small farmers availing timely access to and use of high quality of inputs such as fertilizer, seeds and utilizing financial remunerating tips for marketing their production. Utmost care has been given to eliminate constraints of small farmers in terms of low bargaining power and limited access to market. Support services have been provided to small farmers for formation of their associations and cooperatives which will strengthen their collective bargaining power and open wide access to market networks. The small farmers are illiterate and lack knowledge on market information. This is a great bottle neck in the process of empowerment of small farmers. The government has created Ethiopia Community Exchange Programmes which opens platform for farmers availing access to real time price information. The government of Ethiopia has created an innovative model for empowerment of small farmers of the country and revolutionized the entire agricultural



sector through food sovereignty and sustainable agriculture exploring effective public private partnership. The farmers' cooperatives have been formed covering 50 small farmers each. Each farmer cooperative is autonomous and safe sustainable indigenous farmers' organization where each of the members is supported to plant certified seeds covering an area of 100 hectares. The objective of this programme is to harvest high yielding disease resistant improved wheat variety and meet household food security. The farmers are encouraged with skill development and inputs to grow healthy crops for combating food insecurity which is a major agenda of this programme. The supportive programme of the government aims at creating a platform for revolving the improved certified seeds among small farmers through selling the harvest by these cooperatives and widely covering the land of small farmers with the cultivation for improved seeds. The schematic provisions of the interventions enhance skill of the small farmers through periodic training on cultivation, storing and harvest of improved variety of seeds.

Reducing dependency on food and import of wheat to meet country's domestic demand is key concept of Direct Seed Marketing (DSM) programme launched by government of Ethiopia. Annually, 1.1 metric tonnes of wheat are imported from other countries to meet not less than 24 per cent of domestic demand. This is a challenging issue before policy makers and bureaucrats to combat food insecurity. The planners and policy makers have realized that small land holders of Ethiopia have unexplored hidden potentials in agriculture sector to grow more crops and create base for addressing food insecurity. They are the main actors at grass roots for promoting sustainable development and spearheading more equitable sustainable food production of the country. The small farmers are responsible for producing not less than 80% of food crops consumed in Asia and Africa. But, these farmers suffer due to abject poverty and food insecurity in all regions of Africa. Their viable link with food supply chain has been undervalued. Their strength and potential to promote agricultural production, enhanced food security and reduction of poverty has not been appropriately assessed all over the world. Small farmers constitute not less than 85 percent of farmers. They are the major stakeholders of agricultural production. The sustainable agricultural practice has been missing due to modernization of agriculture and isolation of small farmers. This has led to low productive and wide spread of poverty. In Africa, small farmers are worst sufferers and live on income less than one dollar a day (Food and



Agricultural Organization, 2013). It has been realized that the small farmers in rural areas of Ethiopia contribute towards diversification and recycling in farming practice and production of indigenous vegetables and food varieties. They foster a culture of acquiring indigenous agricultural knowledge, methods and technology from their forefathers towards application of agricultural management and practice. Loss of crop diversity through modernization of agriculture has posed a serious threat to food security. Since last couple of decades, the farmers have lost crop diversity from their field. Empowerment of small farmers through skill development and investment in their field for harvest of high yielding of variety of crops will not only promote agricultural diversity but also enhance livelihood and nutritional status of farming communities of Ethiopia. Keeping above dimensions on agenda, the government of Ethiopia has emphasized on wheat productivity Increase incentive through Direct Seed Marketing (DSM) programme. This programme focuses on empowerment of small farmers in terms of providing them scope for exercise their choice for seeds and facilitating them to market and sale their harvest at primary level. The farmers are encouraged to buy government allotted seeds and collect seeds form primary cooperatives. The farmers are provided platform for promoting credit and market access to certification in terms of strengthening link with seed producers. The government has subsidized farmer run cooperatives to accelerate distribution and marketing. The support programme of government has converted the production and marketing of agricultural products by small farmers from unorganized sector to an organized sector. It is realized that the small farmers fail to promote quality based and market oriented production habit.

