Deutscher Tropentag 2004
Berlin, October 5-7, 2004
Conference on International Agricultural Research for Development

The Status Of Coffee Production And The Potential For Organic Conversion In Ethiopia

Mekuria T., Neuhoff D. and Köpke U.

University of Bonn, Institute of Organic Agriculture,
Katzenburgweg 3, D-53115 Bonn, Germany
Contact Address: e-mail: uzsxcm@uni-bonn.de

ABSTRACT

The collapse of world coffee prices is contributing to a socio-economic decline affecting an estimate of 125 million people world-wide. In Ethiopia, the fall in farmer and government revenues amounted to 42% within a year. In the country some of the major coffee growing regions were visited and intensive discussions on coffee production and marketing with farmers, advisors, traders and researchers were held on. The conclusion was drawn that Ethiopia has the potentials to produce certified organic high quality coffee due to favourable growing conditions and the high diversity of genetic resources in Coffea arabica. Currently, certified organic coffee production accounts for only an estimate of 0.1% of the total national production. Coffee farmers convert to organic production in expectation of higher revenues. Conversion to organic coffee production may, however, result in a significant decrease of crop productivity. Multi-disciplinary research activities on sustainable organic coffee production systems are expected to boost production and promote high quality coffee. Various agronomic and socio-economic research programmes are highly needed. A key focal point is efficient nutrient management by composting coffee husks/pulps, and green manuring by mixed planting of suitable legumes. Moreover, a systematic screening of cultivars with respect to potential use in organic coffee production is recommended. Aspects of taste and quality of coffee deserve special attention as well. Fair Trade organic coffee impacts on rural development in Ethiopia by providing options to stabilise the market for organic growers. Furthermore, the consumer is provided with a range of new products. That could help alleviate the coffee crises and improve social and environmental stability.

Keywords: Coffee crises, organic *Coffea arabica*, Ethiopia

INTRODUCTION

The word "coffee" comes from the name of a region of Ethiopia where coffee was first discovered – ‘Kaffa’. The name ‘Kaffa’ is inherited from the hieroglyphic nouns ‘KA’ and ‘AfA’. ‘KA’ is the name of God, ‘AFA’ is the name of earth and all plants that grow on earth. So the meaning of Koffee (Coffee) from it’s birth-place bells on as the land or plant of God.

Botanically, coffee is belonging to the family *Rubiaceae* in the genus *Coffea*. Although the genus *Coffea* includes four major subsections (Chevalier, 1947), 66% of the world production mostly comes from *Coffea arabica* L. and 34% from *Coffea canophora* Pierre ex Froehner (robusta type), respectively.

Ethiopia is the home and cradle of biodiversity of Arabica coffee seeds. More genetically diverse strains of *C. arabica* exist in Ethiopia than anywhere else in the world, which has lead botanists and scientists to agree that Ethiopia is the centre for origin, diversification and dissemination of the coffee plant (Fernie, 1966; Bayetta, 2001).

Agriculture is the main stay of Ethiopian economy, and contributes to more than 50% of GDP, 80% of exports and 85% of employment. Coffee is the major agricultural export crop, providing currently 35% of Ethiopia's foreign exchange earnings, down from 65% a decade ago because of the slump in coffee prices since the mid-1990's. In a country where about 44% of the population is under poverty (Woods, 2003), coffee cultivation plays a vital role both in the cultural and socio-economic life of the nation**.** About 25% (15 million) of the Ethiopian population depend, directly or indirectly, on coffee production, processing and marketing.

As shown in figure 1, the estimated coffee production area (2% of total cultivated land) in the country is measured in the range of 320.000 to 700.000 ha (FAO, 1987), though potentially there exist about 6 million ha cultivable land suitable for coffee production. The coffee cultivation takes place from 900 in Magi (Kaffa) to 2300 m asl in Gore (Illubabor) (Fernie, 1966), albeit the optimum productive plantations are located between 1500 to 1800 m asl (Paulos,1994). The dominant coffee growing soil types are Nitosol (25%), Acrisol (17%), and Luvisol (14%) (Höfner, 1987). The soil texture class is varying from clay (13%), loamy clay (29%), silty clay (29%), to sandy clay (22%) in relative proportion. The soil pH-value ranges from 4.4 to 6.8. Diurnal and seasonal fluctuations in temperature (14 to 30°C), relative humidity (43 to 85 %) and heavy rainfall (1000 to 2000 mm) are very frequent in different coffee growing zones (Gamechu, 1977).

The forest and semi-forest (10%), garden coffee (85%), and plantation coffee (5%) are the major conventional production systems (Fig.1). There are variations in genotypes, eco-physiology and the biosphere of coffee under different production systems. Plantation coffee can be regarded as an intensively technified system. The small scale farmers are the major producers, whereby about 140 local coffee land races known to grow as garden with owing on average 0.5 ha of coffee farming systems (Demel et al., 1998).

