Review on Economic Role of Agroforestry Practices in Ethiopia

Dagnaygebaw Goshme
College of Agricultural Sciences, department of Agricultural Economics, Bulehora University, Ethiopia
Email:-Ethiopiafuture@gmail.com

Abstract
Agroforestry is important for reducing poverty, improving food security and sustaining environmental quality. It is an alternative and probably cheaper option for agricultural intensification and sustainability in Ethiopia. The role of forests and forest products to household food security and to the national economy is indispensable. There are huge potentials for Agroforestry development in the Ethiopia, such as the existence of indigenous woody perennials (the basic component of Agroforestry practices), commodity crops (coffee and fruit), other types of crops, livestock components integrated together and modern knowledge of the Agroforestry which enable managing the modern Agroforestry practices. Indigenous Agroforestry practitioners provide the level and depth knowledge that has developed over centuries among the indigenous people. Local knowledge on Agroforestry management includes the practices and decisions made by local people. Agroforestry system classified in to agrosilvicultural systems, silvopastoral systems and agrosilvopastoral systems. Agroforestry is economically important in food security, improving rural incomes and nutrition, protecting biodiversity and environmental services, fuel wood for the household energy, building materials, high quality fodder for livestock and other 'non timber products such as nuts, fiber, medicines, resins and high value fruits for income, and others. Therefore Agroforestry practice is so important that need improvement in production and management to transform from traditional to modern production system and also need integration in production practices.
Keywords: *Agro forestry, Agrosilvicultural, Silvopastoral ,Agrosilvopastoral*

1. Introduction
Agriculture is a key sector for Ethiopia, providing employment to 72.7% of the population and contributing 35.8% to the country's gross domestic product (CIA, 2018). It also accounts 85% of the national export earnings (UNDP, 2016). Agroforestry is often defined as an economically viable land-use option on the environmental rehabilitation and sustainable agricultural development (Djalilov *et al*. 2016). In terms of land use arrangement, Agroforestry systems cannot be grouped under forestry, rather they are systems that deliver tree products and services (Rahman *et al*. 2016).

Agroforestry is the traditional practices of growing trees on form land for benefit of the farm families. It has been in use at least 1300 years according to pollen records (Broke Fields and Poach 1994). According to Nair (1987) Agroforestry was brought form the realm of indigenous knowledge in to the fore front of agricultural research less than two decades ago and was promoted widely as sustainability of forest and agriculture. Then there are continued trend toward the conservation of forested land marginal to agricultural lands. Result in massive environmental degradation and series threat to sustainable agriculture and forestry. The fundamental of Agroforestry are now being intensives investigated by many institutions throughout the world. The too key principles set Agroforestry systems; competitions and complexity the intern determines describe properties.

Present day advances in forest management have expanded its scope to accommodate methods and techniques involved in the management of trees for multiple uses rather than for timber alone in order to improve their economic, social and ecological role under dry-land conditions. Agroforestry is one of the recent developments in forest sciences concerned with an integrated interdisciplinary approach to sustainable land use and on-farm tree management for multiple purposes. Various indigenous Agroforestry systems comprise a multitude of little-known woody species that have come to be described as 'multipurpose trees' or 'multipurpose trees and shrubs'. For example, many fruit-producing trees are basic components of traditional home gardens in several developing countries (Nair, 2007).

According to Edinam *et.,al*, (2013) the promotion of Agroforestry technologies is important because it offers the prospect of increasing production and hence raising farmers' income. Sustainable development through Agroforestry can be achieved through a concerted effort to actively and continuously encourage farmers' involvement in Agroforestry activities. The objectives of this review paper are: - To review status of Agroforestry practices in Ethiopia; to review types of Agroforestry practices and their management strategies by local community in Ethiopia and to review economic role of Agroforestry practice in Ethiopia.

2. Status of Agroforestry Practices in Ethiopia
Agroforestry is an alternative and probably cheaper option for agricultural intensification and sustainability in

Ethiopia. The impact of Agroforestry on livelihoods improvement and environmental protection is being demonstrated in many regions in Ethiopia. Productivity is restored on degraded lands and food security has been effectively achieved with Agroforestry practices. High value trees such as Apple and tropical fruits and medicinal trees have shown potential to lift rural farming communities out of poverty in the Tigray and Amhara region. Fast-growing fuel wood, pole or timber trees that are grown in various niches within the farm or across the landscapes and in commercial woodlots and plantations in the Amhara region and the Guraghe highlands are used for generating income or meet household demands (Emiru, 2014).

