ORGANIC COFFEE PRODUCTION AND SUSTAINABLE AGRICULTURE

(A SOCIO- ECOLOGICAL ANALYSIS)

A CASE STUDY IN LIMMUU KOSSAA DISTRICT

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Acronyms

ARDO	Agricultural and Rural Development Office
CPB	Cooperative Promotion Bureau
EEC	European Economic Commission
EEPA	Ethiopian Export Promotion Agency
EU	European Union
FAO	Food and Agricultural Organization
IFOAM	International Federation for Organic Agriculture Movement
ITO	International Trade Organization
LKARDO	Limmuu Koossaa Agricultural and Rural Development Office
NECOFA	Network for Ecofarming in Africa
SNNRP	Southern Nations, Nationalities and Peoples
OBAD	Oromiyaa Bureau of Agricultural Development
OCFCU	Oromiyaa Coffee Farmers Cooperative Union
UNEP	United Nations Environment Program
WHO	World Health Organization

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ABSTRACT

Coffee used to be the main agricultural commodity of the country for long period. The last thirty years have experienced repeated fall in price at the global market. This has affected the country's foreign exchange earnings in general and smallholder producers in particular. About 25% of the populations who directly or indirectly depend on coffee industry need to search for another alternative means of being competitive. As a value-added crop, organic coffee is capturing higher premium price on global and fair-trade markets. This case study is conducted at Limmuu Koossaa District, Jimmaa Zone of Oomiyaa National Regional Government with the objective of assessing the socio-ecological impact of organic coffee production on the sustainability of agricultural development in the area. Three coffee producing sites were selected. Each site is sampled with characteristic attributes relevant o organic coffee production, cooperative membership, non-organic coffee production and non-cooperative membership.

The study employed a socio-ecological analysis of organic coffee production in contrast to non-organic way of coffee production. Socio-ecological analysis comprises ecological, economical, social and institutional components to be investigated. The impacts of these components on environmental sustainability, optimal production and equity are measured.

The study disclosed that organic coffee production is ecologically sound and economically rewarding when compared to non-organic way of coffee production. Social and institutional performances of the system of production are found to be as poor as in non-organic system of production. The results show that organic coffee production, as implemented in Baabboo, did not attain social justice and equity. It ha snot yet attained a 'break-away' from similar constrains of non-organic system of production.

The study concludes that sustainability of organic coffee production at Baabboo is confronted with potential dangers. It, thus, provides signals of policy implications of the challenges and possible solutions.

I. INTRODUCTION

1.1. BACKGROUND

The original birthplace of coffee is known to be in Oromiyaa Region, in the previously Kaffa province (currently Jimma Zone) of Coocce Guddaa locality. The discovery dates back to around 1000 AD according to legends (Oxfam International, 2002). Coffee has become the country's commodity for over 500 years (EEPA, 2002). Coffee in dollar terms is the second most traded product in the world after petroleum. Coffee produces income for millions of small farmers and their families, who are often totally dependent on the crop for their livelihood.
As a nucleus of the Ethiopian economy, it accounts for approximately 60% of the countries export merchandise. It is estimated that there are 1.2 million coffee farmers and approximately 15 million households depend on coffee either directly or indirectly (Oxfam International, 2002). It is estimated that about 25% of the country's population is engaged in coffee industry, 95% of whom are small scale farmers working on more than 380000 hectares of land. Nearly half of the country's annual production is domestically consumed. In the harvest year of 2001, of the total production of 231310 metric tones, 108244 were locally consumed (EEPA, 2002).

The Oromiyaa Regional Government possesses the largest part of coffee plantation of the country, amounting to about 328870 hectares. In addition to this, potential coffee cultivable land is estimated to be about 187230 hectares. The Regional Government's official report records that annual average production of Oromiyaa is about 120000-150000 tones. Of the fourteen zonal administrations, coffee grows in thirteen zones and eighty-eight districts of the region (OBAD, 2001).

In addition to the poor yield, the often-fluctuating coffee price at the world market has negatively affected small-scale producers of Oromiyaa. World coffee prices have fallen by almost 50% in the past three years to a 30-year low. The main cause to this uninterrupted fall in the price of coffee since 1977, is accounted to be an oversupply on the international market. The direct and immediate victims of the phenomena are the producers, the majority of whom are small farmers. The producers' share of the export price in the Jimmaa Zone, for instance, is 27% while that of other parts of the country is 54% for other parts of the country for the year 2001 (Oxfam International, 2002).

Oromiyaa region, being the largest coffee producing area of the country, also played the initiative lead to open its door for modern organic agriculture. It also played a pioneering role for Ethiopia to access the global market and faire trade links for the first time under the auspice of Oromiyaa Cooperative Promotion Bureau and the Oromiyaa Coffee Farmers Cooperative Union Ltd. In august 2001, the General Assembly of the Union announced its resolution of shifting its system of coffee production to organic. The decision was a landmark decision, which transformed the Union into the community of the organic world and enabled the country to delve into a new system of agricultural production system.

Oromiyaa is providing organic coffee to world organic market and faire trade since 2001. According to the Oromiyaa Bureau of Agricultural Development, organic coffee is produced in five districts of East Hararge, three distrcts of Borena, and one district in each East and West Wollega, two districts of Illuu Abbaa Boraa, accounting to sixteen districts in the Region. The average annual production of organic coffee by the Union members from a totally cultivated area of 50692 hectares is 30415 tones. In Oromiyaa, organically cultivated area is 15.4% of the total coffee plantation of the region. Thirty-five cooperatives with a total membership of 23691 households are engaged in this undertaking (OBAD, 2001).

1.2. STATEMENT OF THE PROBLEM

Organic agriculture/farming in general and organic coffee production in particular is a new agricultural production systems in Oromiyaa. The sustainability of this system of production is under debate among the public. At the time the General Assembly of the Coffee Farmers' Cooperative Union resolved to pursue organic coffee production, neither Ethiopia at a Federal nor Oromiyaa at a regional level did formulate a policy regarding organic farming. Still now, no policy pertinent to organics does exist. The communiqué conducted between Oromiyaa Cooperative Promotion Bureau and NECOFA-Ethiopia discloses the union to be the first of its kind in Ethiopia, and even in Africa to engage cooperative farmers of large number into organic production (CPB, 2001).

This study attempts to identify the socio-ecological performances of organic coffee production as practiced in Limmuu Koossaa, Jimmaa Zone, Oromiyaa Regional Government, by analyzing its contributions to environmental sustainability, the state of its optimizing productivity and its implication on equity. The level of participation of its primary producers in line with the

opportunity of decision-making will be scrutinized in the work. The paper will examine the ultimate outcome of the scheme in the drive to achieve sustainable agricultural development.

1.3. OBJECTIVES

1.3.1. General

To explore the sustainability of organic coffee production scheme, as implemented by Oromiyaa Coffee Producers Cooperative Union Ltd through socio-ecological analysis.

1.3.2. Specific

- To identify the basic technical, agronomical and internal quality management practices employed by organic coffee production system,
- To explore problems and constrains relevant with organic coffee production and marketing,
- To assess and analyze the attitude of conventional and organic coffee producers towards the systems of production in which each are involved,
- To assess the level of premium prices and payments of organic coffee in comparison to conventional coffee producers,
- To highlight policy implications regarding organic agricultural production and marketing.

1.4. SIGNIFICANCE OF THE STUDY

Regional and Local Development Studies is a branch of development studies with specific focus to regional and local level development paradigms, strategies and practical experiences. This area of study is meant to address management issues and relationships between the rapidly growing cities and their rural environments. The survival strategy of millions of Ethiopians largely depends on the rural area. The objective conditions of Ethiopia, thus, dictate rural areas to be the springboard for the country's development strategy. This makes agricultural sector to win prior attention in development studies. The proposed research is meant to explore the impact of a new system of agricultural production and contribute to the meager information about organics.

The main agricultural cash crop of Ethiopia is known to be coffee. Due to the fall of price of coffee, the country has suffered a lot in its export sector and the small producers are much impacted. Giants like Brazil and Vietnam now dominate conventional coffee production. A

fierce competition is raging in the area. Searching any other possible option is a relevant issue for Ethiopian coffee. Organic coffee production is taken as an option. This paper will attempt to assess the viability, performance and achievement of the alternative chosen by Oromiyaa, there by availing fresh information for future research in the area.

One of the reasons to shift to organic coffee is often told to be that it is more rewarding than conventional coffee, and it is also advocated to be ecologically sound. The contribution of organic coffee production to sustain agriculture is frequently reported. Notwithstanding this positive advocacy of organics, other groups of experts, not only question its sustaining role, but openly reject its necessity. Both groups forward their argument. A point of serious consideration with relevance to Ethiopia is the often-heralded argument that organic production is low yielding. With millions of people under chronic food insecurity and breaking poverty, goes the argument; agriculture should target high yield achievement. The current shift to organics is not thus plausibly accepted. This paper attempts to address this issue with the help of descriptive analysis of socio-ecological analysis.

Last but not least, the concept organic agriculture is differently understood in different sectors of the public, probably including a significant number of intelligentsia. Very often, people claim that Ethiopian coffee is organic by default. Conceptual confusion prevails in this regard. By availing the origin, the growth and principle of organic agriculture, the paper will attempt to make clear features that distinguish organic agriculture from conventional agriculture.

1. 5. THE STUDY AREA

The study was conducted in Limmuu Koossaa District in Jimmaa Zone of Oromiyaa Regional Government. The regional Bureau for Agricultural and Rural Development has identified a total of 88 didtricts as coffee producing areas. The study area is categorized as one of the 23 high coffee producing districts of the Region and one of the four high producing districts of Jimmaa Zone.

Location

Limmuu Koossaa District is located in the Western part of the Region at a distance of 415km from Finfinnee and 75kms away from Jimmaa. It is found at an altitudinal range of 1200 masl – 3100 masl. It borders South West Shawaa Zone, SNNRP on the North East, Limmuu Saqqaa District on the west, Xiroo Afata and Sekorruu Districtss in the West, and Gommaa and

Maannaa Districts and Illuu-Abbaa Booraa Zone on the South and South-West and Wollagaa Zone on the North West.

Population

The total population of the District is reported to be 240,735 of which 224,303 (93.17%) are rural residents while 16,432(6.83%) are urban dwellers. Of the total population, 50.33% are male while 46.67% are female. In like manner, 50.29% are male and 49.71% are female living in the rural areas. (LKARDO, 98). Compared with the total population of the district, 182160, and that of the rural population 171019 reported by CSA in 1994 (Tegenge, 2001), a substantial increase of 58575 and 53284 people are recorded in the last twelve years, in the urban and rural areas respectively. The trend of population growth in the district in the last 5 years is shown on Table1.

Table 1: Total Population

Year	Male			Female			Total	Growth Rate (%)
	Urban	Rural	Total	Urban	Rural	Total		
2001/02	9934	102843	112777	9770	104047	113817	226594	-
2002/03	10137	104941	115078	9969	106171	116140	231218	2.04
2003/04	10344	107083	117427	10171	108338	118509	235936	2.04
2004/05	8159	109268	117427	10171	110338	118509	235936	2.04
2005/06	5063	114498	119561	8366	112805	121171	240735	2.27

Source: LKARDO (2005/06)

Similarly, the total number of households in the district shows an incremental trend. Data reported by the Agricultural and Rural Development Office at the study area is presented on Table 2.

Table 2. Total Household

Year	Male	Female	Total	Rate (0%)
2001/2002	36285	1602	37887	-
2002/03	37026	1634	38660	2.04
2003/04	37781	1668	39449	2.04
2004/05	38552	1702	40254	2.04
2005/06	40314	1740	42054	4.47

Source: LKARDO (2005/06)

Agro-ecology

The total area of the district is estimated to be 3011sq.km. According to the traditional zonation, the district is divided into Baddaa (Dega), which occupies 10% of the total area, Badda-daree (Weyina dega) 65% and Gammojjii (Bereha) 25% of the total area. The average annual rainfall of the district is 1954.23mm and average maximum temperature is 27.34^0c (LKARDO, 2005/06).

Land use

Various land use practices exist in the district. Forestland in the district accounts for 35.38% of which 34% is natural forest. 20% of the area in the district is grazing land. Land cultivated under annual crops covers12%, while that under perennial crops accounts for 10%. The district is also engaged in livestock rearing with a total of 158535 heads of cattle, in addition to other domestic animals. Areas of Coffee plantation owned by smallholders round up to 25854 hectares (LKARDO, 2005/06). This figure does not include state owned mechanized agricultural land under Sunxuu Coffee Plantation, Gumer Coffee Plantation, Koossaa Coffee Plantation and Calalaqii State Farm, and also large coffee plantations and sesame farming operated by private investors.

As shown in the population data, 93.17% of the population resides in rural areas where agriculture is the main source of livelihood. According to 1998 report of the district's Agriculture and Rural Development Office (LKRADO, 2005/06), about 42054 households depend on agriculture as their main occupation. The main crop of the district is coffee. As it is

common in all other cash crop areas, a significant number of farmers also involve in coffee trading, playing a role of "sebsabie" (collectors), i.e. buying coffee from rural producers and supplying to the "terekabi" stationed at the outskirts of towns is the area. The "terekabi" in turn submit the crop the "chanye" (supplier) who sells the crop to exporters in Addis.

In addition to coffee as an export cash crop, the area is engaged in producing sesame at large. The indigenous community is not yet involved in sesame production in the area. The production of this crop is monopolised by both self and government sponsored settlers and by private large scale commercial farmers. Settlers producing sesame are economically dominating the area currently. They are the sole farmers who own tractors and very often one or more 'ISUZU' cars, both transporting people and freight in the area with expensive payments, especially during coffee season. The fact that relatives of these settlers are flooding to the area and occupying land has created discontent among locals and recently a large number of households from Amhara Region were driven back home signals a precarious condition in the area.

The urban population of the district is known to be 15157, 15467, 15782, 16104 and 16432 respectively for the consecutive years 2001/02-2005/06. There were four towns in the district, Genet, Baabboo, Ambuyyee, Jimaatee and Beggee. The latter one is made the administrative centre of the newly established Cooraa-Botor Administrative district at the time of this study. The residents of those towns are mainly engaged in trades of different levels. Except the capital Limmuu Genet, other town dwellers are depending both on agriculture and trading. It is only on two market days that these small village towns seem lively, that too, during the coffee seasons of three to four months. Shops, tailors houses, bars and 'tej betes' are those business sectors, which attract the majority of clients. The most dominant trading activity is undertaken in coffee sector, where almost all farmers come to the market place and sell their produce to one of the more than hundred 'sebsabies'.

Infrastructure

The district is endowed with poor infrastructures. In all these towns, except Limmuu Genet, where light service is diesel based generator supplying power for five hours, only from 7-11 in the evening, none has electric light. It is similar with water services. The 60km long distance road to Limmuu Genet, branching from the main highway leading from Jimmaa to Aggaaroo, was very poor up to this year. Recently construction of the road is underway.

Education service

The educational coverage of the district is 75.75%. According to information from educational office of the district fifty nine schools of different levels are functioning in the district, four of which are giving education service to 9th and10th grade students while a single 11th and 12th grade high school is found in the district. The total student population of the district is 29367 of which 52.9% are male and 47.1% female students in the current academic year. Similarly, the number of dropouts of male students is 858, that of females 878 making a total of 1536. A total of 392 teachers, 33.7% female and 66.3% male, of different educational level work in the district. Data showing student population and number of dropouts in the academic year 2005/06 is presented on Table 3 and data on Rural-Urban School Distribution is given on Table 4.

Table 3: Student Population

Level of School	**Student Population**		**Total**	**Drop Outs**		**Total**
	Male	**Female**		Male	Female	
High School (9-10)	1263	742	2005	85	30	
High School (11-! 2)	57	12	65	1	-	116
Primary (5-8)	4662	4044	8706	314	209	523
First Cycle (1- 4)	9269	8765	18034	458	639	1097
Kindergarten	273	280	553			
Total	15524	13843	29367	858	879	1736

Source: Limmuu Koossaa Educational Office (2005/06).

Table 4: School distribution

School level	Urban		Rural		Total
	No. of schools	%	No. of schools	%	
High school (9-10)	2	50	2	50	4
High school (11-12)	1	100	0	-	1
Primary (5-8)	3	15.8	16	84.2	19
1st cycle (1-4)	1	9	16	94.1	17
Kindergarten	5	55.6	13	44.4	18
Total	12	-	47		59

Source: Limmuu Koossaa Educational Office (2005/06).

Health service

The ratios of health centres, health posts and clinics to the number of beneficiaries in the district are 25,000, 110,000 and 15,000 respectively. A single rural hospital, which serves the population of the district, is posted in Limmuu Genet town. The health service coverage of the district, including state farm clinics, amounts to 59%. The data is presented on Table 5.

Table 5: Number of health institutions and Ratio to population

Type of institution	Number	Ratio
Rural hospital	1	1:255712
Health centre	2	1:110,000
Clinics		
Government	7	1:25,000
State farm	4	
Health posts	8	1:10,000
Total	**22**	

Source: Limmuu Koossaa Educational Office (2005/06).