This habit needs to be infused in agricultural operations of small land holders where they are encouraged to promote their bargaining power for demanding better price on their products. The fluctuations of price during harvest season and off season very often affect traditional high diversity agriculture. Utmost efforts and inputs are provided by supportive programme to promote access of small farmers to credit institutions and marketing network. This would go a long way not only in ensuring optimal utilization of agricultural products, but also promoting income on food security. The government of Ethiopia has initiated value chain approach for wide scale marketing of selected agricultural commodities such as haricot bean, oilseeds, small ruminants, honey, cereals and vegetables. It is assumed that the farmers' cooperatives will play a vital role in value chain approach by evolving



collective marketing strategy and ensuring value addition activities for their harvest in market. The focus on value chain approach revolves around a series of activities ranging from physical transportation of products to distribution among final consumers and final disposal after use. The priority has been given to promote the food by the small farmers not for domestic consumption but for regional and national consumption. The constraints and barriers affecting sustenance of traditional high diversity agriculture by small farmers are numerous and complex. Absence of appropriate post harvest storage coupled with their poor skill for handling gross spoilage and loss of harvested crops have created serious challenge for food in security. The infrastructural inadequacy and inappropriate distribution, supply chain along with technical service create stumbling blocks for sustainable agricultural input production. The socio-cultural and physical barriers including transportation constraints deprive a significant section of small farmers off availing physical access to market. Another setback is their poor knowledge on market information for which they fail to bargain the reasonable price for the crops during harvest time. The social challenges threatening empowerment of small farmers are ignorance, illiteracy, inability to negotiate equitable commercial contact with traders and customers. They are not appropriately empowered to take benefits from government support programmes and take part in institutional agreement.

The climate change has posed major threat to small farmers of Ethiopia. The livelihood of small farmers in Ethiopia is closely interlinked with functioning of the ecosystems around them. The human induced climate change caused by fossil fuel burning, deforestation and industrial activities have serious damage for the crop diversity and livelihood of small farmers. The small farmers of Ethiopia live in marginal environment and isolated rural regions characterized with inadequate health, social and physical infrastructures. The livelihood issues of small farmers in rural regions of Ethiopia are declining soil fertility, soil erosion, deforestation, chronic fire wood shortage, over grazing by livestock, shortage of ground water supplies and others. The farming system adopted by farmers is not resource efficient which has made their economy vulnerable to food security. There is an urgent need for implementing appropriate support programmes facilitating diversification of farming system and creating more opportunities for incorporation of men and women of small farmers community in all aspects of food production from planning to marketing and value



addition. The small farmers need to be involved in prevention of environmental degradation, promotion of agricultural productivity, elimination of hunger and poverty, apart from conservation of natural resources. The holistic and integrated supportive programme need to incorporate promotion and strengthening of farmers cooperative, creation of awareness of farming practices that promote sustainable agriculture, facilitating market linkage and providing skill developed training to small farmers for adopting appropriate forward and backward market linkage strategy. The villages of small farmers need to be promoted as agro – ecological villages which shall become self reliant in terms of creation of integrated and ecological food production and energy systems. The sustainable agriculture relies of ecological land management and sound farmers cooperatives for mobilization of internal resources and utilization of agro resources in sustainable way. The sustainable agriculture is promoted by enhancing food and energy security through introduction ecological farming and energy systems. Secondly, community based mechanism for prevention of external expenditures on fossil fuels, synthetic pesticides, fertilizers and imported seed and crops are crucial to mainstream sustainable agriculture for small farmers. Thirdly, diversification of farming promoting ecological process on agriculture has far reaching effect on alleviation of poverty, conservation of biodiversity and reduction of risks. The small farmers of highlands of Ethiopia are exposed to multiple problems like land degradation, reduction of land productivity, reduction of farm income and soil erosion. Very often, they are handicapped to carry out cultivation on steep slopes without adequate soil conservation majors and gully formation. These challenges multiply their food insecurity and community based mode for sustainable agriculture. The role of small farmers in safeguarding natural resources and genetic diversity cannot be ignored. They are custodians of agricultural bio – diversity ranging from genes to agricultural ecosystems that are used in food production. They maintain balancing mechanism among different components of agricultural ecosystem which generate agricultural productivity, food security, environmental sustainability and nutrition value. Agricultural biodiversity significantly influence the natural resource management. Small farmers are not only custodians of agricultural biodiversity but also promoters of synergy between natural resource management and agricultural biodiversity. The combination of both promotes food security and environmental health. The indigenous mode of sustainable agriculture upheld