Traditional Agroforestry practices Ethiopia are rich in indigenous tree/shrub species. Ethiopia in different Agroforestry practices across the various agro-ecological zones that stretch over only 37 km distances. Among these Differences in species composition, evenness and richness exist along the ecological gradients. For instance, *Eucalyptus* spp*., Cupressus lusitanica, Coffea arabica* and *Rhamnus prinoides* are the most widely planted species thus they are the most dominant and frequent species in the mid-altitude due to their lucrative market prices and better market demands (Melese and Abay, 2017).

3. Local Knowledge and Types of Agroforestry Practice in Ethiopia

The common management practices on woody species include fertilizer application, pruning, coppicing, prescribed burning, thinning, pollarding, protection from animal damage, mulch application, crop residue application, and watering (Madalcho and Tefera, 2016). According to Alemu (2016) Agroforestry has been practiced for centuries in different parts of the world by making use of indigenous technical knowledge. Since societies have lived for long period of time in a specific area, indigenous knowledge has been transferred from generation to generation by building on new inventions on what has been inherited across years. The practice has served communities to find indigenous medicinal plants; edible fruits, leaves, roots and steam; fuel; feed for livestock; shelter; construction materials; ameliorating micro climates; and many more.

Evidence shows that many of the indigenous communities and practitioners have continued on the traditional management ways and practices of natural resources. The wealth of knowledge from the indigenous Agroforestry practitioners provides the level and depth knowledge that has developed over centuries among the indigenous people. Agroforestry ecosystems harbor a variety of life forms functioning together which in turn provide the services that enable the wellbeing of humanity and other life forms. Agro forestry, the integration of trees in agricultural activities has the capacity to increase soil fertility, nutrient recycling, reduce evaporation, and reduce land degradation from erosion, carbon sequestration and improvement of water quality. These benefits will have an impact and environmental benefits contribution at the farm scale, local and regional levels. Agroforestry practices in general will help to maintain the wellbeing of societies at all levels (Jose, 2009).

Local knowledge on Agroforestry management includes the practices and decisions made by local people. It is based on experience based from one generation to the next never to the loose. It changes adapt and assimilates new idea to local is designed as full variety of insight observation and belief related to a particular decision that do not stem from conservation scientific expertise /some of the holders of the knowledge are long time community residents. Some are resource users with specialized knowledge such as fishers, farmers or hunters. According to Leakey (1996) Agroforestry is dynamics ecological base natural recourse management system that through the integration of trees of farms and in the agricultural landscape diversity for increased social, economic and environmental benefit for land users at all level. Agroforestry is useful because of environmental services both on a macro and micro scales of area. A macro scales it mitigate land degradation through the measure of the water erosion. Sheet and rill erosion (soil erosion) remaining marginalized land and by increasing irrigation and agriculture productivity can be achieved (Wuand Zhu, 1911).

Forest management and conservation seems to be more governed by local by-laws than regular judiciary system. The management system starts to recognize integrated approaches to ecosystem and landscape management, which include local institutions and groups as important partners, and they are getting more emphasis (Emiru, 2014).

The transmission of indigenous knowledge from parents to young people is still continuing but at a very slow rate in the study area. Only a minority among young people are well versed in the IK of agro forestry. The majority of young people are not equipped with a level of indigenous knowledge that is required for the sustainable use of agro forestry. Today, young people that attend school are no longer interested in becoming farmers. Most farming practices in Ethiopia are predominantly based on knowledge of the people who have the knowledge about maintaining biodiversity. Above all, the people are known for their intensive use of their land through intercropping. People avoid planting tree such as Bisana (*Croton Macrosachys*) on their farmland, as it is harmful to other plants. They know that fallen leaves from the tree affect the emerging and fruiting parts of the lower canopy of crops such as coffee and *enset*. Moreover, the farmers have recognized that edible fruit such as avocado and trees such as eucalyptus and Setamo (*Celtis sp.*) can hamper the growth of plants grown close to them, as their roots go deep and spread wide in search of water and nutrients (Abiyot etal, 2013).

Agroforestry systems can be classified on the type of components involved namely, agrosilvicultural systems

(woody plant species and seasonal plants)' silvopastoral systems (production of livestock and woody plant species), and agrosilvopastoral systems (production of livestock, woody plant species and seasonal plants) (Nair, 1989, 1993).