Total health professionals serving in the district amounts to 66, with only two MDs in Limmuu Genet Hospital. The ratio of health professionals to beneficiaries is shown on Table 6.

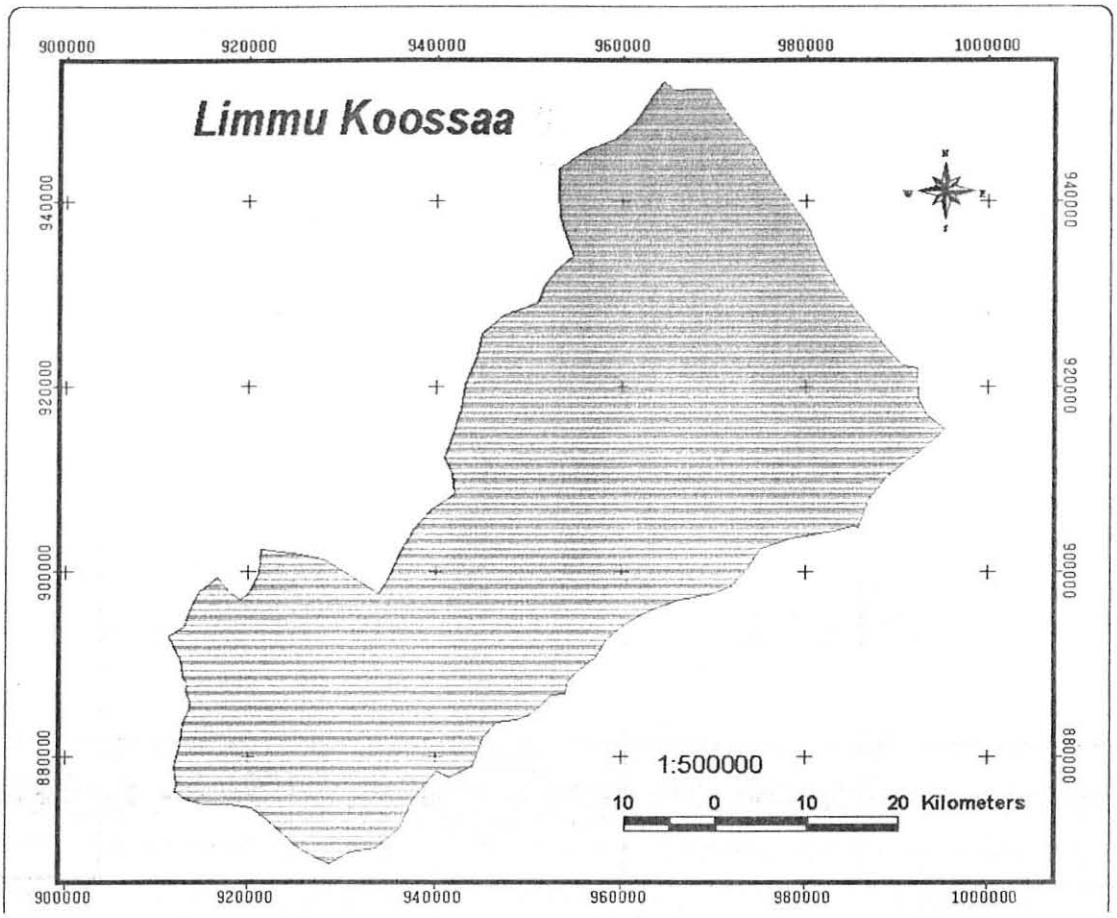
Table 6: Number of health professionals, and professional/beneficiary ratio

Professionals	Number	Ratio
Medical doctors	2	1: 120368
All types of nurses	24	1: 10031
Health assistants	15	1:16049
Health extension Package workers	12	1:20062
Druggists	1	1:240726
Sanitarians	2	1: 120368
Laboratory technicians	5	1:48015
X-ray Technicians	1	1:240726
Total	66	

Source: Limmuu Koossaa Health Office (2005/06).

Limmuu Koossaa is malaria prone area. Information from the District Health Office elucidates that malaria, intestinal parasites, respiratory tract infection, rhumatisizm and skin infection are the five top ranking diseases in the district.

Figure 1Limu Kossaa Wereda



Source: Oromiyaa Agricultural Development Bureau (2003/04)

1.6 METHODOLOGY

1.6.1 Data Sources

The study utilized both primary and secondary data. The sources for the primary data are sample elements exposed to questionnaires and producer's cooperative offices of all sample sites. Secondary data are collected from various institutions like Oromiyaa Coffee Farmers' Cooperative Union office, Oromiyaa Agricultural and Rural Development office, Limmuu Koossaa district offices for Health, Education, and Agricultural and Rural Development. Documents and research out puts from Oxfam International, Ethiopian Export Promotion Agency, Ethiopian Coffee and Tea Authority are also utilized. Information from the office of Organic certification agent in Addis Ababa is utilized.

1.6.2. Data Collection

Primary data collected from respondents focused on personal information, the system of production, yield, agronomic practices, income and savings, the state of biodiversity, level of participation and the perception of respondents towards the particular system of agricultural production they practice. Secondary data utilized in the study deal with cost frequency and procedures of certification, price of coffee, the procedure of export and amount of dividends.

The survey was conducted at three different villages: Baabboo, Ambuyyee and Walakkee Sonboo in the same district. Each of the other two villages is bordering Ambuyyee. Each village has its own characteristic attributes distinguishing it from the other two. For instance, both Baabboo and Ambuyyee are organized under producer's cooperatives. Ambuyyee is a non – organic coffee producing village while Baabboo is an organic coffee producing village. Like Ambuyyee, Walakkee Sonboo is a non-organic producing village, but unlike both Baabboo and Ambuyyee it is not organized under producers' cooperative.

The focus of the study being assessment of impact of organic coffee production, sampling of non-organic coffee producers is meant for comparison. The unit of analysis in the process of data collection is coffee producing households and producers cooperatives'.

1.6.3 Sampling: Frame, Size and Technique

The sampling technique employed is a two-stage sample design. The first stage is used to select sample sites as organic producing cooperative members, non-organic producing non- cooperative members. In the second stage systematic sampling technique is employed to select sample elements from within the sample sites. In this stage sampling frame from the producers'

cooperative offices of Baabboo and Ambuyyee were used. For the selection of sample elements from Walakkee Sonboo, since producers are not yet organized under a cooperative but on the initial process, list of potential members registered at the organizing committee is taken as a sampling frame.

From the sampling frame of 850 members at Baabboo 31 elements (3.6 %) were selected. Accordingly every 31st member was selected from the list. The sample elements were spotted in three PA's of Harangamaa (11), Aacaa (10) and Keellaa Gabbisaa (10). From Ambuyyee, the second sample site 3.3% which amounts to 23 sample elements from the total active members of 700 were selected. Every 23rd members was taken randomly as a sample element. Accordingly these selected sample elements were spotted in Warjii, Yaatuu Tirjii and Dangajaa Soolee peasant associations during the administration of the questionnaires. Using the list of potential members who have registered to join the cooperative in the process of forming at Walakkee Sonboo 4% of the total members, amounting to 15 was selected by randomly picking every 15th element from the sampling frame. Thus a total of 69 sample elements were selected from a population of 1900, which is about 3.6% of the total population. Table 7 shows the distribution of the sample and its size.

Table 7: Sample Size

Cooperative	PAs Sampled	Population (N)	Sample (N)	%
	Walakkee Sonboo	350	15	4
Ambuyyee	Warjii, Yaatuu Tirjii Dangajaa Soolee	700	23	3.3
Baabboo	Harangamaa, Aacaa Keellaa, Gabbisaa	850	31	3.6

Source: Field survey

1.6.4 Methods of Analysis

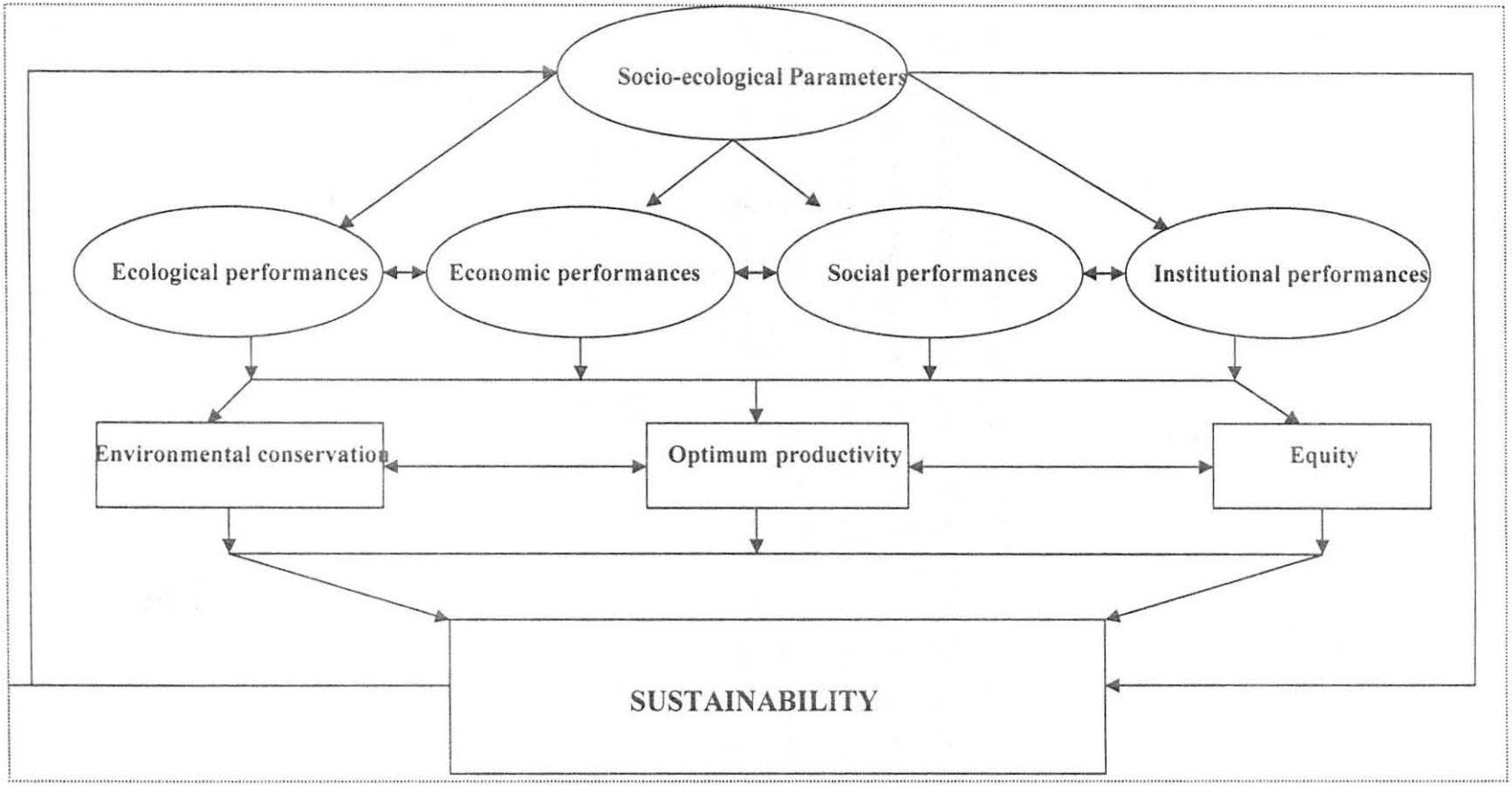
The socio-ecological analysis is based on the framework of ecological, economical, social and institutional performances of the agricultural practices of the sample sites. The indicators for these performances were identified as the state of resources and the management opportunities of these resources in each sample site. A series of variables are identified for investigation under each indicator, whose impacts on environmental sustainability, productivity or equity are evaluated in each site. Fig. 2 shows the framework for the socio-ecological analysis.

The study employed both qualitative and quantitative methods. To this effect, the raw data were first organized by editing information gathered for its accuracy and complements. Then the raw data were classified in to different categories depending on the nature of the variables under investigation. Accordingly, data of qualitative and quantitative nature were identified for respective analysis. Finally responses were evaluated manually.

The qualitative analysis included the evaluation of responses on the conception and attitudes respondents hold towards the merit / demerit of different coffee production systems (in this case organic Vs conventional), their opinion towards biological plant protection Vs use of pesticides, their preference between biological and chemical fertilizers, the level at which they evaluate the current leadership of the cooperatives in comparison with those of the Dergue time, the level of their participation in decision making. Nominal scale of measurement with an appropriate statistical description technique of central tendency i.e. frequency distribution is employed.

Quantitative analysis included the measurement of responses on variables under investigation such as yield (kg/ha), price (birr / kg), number of additional crops grown other than coffee, cost of inspection and certification, conversion period, premium payment ('Secondary Payment'), total production, production during slack /peak years, net profit and supply to market. The scales used to measure these variables are ordinal, interval and ratio scales. The analysis employed descriptive statistical techniques of the measures of central tendency and the measures of variation. Inferential statistical techniques are also employed where relevant. To this effect for instance, yield was obtained by computing the arithmetic mean of slack and peak years; mean deviation was computed to identify the variation of scores from the mean; the coefficient of mean deviation is computed to compare variation of different samples from the mean.

Figure 2: Framework for Socio-Ecological Analysis



Adopted from Scialabba (2000: 20)

1.7. Organization of the Paper

The first chapter of the study presents the introductory part, where it deals with the background, problem statement, and significance of the study, the objectives and the methodology. The second chapter of the paper presents with relevant literature on the issue under consideration. Findings from field survey and results of the data are discussed in chapter three. Chapter four presents the summary of the discussions and highlights possible policy implications of the issue under study.

II. LITERATURE REVIEW

2.1 The Trend of Global Agriculture

The Need for a shift in Agricultural Paradigm

World population is climbing by 90 million people annually, which demands from the world farmers to increase food production by 50% to feed some 2 billion more people by 2020. As many as 840 million people, more than the combined populations of Europe, the USA, Canada and Japan do not have enough to eat. Each day, 19, 000 infants and children die of malnutrition. Among other problems, these make the current situations more complex and serious than they were a century ago, whence the world faced a global food shortage and the green revolution championed in meeting the food demand by increasing agricultural productivity and yield. The challenge of new millennium will not be met by producing more food to curb the catastrophe. Instead, overcoming poverty, food insecurity, environmental degradation and genetic erosion are problems facing the world community (Shah and Strong 1998: 16-17). All these factors pertinent to agriculture show that agricultural system is a complex system.

There is no doubt that agriculture on a global scale has been successful in meeting the growing world food demand during the latter half of the twentieth century through dramatic boost of production. This high productivity exceeding population growth has resulted to diminish the chronic hunger that loomed over the world population at the time. The merit to this achievement could be accounted to scientific advances and technological innovations, which resulted to the development of new plant varieties, the use of fertilizers and pesticides and the utilization of irrigation (Gliessman, 1997:3). Agriculture has well served its purpose at the time.

The reality that agricultural sector is the sole feeding sector of humanity is a point of compromise by no one. Every body is giving primary attention to increase agricultural production to meet the food demand of the world population. It is also unambiguous that agricultural systems are multi-dimensional and complex systems made up of many different components that operate parallel to one another on different space-time scale. These components include soil micro-organisms, populations of specific plant species and crops, individual farmers, farmer households, rural communities, local economies, local agro-ecosystems, regional economies, stabilizing biospheric processes, biogeochemical cycles (of water and nutrient), and

the overall socio-economic processes operating at the macroeconomic level controlling the boundary conditions of farming systems (Giampietro and Pastere in Gliessman, 2000:179)

But a number of researchers doubt and even do not have convictions that modern agriculture always remains to be the panacea for problems linked with food. For instance, Reijnjtes, Haverkort and Waters-Bayer (1992:4) comment that there is an upper limit to the productivity of ecosystems and if this is exceeded, the ecosystem will degrade and may possibly collapse resulting to sustain fewer people than before. This implies that, where production cannot increase indefinitely, in the face of the growing world population, the system of agriculture now under practice may not solve world food problems. Shah and Strong confirmed with their research results that limits on productivity even on lands where Green Revolution was most successful were prevalent. Accordingly, they exposed that the current decrease in agricultural productivity to be 1.3% (1998:21-22):

> *That drop could signal that irrigation and fertilization have reached their effective limits, or even that the ability of plant breeders to develop higher yielding varieties has reached a plateau, at least for cereal crops.*

Bourguignon and Gabucci report that the steadfast confidence in intensive agriculture as a unique solution to feed humanity is on the verge of losing its fine edge. In their analysis, they traced the phenomenon of increased productivity from 1950 – 1984 to be 3% annually while that of 1984 – 1994 to be 1% per year (IFOAM, 1996: 139).