by small farmers since generations together cover agricultural biodiversity, soil and water conservation and ethics of natural resource management. The small farmers maintain crop and tree diversity with and between crop variations which are eliminating risk factors and enhancing food security and income. Such diversity ensures optimal land use and facilitates changing conditions. Within the regime of sustainable agriculture, the indigenous principles are enforced from bringing interactions and synergies among crop, livestock and soil organisms. The cumulative effects of such elements promote functions and productive capacity of agro ecosystem, sustainable agriculture and food sovereignty. The traditional farming system of small farmers maintains not only genetic diversity of crops but also diversity of plant and animal species over many centuries. The indigenous knowledge associated with managing these resources constitutes core areas of sustainable agriculture. In a nut shell, the small farmers of Ethiopia are to be treated as best managers of diversity and livelihood management in stress prone agricultural production area (Altieri Miguela ,2009) . Any supportive programme designed to empower small farmers of highlands in Ethiopia for ensuring food security and sustainable agriculture needs to incorporate following dimensions that seriously affect their indigenous mode of natural resource management and agricultural diversity. The components are:

1. Diversification and integrated production systems.
2. Socio – economic and policy issues.
3. Natural resources management and climate change.

The highlands of Ethiopia are enriched with genetic resources and agro biodiversity that are exposed to threat of overgrazing and other human activities. The high – land agriculture sustained by small farmers of Ethiopia contributes significantly towards enhancing food security and environmental sustainability. The highland regions provide potential base for water resources needed for agricultural, domestic use and expansion of industrial activities. But, unfortunately a very little attention is given on relevance of highland regions in addressing the issues of rural poverty, low agricultural productivity, water shortage and out migration that are multiplied by degradation of natural resource and adverse impact of climate change(AbdisaYohannes, et al.,2002) . It is estimated that not less than 12% of world population inhabit in mountainous and highland regions. A significant section of them accounting for 80% living below poverty line. Their living condition is deplorable and worst.



As many as 20% of them live in starvation where as 37.5% of them are affected by food insecurity. The United Nations Conference on Environment and Development, Rio in 1992 has sensitized the international community on issues of poverty, food insecurities of farmers living in high land and mountainous regions of the world. The participating countries have united together to adopt the agenda of the conference for promoting collaboration for sustainable development of high land and mountain regions of the world. Due to lack of holistic policy, appropriate interventions efforts have not been taken to promote food security and alleviate poverty among small land holders in high land regions of Ethiopia. These dimensions have been carefully examined by policy makers of government of Ethiopia prior to adopting innovative approach to food security and envisaging programmes and policies under Ethiopian Agricultural Transformation Agency (EATA).

The combination of market forces and political forces and their dynamics pose threats to small farmers and their contribution to agricultural bio – diversity. These setbacks have been appropriately realized by government of Ethiopia who have eliminated policy biases against small farmers and recognized their meaningful contribution towards in situ conservation of crops genetic diversity. (MEDIC ,1999)

The support programme envisaged by government of Ethiopia creates ample space for development of markets for traditional varieties of crops and create provision for supporting part time farming as an element of household livelihood strategies. The small farmers of Ethiopia have vast knowledge on sustainable agriculture and natural resource management which are not appropriately recognized by policy makers. They uphold indigenous knowledge on organic agriculture and natural resource management. This knowledge has been transferred from one generation to another generation to sustain indigenous mechanism of creativity and innovativeness.

### **3.4 Crop rotation**

Traditional crop rotation method adopted by small farmers has not only ensured genetic diversity but also soil health and soil nutrition. The tradition practice of crop rotation has prevented crop loss and ensured safety measures against food security through sustainable use of resources. It is believed that renewal of tradition practice of crop rotation will



significantly contribute towards promotion of food security and sustainable agriculture by small farmers in highlands of Ethiopia .

### **3.5 Crop diversity**

Traditional farming practice of small farmers has facilitated harvesting of varieties of crops and sustained crop diversity. Such mechanism of traditional crop diversity has minimized the resource burden on farmers and created a potential ground for sustainable agriculture.

### **3.6 Management of Grazing**

The traditional practice of maintaining eco-health and land productivity are interrelated with periodic shift of grazing land for live stocks. Variety of grazing pastures is utilized by moving live stocks which used to provide them different nutrients. The excreta of the livestock are utilized as natural fertilizer for the land. The traditional practice of change of location prevented soil erosion and renewed soil fertility required for agricultural diversity. The traditional practice of weeding is labour intensive and suitable for small farms.

The traditional practice of burning of old crops as a measure to prevent wheat producing seeds and prevent damaging of crops is adopted as viable mechanism for ensuring soil fertility.