Agrosilvicultural Systems; This is an Agroforestry system where agronomic crops are combined with shrubs/trees on the same unit of land for higher or better-sustained production of annual crops, fodder, and wood. An Agroforestry system is identified by certain types of practices that, taken as a whole, form a dominant land-use system in a particular locality, characterized by environment, plant species and arrangement, management, and social and economic functions. Although an Agroforestry practice is a distinctive arrangement of components in space and time, when the combinations are arranged in time sequence, such practice is called taungya practice. The combinations can also be arranged in space, such as the hedgerow/mixed intercropping practice.

Silvopastoral Systems; This is an Agroforestry system where range crops and/or animals and trees are combined for better production of grasses and fodder. This combination can be arranged as a pure stand with fodder trees/shrubs planted as a protein bank (with cut-and-carry fodder production) and/or mixed in different configurations such as living fences of fodder trees and hedges. The trees and shrubs and grass components are arranged in such a way that their healthy coexistence is not disrupted. The acacia-dominant system in the arid parts of Ethiopia, Kenya, and Somalia are good examples of this system. The main objective of this practice is to supply feed for livestock during the dry season with high quality tree leaves and pods. This will substantially increase the productive capacity of poor and scarce pasture lands common on the Hararghe Highlands. Fuel wood and construction poles can also be produced with this system.

Agrosilvopastoral Systems; This is an Agroforestry practice by which food, pasture, and tree/shrub crops are combined on the same unit of land for the production of grass and browse feed, biomass for fuel wood and green manure, and food for human consumption. This system is practiced when the farmer needs all the benefits that would be obtained from silvipasture and agrisilviculture systems from a unit of land. Usually, such a system is practiced on cultivated land. Alternative rows of hedges, grass strips and/or crops would form such a system, a form of alley cropping. Agrosilvopasture is also practiced when the cropland is constrained by slope and threatened by erosion. These are very common problems of land use in most of the Ethiopian Highlands; therefore, this system has potential for use in various regions of the country.

4. Economic Role of Agroforestry Practice in Ethiopia

The importance of Agroforestry is not only for increased productivity by helping restore of productive capacity of degraded lands and thus food security, but also as a way of improving rural incomes and nutrition, protecting biodiversity and environmental services, and helping the rural poor to adapt to climate change and is now widely recognized in Ethiopia (Emiru, 2014). They provide fuel wood for the household energy, building materials such as poles, this could be another source of income at market, high quality fodder for livestock and other 'non timber products such as nuts, fiber, medicines, resins and high value fruits for income and nutrition security (Jama *et al*., 2006).

Even if the objective of farming among the smallholders is to meet the food requirements for the year and raise income to meet other essential needs, but sometimes this is may not be achieved (Gillian, 2010). In this case Agroforestry trees bearing fruits can be used as food supplements. Indigenous fruit trees have always been important to the rural poor.

In Ethiopia, species such as *Balanites aegyptiaca, Ziziphus* spp., and Gassera (local name) are multi-purpose trees which are valued and protected for their fruit in Afar pastoralists. Trees in Agroforestry also provide the user with quality fuel wood. For example *A. tortilis,* which is common in parkland Agroforestry practice, can provide good quality charcoal as it has high calorific value of its wood (4400 kcal/kg) among the various sources of feed, woody vegetation is generally the cheapest and the one on which the majority of the livestock rely. The protein from ligneous vegetation during the dry season constitutes an essential element in the animal diet. Species such as *Acacia tortilis, Acacia nilotica, Acacia seyal, F. albida, Acacia senegal* and *Balanites aegyptiaca* are important fodder species in different parts of the world (Badege *et al.,* 2013).

The service functions of Agroforestry values include shade (for human or livestock), reduction of wind speed, control of weeds and fencing. The major environmental functions of Agroforestry is actually or potentially includes control of soil degradation, control of desertification, reduction in protection of ground water, increasing biodiversity (farming and landscapes), reducing pressure or forest margins through on farm supply of wood, reduce release of greenhouse gasses (Young 1997).Complex Agroforestry have high potentials to reduce atmospheric concentrations of carbon dioxide and mitigation of the climate change (Refnowati, 2003).