Elucidating the condition, it is often expressed by different authorities in the field that modern agriculture is entangled with a complex of problems to show progress as it did in the previous decades. Most authors attach the problems to originate from various factors, mainly linked with its performance. Gliessman (1997:23) expresses his concern about agriculture to be in crisis, because there are abundant signs that the foundations of its productivity are on danger, and it is undercutting the very foundation upon which it has been built. According to him, modern agriculture has overdrawn and degraded the natural resources such as soil, water resources and the natural genetic diversity on which it depends. Neugebauer (1995: i-ii) expresses his view that the sustainability of agriculture is threatened because of the losses of varieties of species, reduction in forest and water resources, soil erosion, salinization, acidification, desertification deforestation and environmental pollution, which resulted to reduced harvest, low farm incomes

and a decrease in farmland, leading to enormous economic and social problems of the rural population. This is a theme of problems extending to different dimensions with intricate link of concomitant problems cited against the ills of modern agriculture. Researchers name this theme as biophysical components of agriculture.

Yet, an equally important theme of problems pertinent to modern agriculture is also addressed in literature. Sahle and Gast (1999:9) comment that, in the past it was only the biophysical dimension, which received attention with regard to agriculture. Thus they inject the human component to agriculture by arguing that excluding the human dimension from agricultural attention caused its problems. Neugebauer (1995: i-ii) shares a similar view with them. Explaining that men and women have established different relationships with nature, one that attained the most significant impact, he cites this relationship to be "agri-culture", an activity that led to the development of man's identity to culture. He concludes that there is no agriculture in the absence of those who care for it. He sorts the main constraints of modern agriculture to lie on the exclusion of the human component from view.

Critics on conventional agriculture comprise another theme of factors, which resulted to its current situation of retarding to achieve its goal. The failure of agriculture to pay due attention to available local resources, both natural and human endowments is considered to be one of its main constraints. In the drive to boost production, the agricultural practices of the few past decades mainly focused on short-term productivity that required external inputs and on establishing uniform systems (monocultures) according to Scialabba (2000:3). The dependence of modern agriculture mainly on external inputs has become a point of serious concern among professionals. The concomitant negative impacts are often mentioned.

Redclift (1995:22-23), reviewing the energy efficiency of agricultural developments, gives a deep analysis of various factors. He points that the development of agricultural chemistry in the 1840s moved the world to the possibility of altering the balance between the source of energy entering agriculture and those emerging from agricultural production, by substituting chemical compounds produced in the laboratory for those that exist in nature. The principle however has served its purpose at the time, particularly in European agricultural development and in some developing economies. The problem lies when this new agricultural phenomenon known as the "Green Revolution" was imposed as a model to be erected for "agricultural modernization" for

the development of poorer countries. The following table as adopted form Redclift (1995:27) sheds light on the energy efficiency of conventional agriculture compared to other systems.

Table 8: Energy Input, Production and Efficiency of Agricultural Systems (Kcal/ha/annum)

Agricultural System	Total energy input (A)	Energy production (B)	Energy Efficiency (B/A)
Pastoralism (Africa)	5150	49,500	9.6
Crop rotation and fallow (Mexico)	675,700	6,843,000	10.1
Estate crop production (Mexico)	979,400	3331,230	3.4
Estate crop production (India)	2,837,760	2,709,300	0.9
Maize (USA)	1,173,204	3,306,744	2.8
Wheat (USA)	4,796,481	8,428,200	1.7
Rice irrigated (USA)	14,586,351	21,039,480	1.4
Apples (USA)	18,000,000	2,900,000	0.23
Tomatoes (USA)	16,000,000	9,900,000	0.61

Source: Redclift (19995:27)

The table shows that agricultural systems, which employ conventional methods, are of lower level efficiency in using energy compared to those using animals for draught power and pastoralism. Such systems of agriculture, based on conventional methods are illustrated to depend heavily on artificial chemical inputs, hybrid seeds, mechanization based on fossil fuels and also on irrigation. It is further noted that such systems consume non-renewable resources at an alarming rate (Reijntjes et al, 1992:7). To the same effect, Sahle and Gast (1999:25) forward critics against modern agriculture to have developed in a direction contrary to the requirements of productive and sustainable ecosystems for cohesiveness and functional diversity. Kotschi et.al. (1989:1) also share the same view. The threat of collapse of conventional agriculture seems to be a phenomenal agenda agreed upon by a good number of professionals.

It is noteworthy to cite an opinion, which shows a clear disparity from the commonly promoted ideas above. Goldman (1995:304-305) strongly criticizes and thus, discards the idea about the use of external inputs to be a threat to the futurity of agricultural development, particularly to

that of Sub-Saharan Africa. In his article where he reviews threats to sustainability in African Agriculture, Goldman argues that African farms are using, if any, little chemical inputs, fossil fuel energy or irrigation. He thus concludes that it would be difficult to contend oneself with the view that they represent significant portion of African agriculture at present or in the near future. He rather implicates such an idea to be one of the several kinds of Western prescriptions made to avoid most of the practices, which helped agricultural transformations in Europe and North America during past centuries from being used in Africa.

Goldman's argument about the utilization of conventional technologies in transformation of European and North America agriculture is indisputable. Literature does not have diverging views on its success in the past couple of decades. The divergence between Goldman and others lies on two major areas. The first point concerns whether African farms really did use little external inputs or not, and how little did they utilize? This question compels one to visualize the point from two different angles - the agro ecosystem of Africa, which are mostly found in tropical and subtropical climates compared to the temperate climate of Europe and North America. The second point is the practical experiences of frontier agriculture recorded in literature.

Literature shows that humid climate in tropical and sub-tropical Africa is distinct from the temperate zones of Europe and North America. In the former zones exist high nutrient recycling and high rate of organic matter formation due to active performance of the soil biota. On the other hand, the latter zones are characterized by slow rate of nutrient recycling and relatively slow rate of organic matter humification. These ecological features of the two zones make to use high quantities of inorganic fertilizers possible in European and North American farms. On the contrary, using high quantities of chemical fertilizers in African farms is inappropriate. According to Reijntjes et al (1972:12), they disturb soil life and soil balance; increase decomposition of organic matter leading to soil structure degradation, higher vulnerability to drought and lower effectiveness to produce yields. Where there is no high rainfall, they leach too deep and pollute the ground water. If thus Goldman, on his part is prescribing intensive use of inorganic fertilizers to transform African agriculture contrary to those recommendations, he is playing in the hands of the Western transnational corporations, who are reaping huge amount of wealth from the production and export of inorganic chemicals to developing economies (Redclift, 1995 86-91). Similarly, Amanor strictly warns against using high-energy technological

solutions within tropical forests in fear of rapid land degradation due to their higher fragility (Amanor, 1994: 167).

In his arguments that African farms have not used high quantities of external inputs, Goldman, rather predicts that this may not happen even in the near future (Ibid). But history has recorded the contrary with relevance to frontier agriculture and agricultural modernization. Amanor (1994) has given a detailed analysis of farmers' responses on land degradation in his book "The New Frontier". He gives sight of the commencement of frontier farming, which is also mainly manipulated to serve world markets, early in the sixteenth century in pre-colonial periods. What Goldman could not capture was the interactions of the processes in which farming technologies in the pioneer frontier agriculture focused to facilitate its rapid expansion, so that it meets the demands of the export market. He actually lost sight of the fact that the impositions of the colonial rule have created a series of ecological, social and economic contradictions, which resulted in environmental degradation (Amanor in Ghai, 1994:43).

Different researchers promote similar views with that of Amanor. The effects of global development of agriculture on the ecology of colonies are clearly shown by Redclift (P: 8). For instance, he records these effects to be the sensitivity of monocultures to diseases, which led to extensive use of chemical pest control methods. Heavy reliance on the use of pesticides and insecticides has proved to be an obstacle to natural pest control systems. It is also reported that pesticides are dangerous to the labor force, which uses them. Moreover, the phenomenon of internationalization of agriculture had a great consequence on the ecological cycle by transportation of energy from the site of production to areas thousands of miles away, where organic wastes instead of being returned to the soil, are dumped in rivers and oceans. Industrial fertilizers are used to offset the decline in the natural fertility. Viewed from this dimension also, the argument of Goldman in support of using agrochemicals to transform African agriculture runs short of credibility.

The general consensus pertinent to conventional agriculture shows its being trapped in a complex of problems. Most literature questions its future capacity to serve its purpose of meeting the future global food demand. A paradigm shift in agricultural production system and rethinking technological approaches are currently composing the agenda in agricultural development. Where a linear approach of modernization to economic development has failed to solve the

social, economic and political problems of developing courtiers, the issue of sustainable development champions priority and focal attention in development paradigms (Ghai, 1993: 5)

2.2. SUSTAINABLE AGRICULTURAL DEVELOPMENT:

Rethinking the Conventional Paradigm in Agriculture

Sustainability and Sustainable Development

In the previous section, some but crucial issues justifying the unsustainable trends of conventional / modern agriculture are reviewed. The point of concern is not only in the decreased productivity of conventional agriculture. It is more than the issue of production at the farm level. The report of the Club of Rome illustrated the extent of the problems as the original document "Limits to Growth" warns as follows (Meadows et al, 1972: 24):

> *If the present growth trends in world population, industrialization, pollution, food production and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity.*

The document recommended establishing a condition of ecological and economical stability that is sustainable far in the future. Since then, the term sustainable development has become a buzzword in development areas. Scientists, technicians, development planners and politicians frequently use the concept sustainability. Although sustainability as a concept and value has been widely advocated over the last decades, yet varying conceptual and operational definitions are attached to it. In the world where conflicting political and economic interests are the driving forces behind every development scheme, and the power variables play decisive roles, it is natural that such a cross-cutting issue cannot be integrated unanimously by all.

Goldman (1995: 293-304) discusses on sustainability in detail by analyzing different definitions forwarded by various scholars and organizations. In his attempt to trace the origin of the term, he identifies the ecological inspiration, the economic thought and the sociological strands of the associated fields to be the original stands of the concept according to Douglass. In relation to agriculture, Goldman assumes that the main proponents of sustainability view the term from an angle of stewardship and preservation of resources and ecosystems, with sustaining the yield capacity of agriculture as the main objective. Pointing to intellectual heritage of this school, he

attempts to show that it derives mainly from ecological theory and from the tradition of sustained yield and resource-use and extraction, preservation of resource potential for future generations. The definition given to sustainability by Brundtland Commission can be categorized under this theme.

The second theme injected with the mainstream economics expounds the idea that economic needs and desires should be given priority than resource conservation issues. This school of thought focuses on meeting economic needs subject to the constraint of not inflicting significant damage on the resource base and subsumes any resource damage to growth data. Under these themes are classified the definitions given by Ruttan (1988), Lynam and Hart (1989).

Tisdell reviewed the ecological and economic schools (1995: 373-383) in detail. He on the one hand comments on the definitions of ecologist to be unclear. He thus comments that if economic development is to be sustainable, ecological systems on which economic production ultimately relies also need to be sustainable and development may require sustainable patterns of economic exchange. On the other hand, criticizing the approach of the economists, which mainly focuses on the cost-benefit analysis and net present value perspectives only, he proposes that sustainability should necessarily be assessed from the social point of view of resources also.

The third theme that draws its heritage from sociological traditions emphasizes maintenance of the community and social value such as equity and equality of life. This school of thought stresses that to achieve sustainability neither resources nor economic welfare are sufficient in the absence of the maintenance of the human community and the social values, because the community is the repository of agriculture and other resource related knowledge. Pertinent to this school of thought, Cornea (1987), Eicher (1989) and Cohen (1992) complement the importance of institutions and institutional capacity for sustained resource use.

Redclift (1992) has expanded the dimension of the debate on sustainability by combining the core elements from ecological, economical and sociological themes giving it the view of political economy. He argues that it is not possible to undertake environmental planning and management in a way that does minimum damage to ecological processes in the absence of political committeemen, signifying the role played by "the power variables' or power relations. Assessing the practical commitment of international organizations with regard to implementing objectives of sustainable development, he cites that real issues have been "obscured and neutralized by

sterile language and wrong premises'' when fundamentals like land reform and restructuring of the relations of production are brought to the agenda. (Redclift 1992: 32)

Dasmann (1985:215) assumes sustainability to be represented by basic needs and self-reliance, composing the two sides and ecological sustainability to be the base of a triangle. He warns against neglecting considerations of meeting poor peoples' aspirations in the issue of sustainable development. Chambers (1986:7) shares this view and places the immediate satisfaction of needs and shows that the poor hold a different outlook for sustainability from that of economists and ecologists, who give preference to avoidance of risk over sustainability or higher productivity. But how is priority given to the basic needs of the poor? Here lies the adequacy of Chamber's and Desman's definitions. Redclift (36) injects political dimension to it signifying the need for political changes at the local, national and international levels to achieve sustainable development through meeting basic needs, self-reliance and ecological sustainability.

Tisdell (1995:308-381) on the process of scrutinizing the approaches of both ecologists and economists shows their shallowness of being encompassed each in their discipline, and the attempt they did to universalize their approach. At this juncture he brought to light that sustainable development is more preferable to the least developed countries than to developed countries. This brings to the stage two broadly different approaches of global economic development. In addition, Tisdell (1995: 373) pointed out that economists outside the mainstream of economics give due concern to sustainable economic development. These bring development economics to the stage, which claims that being different from modern "neoclassical economics" and from the economics of centralized socialist countries; it is the economics of the contemporary poor, underdeveloped third world countries. According to Todaro (2003) development is conceived as a multi-dimensional process involving various variables, which lead to an entire social change. The core values he sets are life-sustenance, self-esteem and freedom, similar with the definitions of Dasmann and Chambers. Before concluding this section, the notion economists hold about sustainability to be "a stationary state" (Tisdell, 1995:374) and what Goldman (1995:302) depicted sustainability as an effort to achieve a static state should be known to be a complete misconception. Sustainability and sustainable development are dynamic processes derived to achieve the better of all variables.

Crossing the Bridge: Towards Sustainable Agricultural Development

The implications of these complex problems resulted to unsustainability of the production system. Literature shows that modern agriculture has entered its degenerating phase since the last few centuries. Ample empirical evidences exist which justify the trend over years. This does not imply that whatever modern agriculture has contributed is to be discarded. After all, problems of agricultural development viewed as a holistic systems complex, convey value judgment whether their improvements/ eliminations are desirable/undesirable and good or not.

The evaluation of sustainability of conventional agriculture or the need for a paradigm shift to agriculture can not escape subjective/ normative value judgments, and thus can not be value free. Yet differing opinions exist regarding conventional agriculture. Cases like Goldman (1995) who advocate the promotion of high external in-put as the sole Salvatore of African agriculture are extremists. The opinion of Schultz (1974: 74) that expounds the merit of modern agriculture in enhancing environmental possibilities, its improvement and making nature less unstable are all based on value judgments. Tisdell (1995; 373) is more rational in commenting that one should not be categorical about the notion of modern agricultural systems as less sustainable.

Reijntjes et al (1992: 19-21) more critically expound that, despite its shortcomings such as its reductionist approach, conventional agriculture has significant contributions to agricultural development. They stressed its making efficient use of technological innovations and underlined that it is completely an impossibility to do without taking modern agricultural insights. What these authors identify to cause problems in agricultural sustainability is the way modern agriculture employs these technologies in isolation and without sufficient concern for their ecological effects. To this effect Reijntjes' definition (1992:4) implies that the integration of technological innovations and insights of conventional agriculture with due ecological orientation and holistic framework is desirable.

Very often, agricultural production systems are conceived to be the concern of only a single discipline in natural sciences. Researches springing from such a premise ultimately come out with an incomplete result. The desire to attain agricultural sustainability will be successful if and only if complete understandings of agricultural production systems are developed. Systems of agricultural production are simultaneously composed of economic, political, cultural, historical, ecological, agronomic and environmental disciplines. To this effect, the 'critical dynamics of

agro ecosystems arise precisely where the socio-economic processes interact with the ecological'.

What is Sustainable Agriculture?

Similar with its forerunner sustainable development, sustainable agriculture also means different things for different people. Since the concept itself originates from those widely debated concepts of sustainability, development and sustainable development, existence of disparity in conceptual and operational definitions cannot become amazing. Except the definitions of those schools of thoughts that promote modernization and those who are traditional economists, most definitions share a number of variables to be included in their definitions. In this work, the definitions of those who are committed to bring about a paradigm shift to agricultural development are expounded. Based on the fact that most definitions are similar with the definitions of sustainability treated in the previous sections, hereafter, working definitions will be given due consideration.

The basic tenet of sustainable agriculture which will be given due attention in this work is based on the framework that it is an issue of a system's performance over time. Thus, in order to "measure" the performance of a system, one must define its boundaries and the relationships of their constituent components and external influences as well as inputs which cross boundary lines (Scialabba, 2000: 2-4). Considering a system in agriculture, it is expressed to vary from the soil system, to the cropping system, farming system, watersheds system, local/regional and national agricultural systems. Biophysical and socioeconomic conditions are constantly changing in this system. This depicts that sustainability in agriculture is more of an evolving concept than a set of fixed rules. Issues of sustainability must be addressed in relation to values, power relationship, time and space according to Scialabba.

Sustainable agriculture implies that farming regions and individual farms must be treated as ecological systems. In the context of sustainable agriculture, ecology should not be limited only to natural conditions such as soils and climate; but must encompass the entire complex of physical, economic, social and cultural conditions, which affect the growth and development of an organism or affect the growth and development of an organism or organic system. Under the definition of Prof. Kotschi et al (1989; 1-9)

Man, with his culture, needs and customs must be viewed as a part of the ecological system and not as an outsider.