Fig.1: The major coffee growing area map (*left*), garden (*middle*) and typical modern coffee plantation (*right*) cropping system in Ethiopia.

In the past four decades, the global crises in coffee production (prices) has had dramatic consequences both at micro- and macro-economic levels across the world. Coffee growing regions from Central America to Africa (an estimated 125 million people) have been affected by the collapse of world coffee prices (Fritsch, 2002). Ethiopia is the biggest looser. In total, revenue from coffee dropped with the fall in amounting to 42% within a year (Raworth & Wilson, 2002).

Organic coffee production is based on the use of renewable resources and clearly aims to sustain management of natural resources (soil, biodiversity, water, nutrients, energy etc.) (IFOAM, 1998; Demeter, 1986). It has long been competitive to meet consumers demand, but it has failed to fully develop from conventional coffee production systems, that advocate undesired agrochemical inputs as practised in some countries like Brazil and Vietnam. For the organic coffee sector, quality control through inspection and certification is compulsory (Kotschi & Adelhelm, 1984). In Ethiopia, onset of certified organic farming arised from a market deficit of the conventional coffee farming, but there is little information documented about such important segment of coffee production and the country's economy.

Therefore, the objective of this paper is to provide some insights on the current status of organic coffee research and production in relation to widely adopted conventional coffee farming systems in Ethiopia. Key issues on certified organic coffee production systems and its potential impacts on affecting the poverty line of small scale coffee producers have also been discussed.

MATERIALS AND METHODS

A survey was conducted on major coffee producing regions during March 2004 in order to assess the current status of certified organic coffee production (OCP) in Ethiopia. The south (Sidamo and Yirga Chefe) and south west (Jimma, Agaro and Gomma II plantations) coffee growing regions were surveyed. Randomly selected farmers were interviewed to point out their views on organic coffee production systems, including limitations and benefits as compared to other farmers who produce coffee in conventional ways. The survey was supplemented by experts' knowledge, views from national coffee researchers, co-ordinators of organic coffee farmers co-operative unions, and some policy makers. Literature resources on essential information of the organic coffee sector and its prospects for producers, consumers and ecologically stability were reviewed.

STATUS OF ORGANIC ARABICA COFFEE PRODUCTION

The global production capacity of the organic coffee for export is estimated at 12.000 tonnes and 30.000 tonnes for the years 2000/2001, respectively (ICO, data base). Roughly, 50% world supply of organic coffee is produced by small farmers' organisations which are members and non members of FLO-International (Fair Trade Labelling Organisation). Brazil, Vietnam, Colombia, Cote d'Ivoire, and Mexico were the five major producing countries for organic Robusta coffee in 1999/2000, whereas Germany, Sweden, the Netherlands and Denmark were the major importing countries in year 2000 (Kilcher et al., 2002). The sales potential for organic coffee represents only a small fraction: globally about 0.5% of all coffee produced is sold as organic, thus, it is regarded as only niche market or cause coffee (ICO, data base).

As far as Ethiopian Arabica coffee is concerned, more than 90% of the coffee produced was accepted to be *de facto* organic, albeit a certification of small-scale co-operative organic coffee farmers by a small company (BCS* OKÖ-GARANTIE GMBH, GERMANY) exists since 1999. Small-scale farmers owing less than one ha of coffee trees first formed co-operative which was supported by USDA with close collaboration of a local bank (Bank of Abyssinia) to provide initial credits for inputs. Under the umbrella of those co-operative unions some of the farmers converted to be pioneer members of certified organic producers. Yet, the Oromia (OCFCU), Sidama (SCFCU) and Yirga Chefe (YCFCU) Coffee Farmers Co-operative Unions are the major producers and suppliers of certified organic Arabica coffee, which accounts for only less than 0.1 % of the total coffee production in the country.

According to existing scattered information compiled from organic farmers cooperative unions, the number of farmers, the size of coffee plantations and estimated amount of annual green coffee yield for each co-operative farmer are compared in figures 2 and 3. About 60 to 70% of the production is supplied as washed coffee, and the rest as sun-dried coffee. The figure of certified organic arabica coffee green beans (Fig. 3) was compared to the total national green coffee bean exports (Fig.4). Generally, the trend shows that the share of certified organic coffee export is very