There are also other productive functions of trees in Agroforestry system such as traditional medicines, construction and farm implements for households. There are researches reports that trees in parkland are source of different traditional medicines essential for rural health care (IFAD, 2005**;** Jama *et al*., 2006; Badege *et al.,* 2013).

On the other hand, Agroforestry practices offer many advantages such as diversification of agricultural revenues through the production of timber and non-timber forest products **(**Baets *et al*., 2007). Agroforestry trees

can also be integrated with crops either in intercropping mixtures or along boundaries of agricultural fields. The integrated trees can be fruit trees or other multipurpose trees. These fruit trees are extremely important to the diet, and sometimes even the economy (Nair, 1993). Even if most Agroforestry trees make the farmer to wait long to see economical benefit, they have shown higher benefit in terms of income than sole cropping. Trees planted on crop land can be additional source of income for the user. For example *Hardwickia binata* is a leguminous multi-purpose tree, on crop field, which yields extremely hard, very heavy and durable timber, high quality fuel-wood and rich fodder in terms of crude protein (Arun *et al*., 2004). Farmers in India manage *Acacia nilotica* on rice field fetch Rs. 1000 for one tree and Rs. 30 to 90 thousands of money from 1 hectare of land at the time of tree felling (Pandey and Sharma, 2005).

Agroforestry systems can also provide benefits through reducing the cost of purchased inputs, labour or period to use the land again. For example, nitrogen contribution through use of leguminous woody species in alley cropping systems with rice is less costly, despite higher labour requirements, than using chemical fertilizers (Montambault and Alavalapati, 2005).

Agroforestry systems also provide different materials for house consumption instead of buying from the market. The use of supplementary inorganic fertilizers has become less affordable for many farmers when needed (Hailemariam *et al*., 2010). As Agroforestry systems sustain soil fertility without any addition of chemical fertilizer, the farmers' cost for fertilizer is reduced or completely stopped. A major claim about the advantage of Agroforestry systems in this regard is their ability of legume trees to fix nitrogen in symbiotic association (Bellow, 2004). If we take improved fallow, it is used by farmers for improving soil fertility as an alternative to inorganic fertilizers by smallholder farmers (Badege *et al.,* 2013). And the new concept "Carbon credit", which refers to the payment to landowners for planting trees for capturing and storing CO_2 can be another source of income for the farmers and encourages them to establish multi-strata agroforests on degraded land (ICRAF, 2008).

There are different Agroforestry trees in different parts of Ethiopia adapted by farmers for their multiple uses. For example, *Tamarindus indicais* a widely adapted, multipurpose fruit tree in arid pastoral Agroforestry system of Afar region (Badege *et al.,* 2013). *Balanites aegyptiaca* tree in parkland Agroforestry system is also multipurpose tree widely used by Tigray farmers (Hailemariam *et al*., 2010).

Nair (1993) indicated that the combination of several types of products which are both subsistence and income generating, helps farmers to meet their basic needs and minimizes the risk of the production system's total failure. A great economic advantage of the Agroforestry is that villagers can harvest something daily for their own consumption, for sale in the market or for raw materials for their home consumption. Increased production and improved handling of vegetables have great potential to enhance the nutrition of the rural and urban poor in the developing countries, as well as to increase their incomes and provide greater opportunities for employment.

Several indigenous tree species incorporated in Agroforestry systems were found to be sources of fuel, feed (during dry season), poles, farming implements, shade, live fence and other local uses like in traditional medicine, human food and beekeeping. Hence, Agroforestry to be a sound practice, has to meet the farmers' short term needs (fuel, feed, poles etc.) and provide service functions (maintain soil fertility, erosion control etc.) in the long-term (Kindeya, 2004).

Ethiopian home gardens Agroforestry have two-fold functions: some products are mainly for home consumption, while others generate income generation. Consequently, they represent an important foundation for rural livelihoods, economic earnings, floristic richness and the application of local knowledge to the farming, processing and use of plants, animals and products. At the macro-level it is difficult to assign monetary value to Agroforestry products, because a large part of the common vegetables produced in Agroforestry are directly consumed without ever entering the market system; also, in many cases statistical figures do not differentiate between home gardens Agroforestry and dry fields. However, figures for the production of fruit and livestock may be used as a rough indication of the importance of the Agroforestry in the village economy, since they are almost exclusively produced in the home garden, and little is consumed by the people (Zemede, 2001).