Shale and Gast (1999: 23-28) claim that sustainable agriculture is an important move away from approaches previously associated with "Green Revolution", and it gives attention to careful analysis of the local and specific situations of agricultural development. They account that sustainable agriculture puts special emphasis on the knowledge of the target groups; people's knowledge and traditional land-use practices are integrated as part of the concept. They also stress that, though sustainable agriculture strives to create a cultivated but balanced ecosystems, it does not mean that it is attempting to restore nature close to its pristine form.

In a more simplistic and less philosophical manner, Gliessman (1997: 12-16) clarifies his position about sustainable agro ecosystem (as he calls agricultural system) to be the condition of being able to harvest biomass from a system in perpetuity because the ability of the system to renew itself or be renewed is not compromised. Literature gives different names to sustainable agricultural as site-appropriate agriculture, ecologically sound agriculture, biological husbandry, conservation agriculture, biodynamic agriculture, low external input agriculture and ecofarming. However they are termed differently, they all fit to the concept sustainable agricultural development discussed in the previous sections of this work, and are used interchangeably in the remaining parts of this work also.

Criteria of Sustainable Agriculture

Despite the different ways of defining, the variables considered in sustainable agriculture by most proponents are categorized after Reijntjes et al (1992: 8) as follows:

***Ecologically Sound*:** which implies the maintenance of the quality of natural resources and the vitality of the entire agro-ecosystem (enhancement of the human, crops, animals, soils and soil microorganisms). By these criteria, the maintenance of the quality of natural resources and the enhancement of the vitality of the entire agro ecosystem is best ensured when the soil is managed and the health of crops, animals and people is maintained through biological processes (self-regulation). This ecological parameter also includes the use of local resources in a way that minimizes loses of nutrients, biomass and energy, and avoids pollution. It emphasizes the use of renewable resources.

Economically Viable: which enables farmers to produce enough for self-sufficiency and/or income, and makes them gain sufficient returns to warrant the labor and costs involved in production? It considers the measure of economic viability not only in terms of direct farm products (yield) but also in terms of functions such as conserving resources and minimizing risks.

Socially Just: which implies that resources and power are distributed in such a way that the basic needs of all members of society are met and their rights to land use, adequate capital, technical assistance and market opportunities are assured. All people should have the opportunity to participate in decision making, both in the field and in the society. This is rooted in the possibility of existing social injustice, which creates social unrest that threatens the entire social system, including agriculture.

Humane: This means that all forms of life (plant, animal, and human) are respected. The fundamental dignity of all human beings is recognized, and relationships and institutions incorporate such basic human values as trust, honesty, self-respect, cooperation and compassion. The cultural and spiritual integrity of the society is to be preserved and nurtured.

Adaptable: implies that rural communities are capable of adjusting to the constantly changing conditions of farming such as population growth, policies, market demands, price fluctuations, etc. This includes innovations in social and cultural terms in addition to new appropriate technologies.

These parameters of sustainable agriculture may seem conflicting but are not mutually exclusive. There may be divergence in their perceptions among different groups. For instance, the farmers, the community, the region, the nation and the world may analyze them from different perspectives. The element that demands the satisfaction of immediate needs and mean while conserves the resource base may seem to raise conflict between the present and the future generations. Literature reviews confirm that such issues have instigated fierce debates against sustainable agricultural development. The queries such as 'does sustainability imply that no development is desirable which temporarily raises the income of existing generations?', 'To what extent should the potential of future generations and needs be met?' (Tisdell, 1995: 373-375) etc. are logical doubts rose against sustainable agriculture. The merit of sustainable agriculture, however, lies in giving due solutions to such doubts and queries.

As a postmodern approach to development, ecological agriculture is never universal. With a single goal of improving human welfare at the end of the day, through optimizing production, its implementation is site specific in contrast to conventional agriculture, which employs universal methods. In addition, the unique feature to ecological agriculture lies on the fact that it searches to find a compromise between systems that model the structure and function of natural ecosystems and yield a harvest for human needs, manipulated to high degree by humans for human ends (Gliessman, 2000: 4-5). It is a development related process in which changes in the ecosystem must be continuously assessed to determine whether or not specific measures are of value. It does not take farming techniques to be bad or good per se; but assesses their values depending on their applicability within a particular system. Thus, choices to strike balances between these conflicting interests are continuously made in a never-ending research. This necessitated well-functioning institutions and well deliberated policies down from the village to global levels to ensure sustainable development (Reijntjes et al 1992: 2-3)

A sustainable agricultural system is a system that is politically and socially acceptable, economically viable, agro-technically adaptable, institutionally manageable and environmentally sound. Satisfying all these requirements and the other relevant analytical criteria is a complex endeavor, so complex that it may never be implemented for any one system or region. But it is possible to combine comprehensiveness and practicality by conducing more than one type of specific sustainability assessments, and to put the assessments into a conceptual framework that describes what is required for a system to be truly sustainable.

Organic Farming /Agriculture/

The previous section attempted to make a review of the concepts sustainable development and sustainable agriculture. Both concepts, being issues attracting fierce public debates, the paper attempts to show important arguments and the intrinsic forces from which the arguments emanate, but briefly. As already mentioned and since it will be a mirage to expect a single universal interpretation, the purpose of this work is to focus on the approach tending to bring about a paradigm shift to agricultural development, basing itself on the premise that conventional agriculture is not sustainable.

Accordingly, literature review in preceding sections attempted to show what sustainable agriculture/Ecofarming meant. It also showed that, though differently named, the approaches to

sustainable agriculture are all similar. However, it is common to come across literature that expounds both ecological agriculture and organic farming are the same. Ecofarming includes but is not limited to organic agriculture. Organic agriculture is the highest regulated form of Ecofarming. It abides to legally set standards and norms of production, processing and labeling. In this system of production, biophysical production factors are intimately linked to socio-economic and institutional factors. This makes organic agriculture to represent a continuum from the farm to the consumers' table (Scialabba, 2000:4). In this regard, distinctions between ecofarming and organic farming become clear. Their similarity lies on the fact that they are both agricultural systems that promote environmentally, socially and economically sound productions of food and fibers (Sahle and Gast, 1999:26-31). Organic agriculture is distinct from ecological agriculture due to the strict prohibition of using agrochemicals in the system of production, processing and transportation while the former focuses on optimization of production through site-specific approach, not completely prohibiting agrochemicals.

It is not much significant to ponder on the various definitions of organic agriculture since they are not divergent views. For the sake of complacency, however, some definitional presentations will be availed. Codex Alimentarious Commission describes organic agriculture as (FAO/WHO, 2001: 2-3):

> *Organic agricultural is one among the broad spectrum of methodologies, which are supportive of the environment. Organic production systems are based on specific and precise standards of production, which aim at achieving optimal agro- ecosystems, which are socially, ecologically and economically sustainable.*

The main elements of this definition are settings of standards of production in addition to the previously discussed criteria of ecofarming. The document is an internationally recognized document as a provider of universal guidelines pertinent to all issues of organic agriculture. It avails an all round definition of the production system. In addition to the above definition, the document proceeds as:

> *Organic agriculture is holistic management system, which promotes and enhances agro ecosystem health including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of farm inputs taking into account that regional conditions require locally adapted systems.*

Shale and Gast (1999:26-31) present that organic agriculture adheres to globally accepted principles, which are implemented within the local socio economic, geo-climatic and cultural settings. Chris and Paula Steenholdt (1998:5-8) congest many elements of organic agriculture into two areas of concentration: the health of the soil and of those plants and animals, which feed from it on the one hand, and the avoidance of harmful chemicals on the other.

What Makes a Product Organic?

The foregone discussion attempts to clarify the fact that low or totally no usage of synthetic fertilizers built a base for confusion of a product to be considered as organic. This confusion holds strong grip in our society including the intelligentsia at large. The purpose of this section is to clearly identify what an organic product is. In traditional agricultural practices, no agro chemicals were employed. Soil fertility management was conducted through employment of indigenous knowledge and local recourses, which enhanced the biodynamic processes to take place. No practice of mechanized farming/cultivation existed. Pest and weed control activities did not make use of industrial pesticides or herbicides. Instead, natural pest control mechanisms, and mechanical and traditional farming practices served these purposes. Yet, traditional agricultural systems, despite the fact that they did not employ agrochemicals, do not satisfy the criteria to be categorized as organic.

Organic agriculture is not simply agriculture without chemicals. It is much more than that. According to Wettasinha (2002:35), organic agriculture is directed to maintain the ecological balance in the farming systems and utilize the resource base in a sustainable manner. Meanwhile, it pays keen attention to the socio-economic aspects of the production system. Pertinent ecological aspects to organic agriculture are nutrient recycling, optimal use of available resources, diversification of products, site specificity, etc. Food security, Fair Trade, capacity building and others composing the socio-economic aspects are elements of due emphasis in organic agriculture.

Adding more blood to what organic agriculture is, the GTZ Program Office for Social and Ecological Standards, on its home page "Organic Production: Basic Principles", avails detailed information on what makes an agricultural product necessarily organic. It depicts that the concern of organic agriculture does not lie only with not using technical production aids such as pesticides, synthetic chemicals or mineral fertilizers. It is neither also concerned only with

replacing them with production aids permitted in an organic farming system. The document widening the scope thus, describes organic agriculture to be a holistic cultivation system in which an agricultural site is viewed as an organism. Such a system of agricultural production draws its "technical-biological" process from traditional agricultural system. Moreover, unlike conventional agriculture that mainly focuses on maximization of yields, organic agriculture targets the total productivity of a farm (including the ecological components) optimally adapted to site conditions as the most important aspect.

Literature shows that organic agriculture pays due attention to local soil fertility and soil health to be key factors for successful production. Thus, it aims to optimize not only production, but also quality in all aspects of agriculture and environment by respecting the natural capacity of plants, animals and landscapes. It allows the powerful laws of nature to increase both yields and resistance to diseases (Shale and Gast, 1999:26; Stolton et al, eds. 1999:7). The following statement gives a condensed view of what an organic product is (FAO/WHO, 2001:2):

> *'Organic' is a labelling term that denotes products that have been produced in accordance with organic production standards and certification by a duly constituted certification body or authority.*

This last statement implies that the term organic is defined by law or regulation of some sort and waits decision by some authority. In addition to management system and techniques of production, another dimension of set-regulations and decision-makings govern a product to be organic. The outlook, which considers organics as the non-use or minimal use of agrochemicals thus runs short of holding truth. This calls for investigation and elucidation of the concepts and operations of these regulations, standards, and authorities.

Scialabba categorizes the basic principles of organics into production and post-production parameters on the one hand and socio-economic and institutional/infrastructures on the other. It deserves mentioning these parameters, which prepare ground for this work in its future analysis of organic coffee production. Accordingly, Scialabba categorized all the biophysical, technical, storage, processing and transportation components to comprise the production and postproduction parameters.

General Requirements

The general requirements of quality management of organic agricultural products including coffee are the basis for the certification of organic products. Certification of organic products is built on three complementary pillars, which need strict compliance. They are standards for organic production, i.e. inspection by an independent entity and certification by an internationally recognized body. These requirements are viewed from two different angles in the work. The positive dimension treats the logical necessity of setting these standards to integrate and facilitate organics. There also exists the negative dimension, which in particular proved to be an obstacle for the development of organic farming in third world countries and affecting small producers. To facilitate the examination of the merits and demerits of these requirements, it is recommendable to have a bird's eye view of the three pillars of organic certification.

Standards

The standards for organic agriculture comprise rules on production, processing, labeling and inspection against which any product is evaluated. According to Elzakker (2002, 61-68), standards for organic products are needed to define what you do, to achieve common understanding, to create group identity and to form the basis for marketing and organic labeling. It is reported that standards assist as production guideline to describe the method of production. The author also holds the view that standards help to develop a common understanding on what organic farming is. Fulfilling these standards in the process of agricultural production systems is believed to be " a break-away'' from the established conventional system of production, thus establishing group identity. Most importantly, it is impossible for a producer to sell his products in the organic market if he does not comply with these standards. Standard for organic products comprise different legal requirements, which govern organic production. Different countries and even different organizations with in the same country have developed their own organic laws and standards, making the process complex.

Legal Requirements

The three major international markets of organic coffee are Europe, UAS and Japan. These countries have set standards and legal requirements to be complied for organic products including coffee. The main purposes of these requirements are to protect the consumer's rights

and ensure transparency at all stages of production and processing, thereby improving the credibility of such products in the eyes of their consumers (Naturland, 2002). For instances, Regulation (EEC) No. 2092/91 is a legal framework which is implemented in all EU member states to import organic coffee. The Regulation was adopted by the Council of European Communities in 1991, and was enforced as of 1992. The regulation, with its consequent amendments stipulates rules and standards for labeling and production, descriptions of inspection systems, general enforcement measures of trade aspects and, administrative provisions and implementations. In addition to the rules, the Regulation includes eight broadly set annexes specifying issues on Principles of Organic Production at farm level, off-farm inputs, minimum Inspection Requirements and Precautionary Measures under inspection scheme, ingredients of non-agricultural origin, requirements of animal husbandry and also directives on imports from third countries.

It is reported that organic producers all over the world develop methods for guaranteeing the organic status of their products to consumers, processors, and traders' agencies in charge of quality control. For instance, Naturland has developed its specific Naturland Standards for organic agriculture. Bioland, another association of farmers, gardeners and vintners has developed its own Bioland Guidelines (standard).

In USA, the Federal Organic Foods Production Act was passed in 1989. The National Organic Standards Act of the National Organic Program was enforced as of 2002. The Act was meant to set up a uniform national guideline on organic products, and in order to protect consumers from being misled and to facilitate the trade of organically produced foodstuffs with in the USA (Neuendorff and Koschella, 14-16). The sole responsible government agency of the regulation is the United States Department of Agriculture. As in EU regulation, in USA also, some states have developed their own standards. The Californian Organic Foods Production Act of 1990 is a physical example. The standard in USA, which is designed to conform to Regulation No 2092/91 of Europe, is so lengthy a document with specific and strict rules and standards for organic productions to be imported to the Federal State. The Japan Agricultural Standard for agricultural products was enforced on 2002. The main regulatory body of this regulation is the Japanese Ministry of Agriculture, Forestry and Fisheries. Although coffee is not produced in Japan, the regulation stipulated rules and standards to be complied by imported coffee to the country (ITO, 2000: 76).

The Codex Alimentarious is another document of paramount significance, worth mentioning with relevance to standards of organic agricultural products. It is a collection of international food standards prepared by the Codex Alimentarious Commission, which works under the mandate of FOA and WHO. It was published by FAO/WHO as a provision of an agreed upon approach to the labelling and claims for organically produced foods. The guidelines set out standards of organic agricultural products covering all processes from the site of production up to the site of consumption. The principles of organic production, preparation, storage, transport, labelling and marketing, permitted and inhibited inputs, soil fertilization and conditioning, plant pest and disease control and, additives of food and food processing aids are dealt with in the document in detail. The overall aim of the document is to facilitate and ensure the protection of the consumers, as all other documents and regulation intend. What makes the Codex different from others is that it is a collection of international guidelines to be referred and consulted for elaboration of national regulations. It is never an internationally or nationally valid legal regulation (FAO/WHO, 2001).

Of a similar international nature, but representing the private sector, is the Basic Standard of International Federation for Organic Agricultural Movement currently dominating the world organic industry. At this level of global organics, IFOAM is a secret but strong griping hand over organic standards, certification, marketing etc. Producers, processors, certifiers and traders are directly or indirectly linked with IFOAM. The status and linkages it achieved to obtain among EU states, WHO, FAO, UNEP, and others helped the movement to be influential on issues concerning organics. The IFOAM Basic Standards are internationally accepted in all Europe, USA and Japan. Unlike Codex Alimentarious, the Basic Standards of IFOAM are valid rules both internationally and nationally. Almost all organic standards confirm with the standards of IFOAM.

Inspection

The second pillar of organic certification is the component inspection. Inspection is an on site visit to verify whether the performance of an operation is in accordance with the production or processing standards set for organics or not. In most of the cases, delegated private companies acting as official inspection bodies employ the task. These bodies are frequently supervised by

"competent" authorities, all from Europe, USA and Japan. The inspection bodies have to fulfill definite requirements, mainly provisions of Regulation (EEC) No 2092/91 and Regulation No 2491/2001 (Naturland, 20002; 8-9). These bodies have to satisfy the European Standard EN 45011, the European Standard EN 4011, the requirements of International Organization for Standardization (ISO) and the International Electro technical Commission (IEC), the European Norms EN 29000, EN 45000. Any Inspection Body, which satisfies the above requirements, will be officially recognized and will be designated to establish an inspection system by competent authorities. The operators producing and preparing unprocessed plants and plant products, livestock and livestock products as well as operators importing these products are subject to allow the inspection of their handling, storage, transportation, processing and packing activities to the inspection body

The bloodline of organics is the procedure in which the processes of inspection and certification are undertaken. The strengths and constraints of organics are both embraced within these procedures. Inspection and certification activities make a product either organic, thus marketable or not. Moreover, these very issues of inspection and certification have become points of controversy in the organic world. It is thus essential to address these issues in detail to come up with a clear vision of what abides a product to be organic.