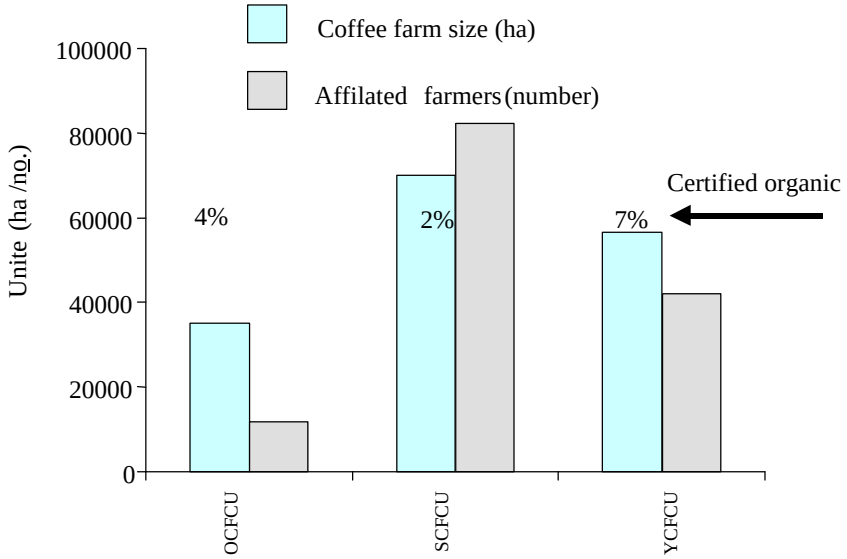

Fig.2: The current status of farm size, affiliated farmer numbers and an estimated percentage of certified organic Arabica coffee production by the Oromia (OCFCU), Sidama (SCFCU) and Yirga Chefe (YCFCU) Coffee Farmers Co-operative Union's in Ethiopia (See Fig.3).

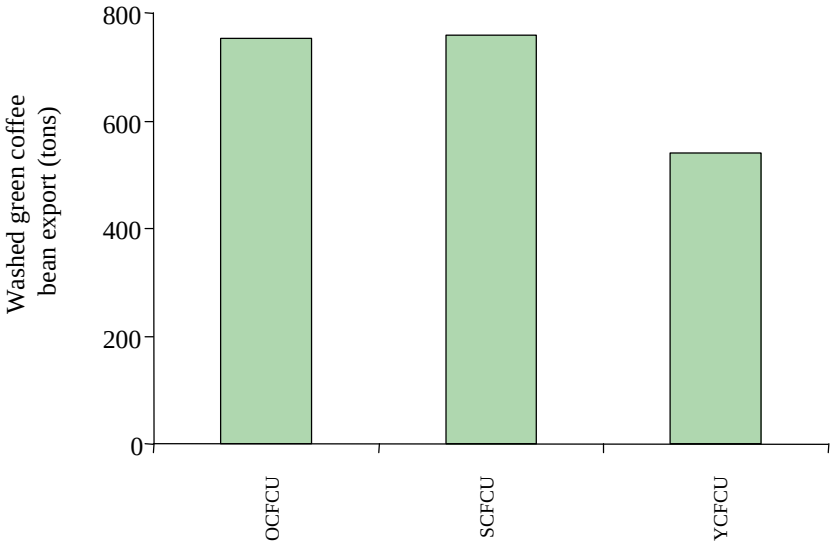

Fig.3: The average supply of green certified Arabica coffee to world market from the three farmers co-operative unions over the periods of 2000/2002 (unpublished data collected from each farmers cooperative unions).

low, as compared to the existing immense potentials that the nation endowed with to meet the global needs of consumer's. But almost everywhere, whereby conventional farmers were interviewed for their future farm strategy replied that they would prefer to convert certified organic coffee production, provided that reliable market situation and effective technology stabilising the coffee yield and quality are well promoted.
According to a recent report of Yussefi and Willer (2003) about the status of organic farming in Africa, the four leading organic coffee and other cash crops (e.g. cotton and tea) producer nations are Uganda (122.000 ha), Tanzania (55.867ha), South Africa (45.000ha), and Zambia (20.000ha). Existing data (figures 2 and 3) considerably indicate that there are enormous potentials for developing of Organic Agriculture in Ethiopia, with coffee farmers in a position to pioneer certified organic crop production.