According to Yohannes (2017) Agroforestery like moringa is multipurpose tree used to fill gaps associated to drought impacts; used for shade; and it has a very high nutritional advantage. Its leaves are served as the main diet as well as medicine for various diseases. It is seen as an important insurance against crop failure. Culturally the tree is taken as a dowry or measure of wealth as how many of these trees the bridge groom has in the garden or nearby farmland to feed his/her family.

According to mersha (2017) traditional agroforestry homegarden has a crucial role in achieving sustainable agricultural land management that combines production of food, wood and livestock for rural livelihoods while sustaining the natural environment. Agroforestry homegarden is perceived by both urban and rural areas as one of the most preferred land covers that deliver multiple ecosystem services. This farming practice has been a livelihood strategy of smallholder farmers to achieve balanced livelihood assets, multiple outcomes and food security.

5. Conclusion and Recommendations

Agroforestry is a land use system and practice in which forest trees, livestock, and arable land (for crops) are

integrated on the same unit of land and managed to give yield on a sustainable basis either simultaneously or sequentially. It is a practice that is economically sound and culturally compatible. There are several types of traditional systems exist in different parts of Ethiopia, and there are also new technologies started by several institutions at a national level across different land use systems. Agroforestry is economically important for improving food security, increase income diversification, source of row material for construction, animal feed, medication, etc. It is also important for ecological conservation and environmental protection, reduction of global warming. In short Agroforestry practice is very important for human beings as well as the whole world in general. To improve and encourage Agroforestry practice in Ethiopia the following recommendations are forwarded:-

- ✓ Develop appropriate country-wide policies that reduce different constraints of Agroforestry practices;
- ✓ Removing barriers to land access and tree tenure, establishing seed sources and nurseries to meet demand and skilled extension workers with the capacity to provide information for farmers on the benefits and techniques of agro forestry.
- ✓ Provide reliable information on the role of Agroforestry in improving the livelihood of rural people is important for improving economic performance.
- ✓ Creating market opportunities for Agroforestry producers
- ✓ Supporting Agroforestry practice with modern technologies, innovations and research output for improving the production and marketing system

6. References

Abiyot Legesse, Bogale Teferi & Axel Baudouin. 2013. Indigenous Agroforestry knowledge transmission and young people's participation in Agroforestry prac- tices: The case of Wonago Woreda, Gedeo Zone, Southern Ethiopia. *Acta Geographica-Trondheim*.

Alemu, M.2016. Indigenous Agroforestry Practices in Southern Ethiopia: The Case of Lante, Arba Minch. Open Access Library Journal, 3:e3278.http://dx.doi.org/10.4236/oalib.1103278.

Arun K. Shanker, Ram Newaj, P. Rai, K. R. Solanki, K. Kareemulla, R. Tiwari, & Ajit. 2004. Microclimate modifications, growth and yield of intercrops under *Hardwickia binata Roxb*. based Agroforestry system. *Archives of agronomy and soil science,* 51 (3): Pp. 281-290.

Badege Bishaw, Henry Neufeldt, Jeremias Mowo, Abdu Abdelkadir, Jonathan Muriuki,Gemedo Dalle, Tewodros Assefa, Kathleen Guillozet, Habtemariam Kassa, Ian K.Dawson, Eike Luedeling, and Cheikh Mbow. 2013. Farmers' strategies for adapting to and mitigating climate variability and change through Agroforestry in Ethiopia and Kenya. Forestry Communications Group, Oregon State University, Corvallis, Oregon. Pp. 11-85.

Baets N. De, Gariépy S. and Vézina A. 2007. Portrait of Agroforestry in Quebec. Executivesummary. Published by Quebec: Agricultural and agri foods Canada. Pp. 3-16.

Bellow John G. 2004. Fruit-tree-based Agroforestry in the western highlands of Guatemala: an evaluation of tree-crop interactions and socioeconomic characteristics. Ph.D. Dissertation. University of Florida. 217p.

Broke Field, H and Paoch C, 1994 Agro biodiversity and Environment 36/05 7:11.

CIA (Central Intelligence Agency).2018. World fact book on overview of Ethiopian economy. USA.

Djalilov BM, Khamzina A, Hornidge A-K, Lamers JPA.2016. Exploring constraints and incentives for the adoption of Agroforestry practices on degraded cropland in Uzbekistan. J Environ Plan Manag 59(1):142–162. doi:10.1080/09640568.2014.996283.