The inspection system covers the whole food chain from the production over processing to export. It begins with description of a production unit to be submitted to the inspection body. This includes the blue prints of area map, history of land-use, plan of processing equipments, product flow charts, farm account, types, varieties and origin of seeds, types of fertilizers and pest control, etc. With clear records of this information, then the operator applies for inspection to a particular inspection and certification body. Accordingly, a contractual agreement will be concluded between the parties after which the first inspection is conducted by an inspector commissioned by the inspection body. The inspector verifies the fulfillment of the requirements of the guidelines and presents a report, countersigned by the operator, to the inspection body. It is this report, which serves as a basis for the certification decision by the inspection body. Organic certification shall be provided after the successful conversion period of consecutive annual inspections, depending upon the type of product under inspection. In the case of coffee, conversion period lasts three years.

This is only one of the requirements to be met for coffee in order to be marketed as an organic commodity. Non-usage of synthetic fertilizers and pesticides cannot make coffee organic. Consequently, most Ethiopian coffee produced by smallholders, which is organic by default, cannot be marketed as an organic product due to not satisfying the above requirements of organic standard. Not yet mentioned in this work up to now is the fact that the inspection system and process is not one undertaken free of charge. It is a costly job not often affordable by small-scale farmers, especially the Ethiopian coffee farmers who have been marginalized by the recurrent fluctuation of the price of their produce. The inspection system is also a complex system of standards to be comprehended by ordinary farmers. Still more, the system is totally commanded by International Inspection and certification Bodies of the industrialized world.

Certification

This requirement is the third principal pillar for certification of organic agricultural products. It is a vital procedure of organics in which a third party gives a written assurance that a clearly identified process has been methodically assessed such that adequate confidence is provided to specified requirements (Naturland, 2002). As defined by Codex Alimentarious, it is a procedure by which official certification bodies, or officially recognized certification bodies provide written assurance that foods conform to requirements (FAO/WHO, 2001:3). Agricultural products from developing countries can only be traded as organic products in the EU, the USA and Japan if the particular prerequisites such as the requirements set on the Codex, EEC Regulations, and US Standards for Organic Agriculture and Japan Agricultural Standards for Organics and IFOAM Basic Standards are met. Certification is a legal procedure, which bases on the inspection report. As it is done in inspection, independent and neutral certification bodies that are operating according to specific guidelines certify the entire production chain.

According to IFOAM Basic Standards and Certification, third party organic certification was first instituted in the 1970's. In the early days, farmers inspected one another on a voluntary basis. In the latter days, the market demanded it for transactions, and now the process assumed a key position and has become a requirement by regulations of the organic world for any kind of an "organic" claim on a product label (IFOAM, 2005).

The production, processing, exportation/importation and sale as organic of both green bean and processed coffee should necessarily comply with these legal requirements and tedious

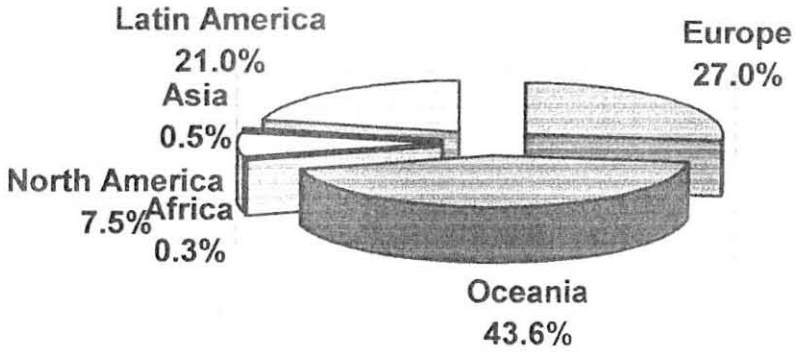
procedures. It is only then that coffee can be considered as organic and traded. The first official trading of organic agricultural products started in the year 2001/02 when Oromiyaa Coffee Farmers' Cooperative Union Ltd. exported organic coffee to Europe (OCFCU, 2001).

Organic Agriculture in Ethiopia

The move towards modern organic agriculture originated in the 1920s, when Rudolf Steiner developed a concept of a sustainable agriculture in a circle of farmers and friends. The introduction of the concept soil ecology by Räoul F. France in 1911 and the result of research on soil biota of agricultural soils in India by Sir Albert Howard in 1948 became additional stimuli to the field. Lady Eve Balfour's the Haugley Experiment, which was conducted on her own farm, was equally a spectacular activity in developing the modern organic agricultural concept in the 1970s (Niggli and Lockeretz, 1996: 9-10).

The attempts made by these pioneers of organic agriculture in limited areas, expanded its scope to a scale of global movement in the consecutive three decades. The International Federation for Organic Agricultural Movement (IFOAM), established in 1972 played a crucial role in promoting organic agriculture. Though extensive expansion took place in the North, in the South it is only some countries that have already engaged in organic agriculture for long. Yet, the share of developing countries is almost negligible. The following Figure 3, as presented by Kotschi (2002:31) shows the distribution of total organically cultivated area in the world.

Figure: 3. Cultivated Area



Source: Kotschi (2002)

Though the area cultivated under organic agriculture is highly insignificant in Asia and Africa, those countries that have already engaged in the scheme are taking advantage of the conditions. A scrutiny of the promotion of organic agriculture in Ethiopia does not give an encouraging impact when viewed in light of Africa. For instance, on an International Training Course Workshop conducted in Ethiopia, (Nov.16-December11, 1998) on "Ecofarming-Ecologically and Socially Sustainable Land Management in Africa", relevant officials from the Ministry of Agriculture refused either to give opening or closing addresses, with the pretext that it promotes the technologies of minimizing and prohibiting agrochemicals. At the time of the workshop, the extension package program was in its honeymoon period in Ethiopia. A year later, on a National Workshop conducted in Addis Abba (21-22 December, 1999) on the topic "Ecofarming: Retrospect and Prospects", the then Commissioner for Science and Technology Commission of

Ethiopia delivered a key not address to the effect that the issue is not relevant to Ethiopia (Asrat. 1999:3-4) as follows:

> *In the case of Ethiopia, the scenario is not really applicable to day as it would have been some 30 years ago. For any rationalized approach, for any sensible balanced growth to hold ground firmly, the issue is poverty alleviation. The sooner would it the better. Otherwise, there will be not such topical issue.*

In August 2000, IFOAM conducted its 13th International Scientific Conference in Switzerland. This was the first time, since its 1st conference in 1977 that participants from Ethiopia got a way to such a conference, where participants from about 100 countries worldwide often participate. Participants of that conference were about 1200 in number, 38 from Africa of which 4 were from Ethiopia. None of the four Ethiopian participants had any direct relations with organic agriculture. Their participation was only facilitated by various personal relations they had with different agencies. No private or government firm relevant to organic production, processing, marketing or certification has any advocacy role on this worldwide conference at the time. This shows that even after some eight decades of it's coming to being, this system of agricultural production was neither promoted nor encouraged in Ethiopia. It was only in the year 2001 that the first organically certified agricultural product from Ethiopia was marketed on global organic market. As the institution claims, the Oromiyaa Coffee Farmers Cooperative Union Ltd is the first of its kind in Ethiopia (15, 2001).

In light of this gap, it would be superfluous to expect that information about organic agriculture in Ethiopia be clearly transmitted. Very often, the mention of organic agriculture is instantly coined with organic coffee only, since it is mainly organic coffee, which gained popularity. Responses obtained about organic system from different sectors of the public show that a great confusion prevails with relevance to the concept. Many claim that Ethiopian coffee, as a whole is organic. They argue that expect few state coffee plantation enterprises, farmers do not use much fertilizers, and thus, their products are organic. There being a majority of the public with scanty information, still there exist a conscious group favoring high external input practices, which deliberately corrupts the picture of organic agriculture. In fact, this latter group is the most influential constituency, who contributed much to the weaknesses of organic agricultural development in the country. As a result, there are only two Farmers Cooperative Unions Ltd, that

of Oromiyaa and SNNPRs who are engaged in production and marketing of organic products, mainly coffee.

This work is believed to be one of its first kinds to attempt assessing organic coffee production in general and its socio-ecological impact on the sustainability of agriculture in particular as implemented in our country. It can only be a minor contribution for further work on this direction.

III. FINDINGS AND DISCUSSIONS

Data collected in the process of the study were directed towards the analysis of socio-ecological performances. The analyses are conducted by examining ecological, economic, social and institutional performances to make the assessments of the sustainability of organic production possible.

3:1. Ecological Performances

Attempts to investigate ecological performance embraced two components: state of natural resources and resource management opportunity. Variables of measurement were land availability and productivity, species abundance and diversity, eco-regulation and, lastly biodiversity. Relevant to these indicators respondents were requested to answer seventeen different questions meant to evaluate ecological performances of the systems of production they are practicing.

3.1.1. State of Natural Resources

The state of natural resources in the sample sites was investigated with relevance to land availability and the productivity (yield) of the coffee plantation under the operation of the respondents. Based on the basic assumption that land tenure security has either positive or negative implication on the management of natural resources, focal group discussions were conducted at all three sites where queries were posed to assess the attitude of respondents regarding the system of tenure prevailing. It is reported that coffee land currently found under the possession of these producers was previously owned by feudal landlords and confiscated by Dergue in 1975. Respondents from groups 1 and 2 have organized themselves in cooperatives over these coffee plantations and group 3, though not organized yet, have distributed these plantations among themselves. The discussions showed that farmers are well satisfied with the prevailing state of land tenure, being sceptic of losing their possession if any change is implemented. The condition that the National Regional Government is issuing ownership certificate to their farmland consolidated their conviction that they are tenure secured. This is manifested by the attention they give to land conservation activities. With relevance to tenure security, provided other necessary conditions are fulfilled, the assessment confirmed that conservation of natural resources might not face any obstacle.

Land availability, as a condition to effectively conserve natural resources, was considered as a variable for investigation. All three groups were requested to respond to a question, which enquires the total sizes of land under their ownership, and the portion on which they practice coffee production. In relation to the size of farm plot, the smaller the size under operation, the higher the drive to obtain maximum production through intensive land utilization and thus, the lower will be the attention given to natural resources conservation. Respondents were exposed to three classes of total land area: 5 hectares and above, less than 5 hectares but greater than 2 hectares, less than and equal to 2 hectares, from which they are required to identify the class of their total land area.

The survey in this regard showed that of the total sample in all three-study areas 11.59% of the respondents owned five hectares and above. The remaining 36.2% owned more than 2 hectares, but less than 5 hectares. Those who owned 2 hectares or less amounted to 52.2%. It is also known from the study that farmers do not produce only coffee. They partition their plots to produce other crops. It is only 7.24% of all respondents who produce only coffee on all farm area they possess. Data showing the total area owned and the portion under production of coffee is shown on tables 9 and 10 respectively.

Table 9: Total Area Owned (in ha)

Total Area	Owners						Total
	Baabboo		Ambuyyee		W. Sonboo		
	N	%	N	%	N	%	%
5 hectares and above	2	6.5	5	21.75	1	6.7	11.6
Less than 5 but greater than 2	12	38.7	5	21.75	8	53.3	36.2
2 hectares and less	17	54.8	13	56.5	6	40	52.2
Total	31	100	23	100	15	100	100

Source: Field survey

Table 10: Portion of Farmland under Coffee Production (%)

Land portion Under coffee	Baabboo		Ambuyyee		Walakkee Sonboo	
	No	%	No	%	No	%
All area	2	6.4	2	8.7	1	6.7
On more than half of possession	13	42.0	12	52.2	2	13.3
On less than half of possession	16	51.6	8	34. 8	6	40
On less than quarter of possession	0	0	1	4.3	6	40
Total	31	100	23	100	15	100

Source: Field survey

The data on table 9 shows that average land holding in the study sites falls above the average holding of the region, which is 1.5 ha (Berhanu et.al. 1998). This elucidates that there does not exist chronic shortage of land in the area. This implies a favourable opportunity for conserving the natural resource base, thereby maintaining and optimising the ecological performance under appropriate agricultural practices and employment of site-specific technologies.

Ecological performance is well manifested through productivity. An ecologically sound production system is geared towards optimising productivity through maintaining the soil health and energy recycling. Based on this fact, the productivity of coffee farms both under organic and non-organic systems of production was compared. Questions were posed to all respondents as to the yields of their plots in both their peak and slack seasons. The mean yield was then calculated for the purpose of comparing the two systems of production. It is reported by respondents that years of low yield recur in a cycle of three years. Farmers are forced to take heavy loans from local traders and moneylenders to repay coffee in kind, during the next harvest period. In their slack years, coffee production is next to nothing. The slack years, as respondents recalled in the course of their responses to questionnaires, are years in which on the one hand they suffer most in their livings, and prices rise highly on the other. It is known from personal conversations that though coffee prices are high during these years, farmers were not benefited, because they supply

to the market almost nothing. Conversely, during peak years, though relatively higher yield is obtained, the price falls and the benefits go to coffee traders according to the comment of respondents. Data regarding yield (qt/ha) in both slack and peak years was collected. The mean, mean deviations, population and sample standard deviations are shown on Table 11.

Table 11: Yield (qt/ha)

Site	Yield (qt/ha)	Mean (x)	Standard Deviation	Standard Error
Baabboo	Slack year	14.3	6.1	1.07
	Peak year	27.2	7.4	1.3
Ambuyyee	Slack year	3.1	1.9	0.4
	Peak year	10.4	4.8	1
Walakkee Sonboo	Slack year	0.6	0.9	0.2
	Peak year	14.4	10.7	2.7

Source: Field survey

Data was computed for mean, standard deviation standard error. The significance of differences between mean values of sites was also computed. Accordingly, mean yield during slack seasons at Baabboo amounted to 14.3 qt /ha, that of peak seasons at amounted to 27.2 qt/ha. Compared with Ambuyyee 3.1 qt/ha and 10.4 qt/ha for slack and peak seasons respectively, yield at Baabboo is 361.3% higher during slack seasons and 161.5 % during peak season. Similarly, compared with that of Walakkee Sonboo (0.6qt/ha during slack and 14.4 qt/ha during peak seasons), yield at Baabboo exceeds by 2283.3% during slack and 88.9% during peak seasons. This indicates the higher productivity of the system of coffee production at Baabboo than that at Ambuyyee and Walakkee Sonboo. The level of significance for the existence of real differences between the mean yields was computed. As a result, the sample difference given in standard measures between means of Baabboo and Ambuyyee rated 9.3 for slack and 9.9 for peak seasons respectively. That of Baabboo and Walakkee Sonboo rated 12.5 for slack and 4.1 for peak seasons respectively. Levels of significance at 0.05 and 0.01 were taken as two arbitrary standards, for accepting or rejecting whether the population falls under normal distribution or not. All values obtained from the computation of the data are greater than +1.96/-1.96 i.e. they are off line along the base line of the normal distribution curve, showing at 95% confidence level the assumption that 'the population is a normal distribution' is rejected.

In the same manner, at level of 99% all values are greater than +2.58/-2.58, which is the value of acceptance for normal distribution. This again confirms that the population is not a normal distribution. Accordingly, the test obtained shows that there is a real significant difference between the mean yields at Baabboo and Ambuyyee and those of Baabboo and Walakkee Sonboo.

The greater variation of yield during slack and peak years shows higher fluctuations in productivity i.e. higher yield during peak years and lower yield during slack years. This inconsistency is a sign of the weakness of the agro-ecosystems to sustain itself as observed at Ambuyyee and Walakkee Sonboo. Contrary to this, in sample site 1, yield during peak years does not show wider variation from that of slack years. This indicates that the agro-ecosystem is able to sustain itself. In other words, farm management at Baabboo practices biological techniques of crop protection and soil fertilization. These techniques do have the capacity of enhancing and conserving the agro-ecosystem to rehabilitate itself, as a result of which, significant differences in yield during slack and peak years do not occur. The fact that yield during peak/slack years is not exaggeratedly varies confirms optimal performance of the system.

The other indicator of ecological performance of a system is evaluated by the extent to which it enhances and/or maintains species diversity and abundance. Similarly, the state on which the condition of biodiversity is found indicates the sound functionality of an agricultural system of production. Organic system of production, employing sustainable and site specific practices and technologies plays a significant role in conserving biodiversity and preserving species diversity and abundance (Pfiffner, 2000, 67-73). To comply with the necessity of addressing the issue in socio-ecological assessment, respondents were asked for their observation in their coffee plots about the conditions of biodiversity and species diversity and abundance. With relevance to these variables, the mechanisms and techniques employed by sample elements with regard to eco-regulation (natural mechanisms of pest and disease protection) were also verified.