Traditional water management practice adopted by small farmers involves selection of right crops adaptable to weather condition of the regions. Traditional agricultural principles have directed the farmers to choose such crops that are not required much water for dry area. Indigenous water management system has focused on irrigation system preventing river depletion, soil and dry land degradation . The empowerment of small farmers will boost sustainable water management through use of waste water and rain water harvesting. Traditional mechanism of pest management involves conversion of farm land into home of natural pest eliminator involving bats, insects, rodents and birds. The farmers adopt mechanism where these natural pest eliminators shall prevent pest damaging the crops. The traditional technique of tilling the land, ploughing and other indigenous technologies adapted by small farmers not only promote soil health but also provide high yield. Such indigenous technologies work as boon for farmers. The small frames use various cover crops, natural fertilizers and manures and adopt indigenous mechanism of crop rotation that not only prevent occurrence of crop diseases but also eliminate pest infestation in crop field.



#### **4. SUMMARY AND CONCLUSION**

During two last decades ,green revolution approach involving application of mixed modern agricultural ecological science and indigenous knowledge system have been spearheaded to promote food sovergnity and ecologically best food production system in different countries of Africa. This approach has been directed towards enhancing crop production, food sovergnity and conserving biodiversity conservation water and soil . This new revolution approach has been designed in Africa by Multi-institutional Alliance for a Green Revolution in Africa. The indigenous model of agriculture sustained by small farmers facilitated cultivation of multi-crops in raised fields. The poly-cultures and terraces have not only promoted agro-forestry systems but also demonstrated creativity of indigenous farmers. The indigenous agriculture practiced by small farmers in Ethiopia has demonstrated an innovative model of biodiversity conservation and sustainable agriculture generating yields without agro-chemicals. This indigenous model is more ecological bio-diverse, sustainable and socially viable. The ecological rationale of indigenous small scale agriculture is comprised of replicable model of community based agriculture which posses in puts for feeding the population living in the region for centuries. The productivity and sustainability of community based agriculture upheld by small farmers of Ethiopia for centuries need to be optimized with agro-ecological approaches. They form the ground for food sovergnity in terms of right of the region to promote their capacity for producing basic food crops in alliance with corresponding productive and socio-cultural diversity. This model opens platform for exploring farmers' access to water, land and seeds apart from safeguarding the local autonomy, local market dynamics and local consumption production dynamics. The small farmers of Ethiopia have hidden unexplored strength to promote national and regional food security.

Sustainable agriculture is possible by empowering small farmers through appropriate policy interventions. There is an urgent need to involve small farmers in improvement of sustainable agriculture by promoting their access to credit market and support for organic farming. The package of support service provided by Ethiopian Agricultural Transformation Agency will go a long way in supporting sustainable agriculture. The package of support service covering new regulations and incentives, education, training, value chain approach and marketing of agricultural products will create numerous opportunities for small farmers



to be actively involved in sustainable agriculture. Adequate institutional arrangements are provided to support small sustainable farmers and involve policies facilitating conservation of natural environments and supporting usufruct rights. Besides, the collective actions of members of farmers' cooperatives create a platform for promotion and protection of small farmers and sustainable agriculture. There is an urgent need to mainstream small farmers into centre of policy debate and promote participatory development practices in terms of microcredit programmes, participatory rural development and sustainable agricultural initiatives. The formation of farmer s' cooperatives have created a platform for small farmers to change their alliance with markets and empowered them to bring about structural changes required to support appropriate economically, socially and environmentally sustainable development. The government of Ethiopia has developed an innovative model for supporting small farmers and encouraged promotion of sustainable development through package of incentives. It is expected that these inputs and policy reforms will bring about radical changes for making enormous contribution to poverty alleviation and to ensure equitable and environmentally sustainable models of food security.

The traditional agro-eco systems have provided opportunity for prevalence of complex and diversified cropping system that facilitated crops to achieve acceptable productivity level in spite of environmental stress and climatic hazards. The indigenous small farmers have adopted coping mechanism to address climate change reducing crop loss through water harvesting, mixed cropping, white plant gathering, enhanced use of drought tolerant local varieties, mixed cropping and various other traditional agricultural techniques. The indigenous agricultural technologies adopted by small farmers demonstrate not only human understanding of relationship of human world with natural world but also their world view. It may be concluded that development of sustainable agriculture depends on significant structural changes, technological innovation and strengthening of farmers network. The interventions launched by government of Ethiopia would bring about radical transformation of agriculture and empowerment of the small farmers to boost food security and promote sustainable agriculture with corresponding changes in cultural, economic, social and political arenas that significantly influence the agricultural sector of the country.



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