Edinam K. Glover, Hassan B. Ahmed, Mawutor K. Glover.2013.Analysis of Socio-Economic Conditions Influencing Adoption of Agroforestry Practices. International Journal of Agriculture and Forestry, 3(4): 178-184 DOI: 10.5923/j.ijaf.20130304.09

Emiru Birhane.2014. Agroforestry Governance in Ethiopia. Final Report.

Gillian Kabwe. 2010. Uptake of Agroforestry Technologies among Smallholder Farmers in Zambia. Ph. D. Dissertation. University of Lincoln, Christchurch, New Zealand. 234p.

Hailemariam Kassa, Kindeya Gebrehiwet and Charles Yamoah. 2010. *Balanites aegyptiaca*, a potential tree for parkland Agroforestry systems with sorghum in Northern Ethiopia. *Journal of Soil Science and Environmental Management,* 1(6): 107-114.ICRAF. 2008.

Jama Bashir, Eyasu Elias and Kebadire Mogotsi. 2006. Role of Agroforestry in improvingfood security and natural resource management in the drylands: a regional overview. *Journal of the drylands,* 1(2): 206-211.

Jose, S. 2009. Agroforestry for Ecosystem Services and Environmental Benefits: An Overview. Agroforestry Systems, 76, 1-10.

Kindeya Gebrehiwot.2004. The Dry lands Agroforestry Workshop September 2004. ICRAF Headquarters, Nairobi- Kenya.

Kumar, B. M. and Nair, P. K. R. 2004. Tropical homegardens: a timetested example of sustainable agro forestry. Advances in agro forestry, vol 3.

Madalcho A B, Tefera MT.2016. Management of Traditional Agroforestry Practices in Gununo Watershed in

Wolaita Zone, Ethiopia. Forest Res 5: 163. doi:10.4172/2168-9776.1000163.

Melese Worku and Abay Bantihun. 2017. Review on Woody Species and Socio- Economic Roles of Traditional Agroforestry Practices in Ethiopia. J Fundam Renewable Energy 7: 246. doi: 10.4172/2090-4541.1000246.

Mersha Gebrehiwot .2017. Agroforestry homegardens in Ethiopia: rural livelihoods in transition. Doctoral thesis Swedish University of Agricultural Sciences Skinnskatteberg.

Montambault, J. R. and Alavalapati,J.R.R. 2005. Socioeconomic research in Agroforestry : a decade in review. *Agroforestry System* 65:151–161.

Nair P.K.R, 1987Agroforestry System in tropics Kluwer, London.

Nair P.K.R, 1993 State of the Agroforestry Research and Education, Agroforestry System, Nairobi, Kenya.

Nair, P.K.R. 2007. The coming of age of Agroforestry . *J. Sci Food Agric* 87: 1613-1619.

Pandey C. B. and Sharma D. K. 2005. Ecology of *Acacia nilotica* based traditionalAgroforestry system in central India. Bulletin of the National Institute of Ecology, 15: 109-116.

Rahman SA, Sunderland T, Roshetko JM, Basuki I, Healey JR .2016. Tree culture of smallholder farmers practicing Agroforestry in Gunung Salak Valley, West Java, Indonesia. Small Scale For 15(4):433–442. doi:10.1007/ s11842-016-9331-4.

RethowetiP.K, 2003 Agricultural Systems Source sink sv green house gates Agroforestry system.

UNDP (United Nations Development Programme). 2016. Strengthening national capacities to enhance agricultural production and productivity. Agricultural Growth and Transformation, Addis Abeba, Ethiopia.

World Bank, 2001 Root Agricultural Symposium on Women in Agricultural Resource Management, Washington, D.C, USA.

Yan UI and Yi YH.1991. History of china's Agricultural Development to Jian jin science and technology press Tiarin China.

Yohannes Shonde. 2017. Livelihood Contributions of Moringa Tree based Agroforestry Practices in Konso District, Southern Ethiopia. *Journal of Resources Development and Management www.iiste.org ISSN 2422-8397* , Vol.36.

Young A, 1997. Agroforestry soil conservation; EAB international washing ford, UK.

Zemede Asfaw . 2001. The Homegarden of Ethiopia: a unique bio- Cultural Heritage. Ashley, C. and Carney, D. (1999), Sustainable livelihood: Lessons from early experience DFID, London, UK.