The results show that 35.1% of the total respondents observed increase in plant varieties in their coffee farm, 47.8% decrease in plant varieties and 17.4% responded that they observed no change in plant varieties in their coffee farm. Responding to the query about the state of standing plant biomass in their coffee plots, 33.33% responded that an increase in standing biomass is observed, 59.42% replied that a decrease is observed and the remaining 7.25% admitted that they

have observed no change. Analysing responses within sample groups, 41.94% responded observing increase, 22.58% a decrease in plant varieties while the remaining 35.48% responded as observing neither neither increase nor decrease in plant varieties in their coffee land at Baabboo. The response of sample group from Ambuyyee to the same questions goes as 21.74%, 73.91% and 4.35% while the third group responded the observation to be 40% as increase and 60% as decrease in plant varieties

Based on the assumption that organic production system either enhances or maintains diversity and abundance, results of the study shed light on a significant difference between organically producing systems and conventionally producing systems. At Baabboo where organic coffee production is underway, 77.42% of the respondents witnessed either an increase (41.94%) or a state of no change (35.48%) of the number of plant varieties. It is only 22.58% who responded as observing a decrease in plant varieties in their coffee farm. What is observed from the responses of groups 2 and group 3 sample elements, which are not operating their coffee production organically, is a diametrically opposite phenomenon. For instance, 73.91% of the responses indicated that a decrease in plant varieties are observed in their plots and a similar observation is recorded at Walakkee Sonboo, where 60% of the samples responded in the same manner. This again confirms the ecological soundness of organic coffee production with relevance to enhancing and/or preserving plant varieties (species diversity) examined in the study area.

Relatively similar results were obtained from the examination of the state of increase in standing plant biomass. At Baabboo, 58.1% responded that standing plant biomass is either increased (45%) or at least not decreased (12.90%). On the other hand at Ambuyyee, 78.26% and at Walakkee Sonboo 66.67%, exposed that the plant biomass in their coffee farms have shown deterioration, a fact which confirms the inferiority of non-organic production with relevance to preserving standing plant biomass. Computed data on plant varieties and standing plant biomass is presented on Table 12 below.

Table 12: State of Plant Varieties and Standing Plant Biomass

Variables	Responses					
	Baabboo		Ambuyyee		Walakkee Sonboo	
	No.	%	No.	%	No.	%
Increasing plant varieties	13	41.9	5	21.7	6	40
Decreasing plant varieties	7	22.6	17	73.9	9	60
No change in plant varieties	11	35.5	1	4.4	0	0
Increase in plant biomass	14	45.2	4	17.4	5	33.33
Decrease in plant biomass	13	41.9	18	78.3	10	66.67
No change in number of plant biomass	4	12.9	1	4.3	0	0
Total	**31**	**100**	**23**	**100**	**15**	**100**

Source: Field survey

Eco-regulation is the technique of practicing plant protection in biological means. It employs natural methods practiced by farmers through a series of direct and indirect measures to safeguard their crops from repeated attacks from pests and diseases. It is admitted that biological way of plant protection is more advantageous than the industrially produced chemical pesticides, which have neither solved agricultural problems of farmers, nor have they improved his financial situation. Some scholars extend their arguments that industrially produced pesticides have resulted to a series of consequences, which politically, economically, ecologically and socially are self-defeating (Langenbruck and Hohberg 1987:8-9). Though the use of agrochemicals, including industrially produced pesticides, have played significant roles in boosting agricultural production, they could not assure agricultural sustainability because of the various negative effects they produce on the health of the soil, on plants and animals including man (Yehasab 1995:1).

With arguments thus forwarded, investigation was conducted to identify which of the production systems focus on biological plant protection. Reactions of respondents to questions show that

24.64% of the elements faced pest infection and 71% disease outbreaks each year, 13.04% pest and 34.78% disease outbreaks every two years, 17.39% and 36% only once since 2001 and 34.78% faced neither disease nor pest problems for the last five years.

The analyses of individual sample groups with relevance to disease out-break and pest infestations in their coffee farms show a different picture. At Baabboo pest infestation is reported to occur every year as reported by 22.59% of respondents while at Ambuyyee 43.48% of the responses report yearly occurrence. At Baabboo 45.17% the responses show that no disease outbreak and pest infestation has attacked coffee farms since the last five years. This fact confirms that producers at Baabboo who are employing organic system of production are possibly utilizing biological plant protection techniques more effectively than producers at Ambuyyee who are not necessarily expected to abide to the organic standard of plant protection. Information obtained form Limmuu Koossaa District Agricultural Development Office establishes that no chemical pesticides are utilized in coffee farms for the last 5 years. This information about the official ban does not exclude the use of chemical pesticides by some farmers without the knowledge of officials, as reported by some conversants. In all cases, agricultural systems which employ biological plant protection mechanisms are both ecologically sound and economically viable, a fact which is the principle of organic agriculture, seen under practice in Baabboo than in Ambuyyee.

This was confirmed by the response of 100% of Baabboo farmers who indicated that they use exclusively natural/biological techniques against disease outbreaks and pest infestation. At Ambuyyee 8.7% and at Walakkee Sonboo 20% of the respondents use either chemicals or the combination of both biological and chemical techniques. Regarding their opinion towards the efficiency of either of the techniques 100% of Baabboo, 86.9% of Ambuyyee and 46.6% of respondents at Walakkee Sonboo responded that biological/natural techniques of plant protection are more efficient than chemical techniques. They are of the conviction that organic agriculture incurs lower cost of production than conventional agriculture. This was confirmed by the responses given by 100% of respondents from Baabboo, 87.00% from Ambuyyee and 73.33% from Walakkee Sonboo. As to the reason of reduction of production cost 87.1% of respondents from Baabboo relate it to reduction of cost of chemical fertilizers and pesticides while 78.2% of Ambuyyee and 66.67% of Walakkee Sonboo attach the same reason to the reduction of production cost in organic agriculture.

3.1.2. Resources Management Opportunity

The ecological soundness of farming systems is usually evaluated by its optimal utilization of resources. The higher the opportunity of a system in utilizing local resources the greater will be its resource management efficiency. For small-scale farmers in particular, the utilization of on-farm inputs such as crop rotation, mixed cropping, mulching, coffee pulp, growing nitrogen fixing plants and animal manure at a higher level than off-farm inputs will economize time and labour along with reducing financial expense. Moreover, loss of energy out of the agro-ecosystem will be checked and nutrient utilization capacity of the system will be optimised. This fact is one of the particular characteristics of sustainable agriculture (Bunch 1995, 14-20; Kahsay 1999, 109-115; Kotschi 1989, 2-33; Yehasab 1995, 13-66).

In line with this assumption, respondents from all sample sites were asked to verify the opportunity of their practices in utilizing and managing resources to their best uses. Accordingly, responding to the question how they fertilize soil in their coffee farm, 89.9% indicated to fertilize organically, 8.7 % chemically and 1.4% by combine organic and chemical fertilization. Examination of the individual sample groups avails contrasting information. At Baabboo, the response was 100% organic/biological soil fertilization while at Ambuyyee 30.4% responded to fertilize their coffee farms with agrochemicals.

As to why 100%, 69.6% and 100% respondents at Baabboo, Ambuyyee and Walakkee Sonboo respectively, make use of organic fertilization for three basic reasons. Information from the Agricultural and Rural Development office made clear that fertilization of coffee land by agrochemicals is forbidden in the area officially, to the extent of prohibiting the storage of harvested coffee in the 'madaberia' sacks. All such sacks were collected and burned, and every coffee producer is expected to store his produce in 'kesha' a sack made of plant fibber 'qacha'. This measure was taken, as believed by the office, to make coffee free from coming into contact with chemical fertilizers in case residual test is conducted. The information further established that use of chemical fertilizers is permitted for land under cereal crops only.

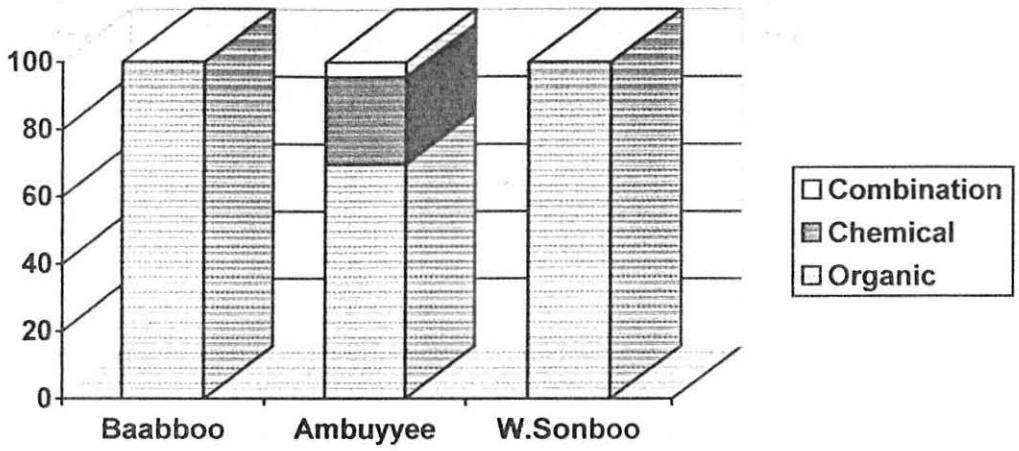
Data analysed from Baabboo and Walakkee Sonboo show that 100% of the HHs established that they fertilize their coffee farm organically. About 70% of respondents, a large number responded similarly at Ambuyyee. Yet their reasons differ. Respondents at Baabboo, through further enquiry by discussions and conversations, reported that they are organically certified through

their cooperative, thus not allowed to chemically fertilize their coffee farms, and if they are found doing so they shall be nullified from the list of organic producers. As a result, they shall be forced to sell their product at a conventional coffee price. Thus, they use only biological materials to fertilize their coffee plots. It is thus, assumed that farmers at Baabboo often use biological/organic fertilizers mainly due to its advantage of facilitating organic certification. Discussion with the whole sample group at Walakkee Sonboo and conversation at Ambuyyee with some farmers, clarified that in addition to the official prohibition of using chemical fertilizers on coffee farms, fertilizing with chemical fertilizers are completely unaffordable from the point of view of the ever-increasing cost of chemical fertilizers, and they are also aware that its long-term efficiency in soil fertilization is low unless more quantity is added to the same plot.

Regarding the specific agronomic techniques of organic soil fertilization that respondents employ on their coffee farm, various standard techniques were presented to them for identification. Accordingly, all respondents at Baabboo and Walakkee Sonboo, and all the respondents of the 69.6% of sample from Ambuyyee responded that they practice the combination of mulching, cover crops, nitrogen fixing trees, animal manure, composting and coffee pulp in fertilizing soil in their coffee farms.

The attitude of respondents towards the merit and demerits of organic/chemical fertilizers is another point of analysis conducted in this study. In helping soil fertility and maintaining soil health, 100% responders at Baabboo and Walakkee Sonboo and 69.6% at Ambuyyee confirm the superiority of using organic fertilizers over chemical fertilizers, while 26.1% witnessed the superiority of chemical fertilizers and 4.3% rated them to be equal. The overall rating of the study, however, shows that the superiority of using organic fertilizers over chemical fertilizers is established by 89.9%, that of chemical fertilizers over organic fertilizers by 8.7% and it is only 1.4% who rated them to be equal. Summary of data on soil fertilization is presented on figure 3.

Figure: 4. Use of Fertilizers



Source: Field survey

Cultivation of different multi-purpose crops on the same plot of farmland fosters efficient use of resources by farmers. Such agronomic practices provide multiple advantages to small-scale farmers in particular. If limited land operated by farmers is productively manipulated it maximizes the output of the farm activity. The ecological advantage of such practices is manifested in enhancing biodiversity, and in increasing biological plant protection capacity of the system. Equally important, such practices serve the purpose of highly enriching the soil quality and in effectively playing a fertilizing role, and finally minimize resource degradation (Bunch 1994:17; Kahsay 1999, 109-144; Yehasab 1995, 13-16). The employment of such cropping systems as leguminous plants as efficient utilization and management of resources are the principles of organically producing systems, which contribute to their sustainability.

Regarding the employment of mixed cropping and crop rotation in their coffee farms, 15.94% of the total sample replied that they use only one additional crop, 52.17% more than one and the remaining 31.89% responded that they practice neither crop rotation nor mixed cropping. Considering the samples, 48.7% from Baabboo responded that they practice crop rotation and mixed cropping in their coffee farm while 61.3% showed they do not practice. At Ambuyyee it is only 12.04% who practice crop rotation and mixed cropping while 86.9% do not practice. At

Walakkee Sonboo all respondents indicated they produce no other crops in their farms along with coffee.

The results show that basic principles of efficient resource utilization and management practices, like mixed cropping and crop rotation, are put to effect at Baabboo at a relatively higher level than they were employed at Ambuyyee and Walakkee Sonboo. The data on resource management opportunity are shown on fig 2 and Table 15.

Table 13: Magnitude of Additional Crops Produced in Coffee Farms (%)

Indicators	Variables	Baabboo	Ambuyyee	W. Sonboo
Additional crops	Only one	38.7	8.7	0
	Two and more	48.4	4.4	0
	None	12.9	86.9	100
Additional Cash crops	All	12.9	0	-
	None	25.8	86.96	-
	Some	61.3	13.04	-

Source: Field survey

3.2. Economic Performances

Any system of agricultural production needs be economically viable in order to achieve sustainability (Reijntjes et.al. 1992, 2-5). It is also clear that agriculture is very much an economic activity. A farming operation that does reward economically never exists for long (Gliessman 1997, 317). Based on this fact, the process of socio-ecological analysis of farming systems necessarily addresses the issue of the economic performance of the activities.

In order to do so, this paper employed examination of variables such as availability of capital, degree of financial autonomy, the level of premium payments, net profit and the level of savings in assessing the state of resources. Data collected from all sample sites were analysed and interpreted, and ultimately the different coffee production systems are compared. Resource management opportunity is investigated using the variables production per hectare, total production, number of on-farm and off-farm activities and net income as benchmarks to measure the economic performances of sample sites, mainly Baabboo and Ambuyyee. Descriptive

statistical techniques like the measure of central tendency and the measure of variation are employed in the analysis. Standard error and level of significance are employed to measure yield.

3.2.1. State of Resources

Availability of capital and degree of financial autonomy of the actors are considered to be some of the criteria for evaluating the state of resources in the economic performance. In order to identify, if they exactly recognized, the procedures of organic certification of their farms, sample elements selected from Baabboo were requested to identify the year in which they completed the conversion period of their farm. This step is a very crucial one in the process of organic certification of farm plots, which usually takes three years for perennials like coffee. As a result 3.2% responded 2004, 12.9% 2005, 6.45% as 2006 and 77.4% responded that there was no conversion period under which they have passed. Contrary to farmer's responses, it is verified from the producers' cooperative office at Baabboo that the cooperative registered for inspection in the same year 2001, the same year it was granted an organic certification. It was also clearly identified from the same office that there was no defined conversion period set either by the cooperative or the certification agent. Yet, the same year Baabboo cooperative registered for organic inspection, the cooperative at Ambuyyee did so, but was not certified as an organic producer. In any case, 100% of the total sample elements admitted that there was no any financial assistance, from any other party, which was directed to them during their conversion period. As a matter of principle, it is expected that farmers should be provided with financial assistance during their conversion period, since yield decreases in the first years of organic production on the one hand, and products from farms under conversion period are not allowed to be sold as organic and win premium price on the other. Regarding access to any financial assistance for managing their farms, all sample elements established that their farms are managed by their own, and no financial assistance is obtained.

Respondents were enquired to answer whether they owe any fertilizer loan from any body prior to 2001. Subsequently, they were also requested to respond on what position they are currently found regarding the payment of their loans. All respondents from Baabboo responded that they owe no fertilizer loan, 86.91% from Ambuyyee responded affirmatively and 60% from Walakkee Sonboo responded similarly. As to their current position, 25% of the respondents from Ambuyyee reacted that they still did not clear their credit while 33.3% of those from Walakkee Sonboo gave similar responses.

As results indicated, non-organic coffee producers were subjected to fertilizer credit prior to 2001 and a significant number of them are still not cleared-off from the loan. In case they obtain money, they shall be obliged to pay-off their credit than utilizing it for their own purpose. This lowers the level of financial autonomy on their earnings. The situation is vice-versa in the case of respondents from Baabboo who are organic producers. They are not obliged to pay-off any fertilizer credit. As a result, they enjoy higher financial autonomy on their earnings.

Certification is cited as the ultimate criterion of the procedure for organic production. As one of the main pillars of organics, certification is known to be the most expensive part of organic agriculture. This fact remained to be the main stumbling block for farmers from developing countries to sell their products in global organic markets. Up to recent times, except few Latin American countries, almost all certifiers are from Europe, USA and Japan. The undertaking is a monopolized business colony of industrialized nations not accessible for third world countries, which are the sole agricultural producers. That makes inspection and certification fee extremely expensive.

The cost of inspection and certification varies depending on individual certifiers and countries. There is no globally set standard fee. This by itself as problem for smallholder coffee producers, supplemented with high amount paid for inspection and certification make the condition more inaccessible for poor farmers. For instance, the external certifier who visits a farm once a year, charges USD 300 per day from the time of his arrival at the airport to the time of his departure. In addition, all accommodation cost during his stay and transport facilities during his field visits have to be covered by the body to be certified. The cost for both arrival and departure are also to be covered by the same body. Moreover, a farm to be certified is supervised twice a year by a local inspector who charges the farmer about USD 2000 per week. In the same manner, the farmer is obliged to facilitate accommodation and transport costs.

However, this condition is realized in the area of International Organic Movement and alternative options, which could reduce cost of inspection and certification, were worked out. One such alternative is to charge farmers' cooperatives collectively, the chance which Oromiyaa Coffee Farmers' Cooperative Union Ltd. was able to exploit. Accordingly, Baabboo producers' cooperative expends Euro1780 annually for inspection and certification collectively. The share of cost for each member is about Euro 1.8.

The dividing line between group one sample and groups two and three is organic certification. If both producers' cooperatives from Ambuyyee and Walakkee Sonboo, each sacrificing Euro1780 per annum, had been organically certified, the opportunity to access global organic market and there by winning premium payment for their coffee could have been facilitated, with additional expense of inspection and certification fee of about Euro 2.52 for Ambuyyee and Euro 5 for Walakkee Sonboo farmers individually, depending on the number of their members. Compared to the premium payments they could win, this additional expense could have not been a burden to the farmers.

Respondents from Baabboo were exposed to questions relevant to certification. As to how much they pay annually for inspection and certification, 58% responded that they do not pay, 18.35% responded they do not know the amount and 22.58% responded that they pay less than birr 100 annually for certification. Those respondents who do not know the amount and those who believe that they do not pay were directed to another question that enquires who then pays certification cost if they do not do so. All responded that they do not know who covers the cost for inspection and certification. Still more, all were enquired as to whether they are bound to refund the amount if somebody whom they do not know covers the cost. Accordingly, 51.6% responded still they do not know whether they are going to refund the cost or not, 29% responded negatively and the remaining 19.4% expected refunding of the amount.

Information gathered form the representative of the only certification agent in Ethiopia; shows that all organic certified cooperatives in Oromiyaa pay a minimum of EU1780 annually. The informant also disclosed that most of the expense is covered by a German institution called Allan Jery and some by the OCFCU Ltd. The German institution is said to reclaim the amount it covered from the premium payment, while the OCFCU Ltd. deduces the expense from sales' price. Information from the office of OCCFU Ltd. confirms this fact. The result shows that organic producers at Baabboo have higher chance of financial assistance, at least as certification fee, than non-organic producers.

The achievement in savings on all three sites as an indicator of economic performance was also examined. Farmers were asked what they have saved in kind since the last five years. Queries included a list of items purchased or constructed by respondents. The list was presented to respondents to identify which of the items were acquired by them. Analysis of data shows that 9

respondents from the total sample (69) saved nothing in kind in the last five years. Of these, 3 (33.33%) are from Ambuyyee while 6(66.66%) are from Walakkee Sonboo. On the other hand, respondents from Baabboo have achieved to save one or more of the items presented for identification. Table 14 shows savings in kind.

Table 14: Savings in kind

Savings	Total sample		Baabboo		Ambuyyee		Walakkee Sonboo	
	N	%	N	%	N	%	N	%
Built "korkoro-bet"	3	4.4	1	3.2	1	4.4	1	6.7
Bought additional livestock only	13	18.8	4	12.9	9	39.1	0	0
Bought wristwatch only	0	0	0	0	0	0	0	0
Bought tape recorder/radio set only	0	0	0	0	0	0	0	0
All of the above	10	14.5	8	25.8	2	8.7	0	0
Most of the above	34	49.2	18	58.1	8	34.8	8	53.3
None	9	13.1	0	0	3	13.0	6	40
Total	**69**	**100**	**31**	**100**	**23**	**100**	**15**	**100**

Source: Field survey

The amount of savings in cash by each sample element varies. Savings for each observation is different. This makes it necessary to construct group frequency distribution. A standard formula for grouping data is employed as follows: For the purpose of employing statistical techniques in the analysis, data collected is classified in to classes of savings. Classes were fixed by using the formula class = $1+3.322 \text{ Log}_{10}n$, where n is the number of observations. Accordingly six savings classes were fixed. Then width of each class is determined to be 1634 using the formula: ***W= Range/ Class***. The lower class limits and upper class limits for each class are generated, using the lowest observation to be the lower class limit. The unit of measure ***(U)*** being 1, lower and upper class boundaries are established by subtracting half a unit from the lower class limit and adding half a unit on the upper class limit of each class. Observations are then sorted, which gave the class frequencies from which percentages of cash savings are calculated. Since none of the

sample elements from Walakkee Sonboo responded as saving cash, analysis is done only for Baabboo and Ambuyyee. Savings in cash form was also assessed. It is only 39.1% of the total respondents who testified that they have managed to save capital in cash forms. About 64.5% respondents from Baabboo also reported to the same effect while 30.4% from Ambuyyee reported to save. None from Walakkee Sonboo saved. The results show that Baabboo farmers enjoy higher saving opportunity than those of Ambuyyee. Table 15 shows frequency distribution of cash savings.

Table 15 : Frequency Distribution of Cash Saving (in Birr)

Class Limits	Class boundary	Frequency			
		Baabboo		Ambuyyee	
		N	%	N	%
200 – 1833	199.5 - 1833.5	15	48.4	6	26.1
1834 – 3467	1833.5 - 3467.5	2	6.45	0	0
3468 – 5101	3467.5 - 5101.5	2	6.45	1	4.3
5102 - 6735	5101.5 - 6735.5	0	0	0	0
6736 - 8369	6735.5 - 8369.5	0	0	0	0
8370 - 1003	8369.5 - 10003.5	1	3.2	0	
Total		**20**	**64.5**	7	**30.4**

Source: Field survey

3.2.2. Resource Management Opportunity

Access to market is the final out-let through which the labour product of farmers materializes. Any farming system whose market access is blocked and bargaining power is shuttered cannot sustain the force of production i.e. the farmers. Market opportunity and rewarding price consolidate the economic base of producers and achieve the sustainability of the farming systems, assuming other factors of sustainability are met. Pertinent to this aspect of the economic performance and resource management efficiency, farmers responded to questions directed to them. According to data collected, 60.9% of the respondents informed that they sell their coffee based on local price offered by local traders and cooperatives. They are not exposed to information about coffee price both national and global and are forced to sell to cooperatives at the price offered to them. None of the producers, as per their response, does have access to world

coffee price to bargain and sell at that rate. A significant proportion, 39.1% responded that they follow-up coffee price from the media and conduct their transactions.

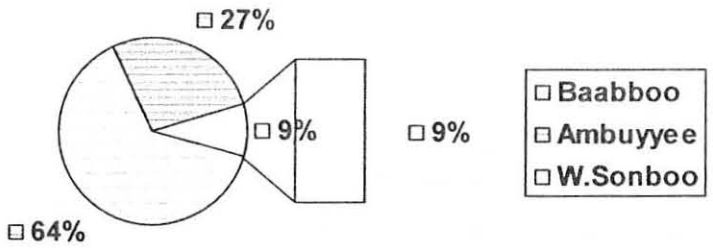
As to preference of clients between cooperatives, local traders and local consumers, all indicated that selling to local consumers is not preferred. Those who prefer to sell to cooperatives amounted to 77.4% while those preferring local traders 22.6% in Baabboo and 78.3% and 21.7%Ambuyyee respectively. Farmers at Walakkee Sonboo, where cooperatives are not yet established, directly sell their products to local traders. The opportunity of market access for Baabboo and Ambuyyee farmers is wider than Walakkee farmers. This wider opportunity emanates from the fact that both Baabboo and Ambuyyee farmers are organized under cooperatives who supply their products to Oromiyaa Coffee Farmers' Cooperative Union Ltd. Through the Union, by-passing the auction process, products of Baabboo and Ambuyyee are directly linked to international roasters, consumers and retailers. Yet, the level of advantage they enjoy varies. Products of Baabboo enjoy double advantage of organic and faire trade certification over Ambuyyee. Here again comes the higher opportunity to market access of Baabboo over Ambuyyee and Walakkee Sonboo Higher market access, on the other hand, implies frequent transactions, which in turn lead to sustainability of the farming system. Thus the organic production system of coffee, which is effective in Baabboo, enjoys higher chance of sustainability and a better economic performance than the non-organic system of production under implementation in the other two sample sites.

The existence of source of extra income is usually considered to be one of the indicators of the well being of the life of poor farmers. In coffee producing areas where the price of coffee is recurrently falling and yield fluctuates frequently, the position of farmers who do not have any other source of income besides the main crop coffee, is always found to be deterred (Gresse, 2002; 2-4). The existence of source of extra income is thus an optional way of subsidizing living expenses during boost years and substitutive during bust and low price years.

One of the sources of these additional incomes, which relatively improves the financial position of farmers, is off-farm activity. To this effect, the existence off-farm activities were investigated. Accordingly 84.06% of the sample responded that they do not involve in any off-farm activity. Thus, coffee is every thing for them. It is only 15.94%, who involve in off-farm activities. Of the 15.94% who generate extra income from off-farm activities, 63.64% are from Baabboo, 27.28% are from Ambuyyee and the remaining 9.08% are from Walakkee Sonboo. According to the data,

the possibility for generating extra income at Baabboo, where coffee is organically produced, is double as that of Ambuyyee and seven times as that of Walakkee Sonboo farmers. This fact shows the merit that organic production systems possess over conventional production of coffee as established in these sample sites. Fig. 5 shows the proportion of extra income generation.

Figure 5: Participation on Off-farm Activities



Source: Field survey

The study considered other on–farm activities, which could generate additional income besides coffee. Respondents are required to generate information on their average annual income of the last five years from coffee and from other crops they produce. They are also asked to give cost of production (inputs both labor and fertilizers) for the same period of time. Through the process of the responses, they recalled the amount of money they expended for hosting the collective labor (debo) they invited for clearing weeds in their farms. The responses in fact could not estimate the cost of family labor. It is also recognized in the process of the responses that they discuss and remind each other the amount they expended each year. Total farm income is computed by adding income from coffee only and income from other crops. Then, production cost was subtracted from total farm income to find the estimated annual net income from all on-farm activities. The measure of central tendency and the measure of variations are employed to measure the distributions and to compare overall performances of the observations.

Accordingly, average farm income at Baabboo amounted to Birr 2407.2, at Ambuyyee Birr 1332.6 and at Walakkee Sonboo Birr 920.8 Computed standard score for overall performance for total farm income, on each site, is 27 at Baabboo, 18 at Ambuyyee and 19 at Walakkee Sonboo respectively. The overall performance regarding total farm income, at Baabboo is 50% greater than that of Ambuyyee and 36.4% greater than that of Walakkee Sonboo. These results indicate that organic coffee production performs better than non-organic coffee production. Of course, the production cost of Baabboo, computed for standard score (overall performance) is greater than that of Ambuyyee by 18.8 %. This did not, however, negatively affect the position of total farm performance of Baabboo over Ambuyyee. Table 16 shows summary of data on income from all form activities, income from coffee only and income from crops other than coffee.

Table 16: Income (in birr)

Site	Source of Income/Expense	Sum	Mean	Standard Deviation	Standard Score
Baabboo	Coffee only	61900	1996.8	2800.4	21.4
	Other crops	37941	1223.9	790.5	46.4
	Production cost	25217.6	813.5	966.3	25.3
	Total farm	74623.4	2407.2	2678.5	27
Ambuyyee	Coffee only	17670	768.3	962.0	17.6
	Other crops	19895	1170.3	1523.6	12.3
	Production cost	6914.7	329.3	308.9	21.3
	Total farm	30650.3	1332.6	1626.1	18
Walakkee Sonboo	Coffee only	10898	726.5	610.4	16.7
	Other crops	4984	383.4	202.2	22.8
	Production cost	2070.7	147.9	179.9	10.7
	Total farm	13811.3	920.8	651.5	19.8

Source: Field survey

Regularity, volume and quality of supply of products are considered as indicators of the economic performance of farmers' engagements. These variables were examined for Baabboo

and Ambuyyee sample sites only. Data cover the quantity of washed coffee supply and prices of the last five years, 2001-2005, only.

Accordingly, Baabboo has supplied a total of 186480.5kgs of washed organic coffee to the Union, which it ultimately exported. The total sales are birr 1849002.30 at an average price of 9.92 birr/kg. This price fits to the price (9.6 birr/kg) with which the Union buys coffee from cooperatives (Gresse, 2002:7). Ambuyyee farmers have supplied the union with 56318kgs of coffee, which is sold for birr 534851.80 at a price of 9.49 birr/kg. A substantial difference is thus observed between the two systems of production with respect to quantity and regularity of supply and price obtained. The average annual supply for Baabboo is 46620.1 kg while that of Ambuyyee is 14079.5kgs. Computing for average price (dividing average supply by average sales), that of Baabboo is 9.92 birr/kg while that of Ambuyyee is 9.49 birr/kg, indicating disparity in quality. Baabboo was able to supply all through the four years while that of Ambuyyee could not qualify to be sold on fair trade, in the harvest year 2002/2003 due to its low quality, indicating irregularity.

Tests were conducted to verify if real differences exist between mean supply and sales Baabboo and Ambuyyee. Regarding supply between Baabboo and Ambuyyee, computed standard measure for mean differences is found to be 2.9 while that of sales is 1.38. At a level of significance of 0.05, when the value for the standard measure is greater than 1.96 or less than 1.9, the difference between means is significant. For this specific case, the value on the normal probability curve is 49.81%, which indicates that it is only 0.38% of the observations that falls between the mean and the value 2.9 on either positive or negative sides of the mean. This indicates that the differences observed between mean supplies are significant, confirming that Baabboo is better than Ambuyyee in supply. In the same manner levels of significance between mean sales was also computed. As a result standard measure of 1.38 was obtained. At a level of significance of 0.05, the value for the normal probability curve is referred to be 41.62%. That means it is only 16.76% which fall in between the mean and +1.38 or -1.38 values by mere chance. This again signifies the existence of real differences in between sales, confirming the superiority of Baabboo shown above. The measure of relative dispersion (coefficient of Variation) between supply and sales at Baabboo is 38.29% and 44.79% while at Ambuyyee it is 95.63% and 21.06%. The ratio of the variations, thus, will be 1: 1.5 and 1:4.54 respectively for Baabboo and Ambuyyee – so wide a variation confirming the inconsistency of the system at

social performance is given significant consideration in the assessments of organic coffee production (Scialabba, 2000:11-13; Reijntjes et.al. 1992: 24-34). The study, thus, based on the principle that organic system of production is socially just, investigated the social dimension of the systems of productions in all sample sites. Regarding evaluation of social performances, data were gathered based on the state of human resources and the management opportunity of these resources at all three sample sites.

3.3.1. State of Resources

Pertinent to these parameters, the study identified the state of human resource in terms of training needs, people expected to drive livelihood from the enterprise, land tenure and conditions of access to resources, gender desegregation and their access to resources. Relevant questions were posed to respondents. The results show that 26.6% of respondents from Walakkee Sonboo had the chance to be trained in two of the components of organic soil fertilization and techniques of biological control. From Ambuyyee 52.2% of the respondents were trained on all four components. Similarly 91.3% of respondents from Baabboo are trained on all components. Where skill is developed, the capacity of optimising production shall be obtained. Enhancement of human recourses in this regard, as previously cited, is possibly achieved by organic system of production at Baabboo more than it was done at Ambuyyee and Walakkee Sonboo.

Further investigation confirms the superiority of organic system of production over conventional. Sample elements were exposed to a number of assessments. Two specific questions, which indicate the state of resources, were presented to respondents: trainings related to farm management and trainings on legal requirements for organic production. The result shows that 69.6% respondents from Ambuyyee are exposed to farm management, 76.7% respondents from Walakkee Sonboo and 88.7% from Baabboo respectively. Here again as the results show, respondents from Baabboo indicate that the area is more accessible to meeting training needs than the other two sites.

With this view, more questions were presented to respondents. As a result, respondents from Ambuyyee and Walakkee Sonboo responded, all in all, that they were never exposed to trainings related to legal requirements of organic production. This is because they are not organically certified producers and are not expected to do so. However, 49.5% of respondents from Baabboo indicated they are trained on the different components of legal requirements of organic

production. The results of the study show two points of significance: for one thing, some elements of this sample group, hence, actors of organic coffee production have more opportunity to be exposed to additional knowledge and skills than the other two groups. This gives the system of production more opportunity of exposure to additional source of knowledge in contrast to non-organic way of coffee production practiced in the other two e sites.

Baabboo was producing and marketing organic coffee since 2001. With half a decade of involvement in organics, and yet more than 50% of the producers not knowing what legal requirements they should fulfil, makes the situation precarious. Marketing of agricultural products demands strict obligation of meeting legal requirements. As observed in the survey, under the condition where more than half of the producers lack knowledge of these requirements, fulfilment of organic standards could be a problem. In cases of strict inspection and certification procedures, possibilities of nullifying the products to be marketed as organic may occur, resulting to put the sustainability of the production system under question. Thus, since engagement in organic production dictates that producers should be conscious of all requirements, training farmers to this effect is fulfilling the requirement on the one hand, and averting risk of un-notified inspections on the other. Summary of the data on trainings is presented on Table 19.

3.4. Institutional Performances

The analysis of socio-ecological performance of a farming system considers the institutional component as a vital dimension for its sustainability. The operations of formal and informal institutions will have direct impacts on the ultimate out-put of the system. The existing complexities of norms and codes of behaviour, naturally, will have influences that shape human interactions impacting on the overall productive capacity of the system. Operational and formal laws and regulations will have biding influences on the standards of farm products, either by allowing or hampering access to markets. The mode of governance and procedures of decision-making can encourage or discourage main actors in enhancing their efforts, in feeling freedom of action, in enabling them to boldly claim the share of the fruits of their labour; or in putting them under submission and enslavement. One of the values of sustainability of organic agricultural production emanates from the possible achievements cited above (Scialabba, 2000:12-14).

Based on the principle that the institutional performance of organic production system is sound, investigation was conducted to this effect at sample sites. Relevant questions were presented to respondents regarding democratic decision making opportunities and practices of good governance in producers' cooperatives. Respondents were exposed to a question, which enquires as to how the decision about allocation of net profits was made. Of the total sample elements, 37.1% responded that the decision was made either by Government or by the influence of government bodies, 27.8% responded that it was made by the Board of Directors of the Union, 12.9% replied that the decision was made by Management of the Union while it is only 22.8% who claim that the decision was made by their democratic will. Totally, 77.8% of the respondents exposed that the cooperative member farmers did not decide the allocation of net profits.

Verifying the opinion respondents hold towards the Cooperative Union and their producers' cooperatives, 27.8% appreciated the Union and the cooperatives as protecting their interest while 72.2% of the respondents disclosed their feeling that they do not protect their interest. For instance, respondents from Baabboo have expressed their complaint about the large share they were told to own in Oromiyaa Cooperative Bank by the leadership of the cooperatives whereas they were neither consulted to buy shares nor were told the amount of share they own either

commonly or individually. This indicates that either the union residing in Addis or producers cooperatives located in the sample sites are lacking acceptance by their own members.

It is a sour life experience of farmers that cooperatives during the Dergue Regime served as tools of suppression for the Military Government. Currently, it is expressed with high-sounding words that cooperatives are serving the purpose of their members and they are organized anew by the will of the people. To this affect, investigation was conducted as to how respondents compare their leadership in view of those of the Dergue time. The results show that 18.5% responded that they are similar with those of Dergue, 61% rated them to be better than those of the Dergue time and 20.4% complained that they are worse than cooperative leadership of Dergue time. Those who complain against the current leaderships to be not well-off than the Dergue cooperatives, amount to 38.9% of the respondents, a significant proportion nearly 40% of the sample.

In the process of administering the questionnaires, even respondents who rated the leadership to be better than cooperatives of the Dergue, exposed their feelings that it is risky to express opinions openly against the leadership. They feel no freedom of expressing their true opinions against the leadership in fear of being attacked under different pretexts (see box below). A significant number of them complained to be exposed to such questions arguing "they are fed up of such questions which ultimately leave things as they are". At this juncture, it worths shedding light on the fact that, the surveyor has recognized from searching the roasters at both cooperative offices, that both cooperatives are not established anew. They are simply cooperatives formed under Dergue and are made to continue operating. In addition to this fact, exploiting the chance of being present on the General Assembly of the cooperative at Ambuyyee, the surveyor came across the following complaints of members raised on the meeting:

- The leadership has become dictator,
- The leadership is intervening in other issues related to their private lives,
- The leadership is corrupted and accumulating wealth,
- The leadership is inciting them against the government,
- The leadership is inciting local government officials against them,
- The leadership did not coordinate them to use their wealth efficiently, and
- The leadership should stand trial for the evil deeds it has perpetuated.

At this very assembly was deposed the leadership and replaced by another committee. Information gathered from Baabboo confirms that it was only in the recent past that a similar measure was taken there too.

Respondents, were enquired to propose solutions about the cooperative they complained about. Optional measures to be taken, such as strengthening, disintegrating and decentralizing cooperatives were presented to respondents to identify what they wish the cooperatives to be. As a result, 25.9% responded cooperatives to be disintegrated, 70.4% wished them to be strengthened and 3.7% responded that they do not mind what ever happens to cooperatives. Those who are not happy with the cooperatives thus constitute 30.5%, or one third of the respondents. Though a minority, this number constitutes a good proportion of the sample, which makes the acceptance of the leadership questionable.

From net profits, 30% is allocated to the implementation of social services. Respondents were asked what social services are put in place through the union or by the cooperatives from the

profit allocated to the purpose. As a result 100% responded that, of the seven choices presented to them to select from, neither the cooperative nor the Union has provided social services with the allotted portion of the profit. The same response was obtained from discussions held at Baabboo with some members of the leadership and with people in charge of both offices.

The preceding few paragraphs shed light on the states of democratic practices, implementation of good governance, farmers' participation in decision-making and provisions of social services in the sample sites. These facts, complemented with relevant variables investigated for social performance, indicate the existence of major constraints uncovered by the study, which ultimately endanger the sustainability of both farming systems. In particular, these constraints are totally incompatible with organic production system as observed at Baabboo, leading to unsustainability in the long run. Table 22 shows the proportion of responses given to variables relevant with opinions of sample elements to cooperatives and their leadership.

Table 22 : Opinions towards Cooperatives

Variables	Indicators	Baabboo		Ambuyyee	
		N	%	N	%
Opinion towards cooperatives	Protects my interest	12	38.7	3	13.1
	Does not protect my interest	19	61.3	20	86.9
Wish of elements towards cooperative	Disintegrate	12	38.7	2	8.7
	Strengthened	18	58.1	20	86.9
	Let every thing happen to it	1	3.2	1	4.4
Comparison of leadership with Dergue cooperatives	Similar	8	25.8	2	8.7
	Better than	23	74.2	10	43.5
	Worse than	0	0	11	47.8
Decision of profit allocation	Government/government bodies	10	32.3	10	43.5
	By board of union	8	25.8	7	30.4
	By management of union	1	3.2	6	26.1
	Democratic will of members	12	38.7	0	0

Source: Field survey

IV. SUMMARY AND POLICY IMPLICATIONS

This chapter is the concluding chapter of the work, where findings and discussions conducted in the previous chapters are summarized. Also the chapter attempts to give insight to policy issues of relevance regarding organics in general and organic coffee production in particular. The generalizations attempted to make, are of course, and based on the survey conducted on the representative sample study.

4.1. Summary

The survey covered a total of 69 household sample elements from a population of 1900 households possessing coffee farms, which is 3.6% of the total population. Assessments and analysis of results focused on the framework of socio-ecological analysis to investigate the ecological, economical, social and institutional performances of organic coffee production at the focal sample site Baabboo. Evaluation and measurements of variables are compared with those at Ambuyyee and Walakkee Sonboo, where coffee production organically does not take place.

The assessment of the state of natural resources in all sample sites do not show any difference on the ecological performance of organic and non-organic systems of production. Tenure security and land availability are common phenomenon for all sample sites, and thus do not show any differential effect on the performances. Investigation for yield, however, resulted to significant differences between the two systems of production due to their intrinsic nature. Coffee production under organic system showed a higher yield and lower variation between slack and peak years. This is supposed to emanate from the capacity of organic production to sustain itself.

Baabboo farmers are found to practice eco-regulation and biological/organic soil fertilization at a higher level than farmers at Ambuyyee and Walakkee Sonboo. These practices highly contribute to the ecological soundness of an ago-ecosystem and are highly preferred by farmers as indicated in the study. As a result, resource management opportunities of the two systems of coffee production, regarding biological diversity and species abundance, have established a better performance at Baabboo than at Ambuyyee and Walakkee Sonboo. Plant biodiversity and species abundance are enhanced or

conserved in the area of organic production than in areas of non-organic production. This is due to the fact that organic system of production, which uses no agro-chemicals, is an ecologically sound agro-ecosystem enhancing biodiversity. Accordingly, organic coffee production, as implemented at Baabboo, proved to conserve and utilize the natural resource base at a higher level than non-organic system of coffee production.

Regarding cropping systems such as having multi-purposes, the engagement of Baabboo farmers rated relatively better than those of Ambuyyee and Walakkee Sonboo. Yet, even Baabboo farmers, who are organic producers, are not found to efficiently practice these techniques. Mixed cropping, multiple cropping and crop rotation practices are efficient ways of fertilizing the soil, conserving soil moisture and facilitating nutrient recycling. Moreover, they are efficient in disease and pest protection. The study indicated that in all sample sites in general and Baabboo, as an organic producing area in particular, much is expected to be done in this regards to gear the production system to further achieve environmental sustainability.

The study has uncovered significant differences between Baabboo and other sites on the state of financial autonomy farmers enjoy. Organic coffee producers are known to be free of any fertilizer loan unlike the majority of non-organic producers. It is also confirmed that financial assistance in the form of pre-payments for certification fee, though available to organic producers, did not negatively affect them since it is immediately refunded at sales. Additionally, the premium price organic producers capture from the sale of organic coffee is found to improve their financial earnings and enhanced their saving capacity.

The capacity of generating extra income from both off-farm and on-farm activities of organic producers is enforced by the ability of the system to support the production of other crops and the intrinsic nature of the system to practice different systems of cropping. The higher income and savings obtained fosters the chance of involving in the generation of off-farm activities. These have encouraged the organic coffee producers to keep the standard and quantity of their supply. This in turn facilitates conditions to capture higher premium price for their organic coffee. Consequently, achievement of the profitability of the system is established as confirmed by the study.

All variables investigated under the economic dimension in all three sample sites clearly indicated organic production system at Baabboo to be of higher economic performance than the non-organic production systems at Ambuyyee and Walakkee Sonboo. The cumulative effects of these performances enforce the economic viability of the system under study to qualify as a system of sustainable agricultural development.

The analysis of social performances indicated that the state of human resources, with respect to fulfilling training needs is relatively better achieved at Baabboo than in Ambuyyee and Walakkee Sonboo. However, the study uncovered a serious gap, particularly at Baabboo, with regard to trainings on issues of relevance to organics such as legal requirements, organic standards and quality management systems. This is a potential danger discovered in Baabboo, whose negative effect can crack the sustainability of the production system. Social justice and equity are observed in neither of the sample sites. Alienation of female family members from entitlement to property prevails in Baabboo as it does in non-organic producing sample sites. In this regard, organic production system at Baabboo could not make a break-away from the conventional way of social approach, and thus is suffering from satisfying one of the crucial criteria of sustainability.

Weaknesses in the institutional performances of organic coffee production at Baabboo are one of the constraints brought to light by the study. Lack of transparency and absence of good governance are manifested in lower popular participation and illegitimate leadership of cooperatives. Corruption, dictatorial behaviour and absence of accountability of the leadership of the cooperatives have resulted to lack of confidence from the side of farmers on their own institution. A scenario such as prevailing in both sample sites does not foster the development of the agricultural system. This state of the institutional performance certainly hampers the sustainability of organic production at Baabboo. In the contrary, organic agriculture is based on fairness – fairness to the primary producers in every aspect.

4.2. CONCLUSIONS

Organic coffee production as a new approach of agricultural development in the area proved to perform well with respect to ecological and economic dimensions. The results of the ecological performances are believed to emanate from the common phenomenon prevailing in almost all coffee producing areas of the country. One can assume that the use

of agrochemicals by our farmers in their coffee farms is at its lower level, eco-regulation is a cultural plant protection practice employed by poor farmers, and that farmers usually plant and keep trees in their farms for their immediate purposes. Though these practices have their own contributions to organic coffee production in the sample site, the differential impact they have produced at Baabboo can not be of significant importance as compared with the other two sites. The higher economic performance, in light of falling coffee price in other areas, can certainly be the merit of the specific production system. The impact of the economic performance is based on the fact that Baabboo coffee farmers have succeeded in obtaining organic certification for their coffee. This has made them access global organic and fair-trade coffee markets from which they capture higher premium price. Here lies the differential impact of organic coffee production.

However, social and institutional dimensions, which are based on conscious involvement of the community and individuals is at its lowest level. If a 'break-away' is not met in such sensitive involvements, the system can face a 'break-down'. As a new undertaking, then, organic coffee production as implemented at Baabboo could be a bad example to be a model for the neighbourhoods. Ultimately, it could possibly result to a shuttering effect to the development of organic production at large in the area.

4.3. POLICY IMPLICATIONS

Organic agriculture is often understood, as a system of food production geared towards the satisfaction of consumption needs of developed countries. In most organic guidelines (Standards) this is clearly stated as protecting consumers from 'fraud'. It is often mentioned that organics is meant for the choice of quality life for the rich. However, there are a number of other concerns, which govern choices of conversion towards organic agricultural production. These concerns vary for developed and developing countries. The main objective for developed countries is to bring about an ecologically, economically and socially sound option in food production and consumption. For developing countries, however, it is directed to income generation through the promotion of certified organic food.

Introduction of organic agriculture, through organic coffee production as an entry-point, is a recent phenomenon in Ethiopia. It is only half a decade since the first certified organic

coffee is exported from the country. For the last five years, the country did not possess an official organic agricultural policy. The Ethiopian government had reservations with the pretext of advancing intensive agriculture to boost food production. The current market-oriented and production of value-added agricultural production approaches of the Federal Government have positive environment for the promotion of organics in Ethiopia.

Oromiyaa Coffee Farmers' Cooperative Union Ltd. was able to scrutinize the ever declining coffee price and the inability of Ethiopian coffee to compete at a global market. Meanwhile, the Union recognized the increasing demand for organic products, as a result of which conversion to organic production system was realized. Other cooperatives in the South switched to the same direction. These scenarios, at last forced the Federal Government to enact an organic agricultural law. Policy formulation on organics is a bottom-up pressure for the Government to re-structure the agricultural sector.

The core policy issues of organic agriculture in Ethiopia are based on income generation through export promotion. The higher premium price obtained from value-added commodity, such as certified organic coffee, attains a place for the country on world market. Under the condition where foreign currency is scarce, it reduces costs by promoting efficient utilization of local resources and by saving on imported agrochemicals. In addition to this, in face of the declining government budget, the commitment of the government to organic production could be conceived as a creative response to withdrawal or minimization of government support to agriculture. In all respects, the market-led policy environment of the country is conducive for the promotion of organic agriculture, opening the possibility for the involvement of the private sector. It is an opportunity to be exploited by coffee farmers and traders since a positive intervention of the Government is realized.

The opposite side of the scenario bears a challenge for the production system under consideration. The main challenge rests on the difficulty of compliance to the organic standards and legal requirements. The draft organic law is meant to satisfy all necessary legal requirements and organic standards set on Codex Alimentarious. Accordingly, the processes of inspection and certification dictate high level of quality management systems. Seed sources, types and nature of fertilizers utilized, site plan of each farm plot, and other

specific and detailed records of the farm have to be availed ready at hand. Compliances to these conditions are necessary for a product and a farm to be organically certified. In this respect, implementation of the law to the advantage of smallholders is a challenge to be tackled. As a tool, though passing organic law is a positive measure, but the advantage to the promotion of organics lies on its wise implementation. For instance, the organic law recently endorsed by the House of Peoples' Representatives should be communicated at grass-roots level. Trainings and orientations should be provided to all parties concerned. Extension works should be effectively conducted to promote organic agricultural products in addition to coffee.

The sole objective of the conversion to organics in Ethiopia, in particular, is income generation and export promotion. It is also evident that environmental concern remains second to livelihood needs. Yet, the core value of organic production still remains to be achievement of ecologically sound production, without which all objectives fail to be accomplished. This is an equally important challenge that the policy needs to seriously consider. The policy environment should coil environmental sustainability, food security and self-reliance in the realm of income generation. Striking a balance in these regards is a challenge to be effectively faced.

In a similar manner, the complicated system of inspection and certification, the absence of universal standards for organic products, and the non-uniform and expensive cost of certification are stumbling blocks for organics in the country, and thus, are areas of due policy considerations. It is a challenge for all parties concerned to explore alternative ways through which the hurdle of inspection is jumped over with the simplest of efforts. One such possible alternative is the employment of Internal Control System. This system is one, which engages organized farmers to conduct internal inspection, thereby shortening certification procedure, and minimizing cost of certification.

Under market-oriented economic policy, organic inspection and certification will obviously become a potentially profitable industry to the private sector. The technical know-how and the provision of certification services are already in the hands of private organizations. This creates a risk to the export of certified organic products becoming a business colony dominated by dominated by large farmers and /or highly organized and

favored groups. Such conditions will make things unaffordable to small farmers, and finally lead to a breakdown of organics in the country. With respect to this challenge, government policies should play key roles in solving technical problems of production and costs of certification. In fact, the participation of the private sector in the industry is badly needed. Legislative frameworks, which provide definitions, standards and accreditation to certifiers, are expected to provide equal and balanced opportunities to all involved.

Finally, successful promotion of organic agricultural development can never be dreamt in the absence of research and knowledge building. It is highly essential that government and non-government supports to organic agriculture focus on research and education. This calls a shift of capital investments from hard to soft technologies. i.e. subsidies previously used to be advanced to chemical inputs should be re-directed to knowledge building (research and education). This is a major policy challenge to organics in Ethiopia.

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