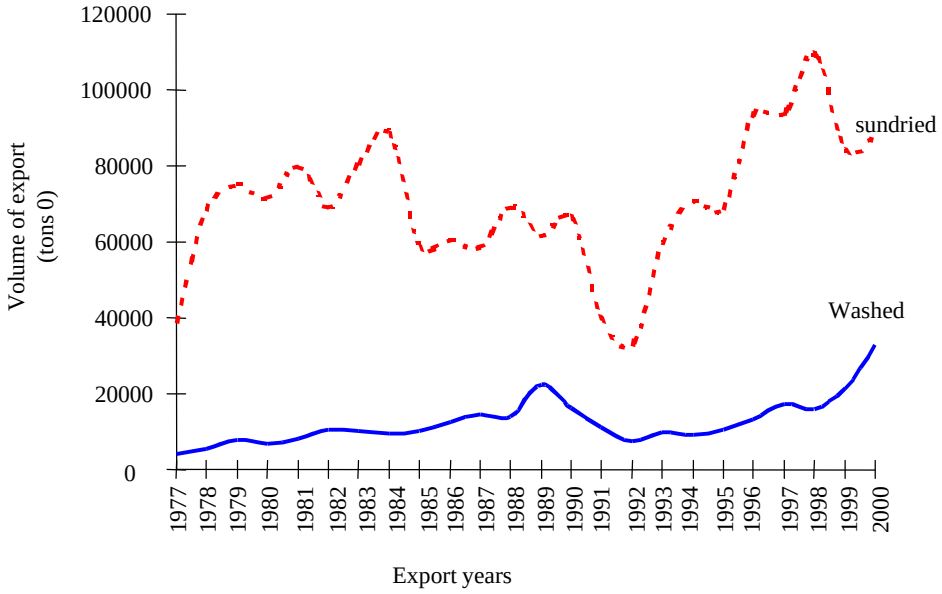

Fig.4: Status of non certified Arabic coffee exported to world market during the periods 1977/2000 [Coffee and Tea Authority of Ethiopia in Tura (2002)].

Among the major agronomic practices include the use of shade trees (e.g. *Albizia*, *Accacia*, *Cordia*, *Sesbania*), use of coffee berry disease (CBD) resistant selections (Van der Graaff, 1978), mulching, intercropping with other staple food and cash crops, green manuring (e.g. *Desmodium*, *Crotolaria*), hand weeding, and composting with coffee husks /pulps. The use of coffee husks/ pulps as compost to improve the soil nutrient status of coffee has been positively reported (Chane,1999), but still there are ongoing studies at the Jimma Agricultural Research Centre (JARC). Regular hand-picking of red cherries, washing or sun-drying of green beans are harvesting and processing methods, though there is known to be an established internal control system by the organic certifier throughout all the chains of production, processing and marketing activity.

ORGANIC ARABICA COFFEE QUALITY & SPECIALITY

A coffee quality can be defined in terms of its organoleptic cup-quality (cup-of-excellence), physical appearances and inherent chemical constituents (sugars, caffeine, volatile and non volatile phenolic contents) of a green bean produced. Moreover, today's definition of a coffee quality is comprised of some more additional characters, which include the description of the way

how the crop is grown and how its quality is settled up matching to consumer's preference by a third party. According to the Speciality Coffee Association of America's as noted by David (1997) coffee quality refers to "... total quality which encompasses quality of life, quality of cup, and quality of the environment...". Similarly, the Speciality Coffee Association of Europe (SCAE) defined speciality coffee as a way of market presentation to charm consumers, which entails certain principal concepts derived from the origin of cultivation, genotypes, processing levels, and cropping systems (organic, shade, mountain, etc.). Hence, all the domain of diversity of the finest of coffee world are categorised based on geographic origin, anomalies (peaberry), roast styles, blends and blendings, cause-coffees (e. g. bird friendly, highland, eco-, bio-, mountain etc.), flavoured coffee, decaffeinated coffee, espresso, fast coffee, gourmet, etc..
Ethiopian farmers normally produce different types of single-origin speciality of Arabica coffee. For conventional producers, there are clearly identified nine spectra of single-origin-speciality coffee (Jimma, Nekemte, Illubabor, Limu, Tepi, Bebeka, Yirga Chefe, Sidamo and Harar) which are so far well diffused into the trade circuits of coffee world. Among them the sundried coffee beans from 'Harar' the so-called "Mocca" and washed beans from 'Yirga Chefe' are considered as the finest and best of all coffees. The certified organic farmers observed to produce mainly the three speciality types: 'Limu', 'Sidamo' and 'Yirga Chefe'. Within the domain of 'Yirga Chefe' speciality, fore example, the finest coffee is said to be harvested in the altitude ranges between 1500 to 2000m asl, whereby the majority of farmers owned garden coffee with interacted diversity of mixed cropping systems (e.g. false banana, sugar cane, sweet potato, Irish potato, maize, sorghum, cabbages) combined with apiculture. Overall in the survey areas, farmers and extension workers confirmed that grading the quality (1 to 4 grades, 1= excellent, washed and 4 = low quality, unwashed) is practiced by Coffee and Tea Authority (CTA) based on physical appearance, size, density, roasting and cup quality analysis of a coffee bean.

DEVELOPMENT CONSTRAINTS

According to GEPA (GEPA, personal communication), 14 years of market price case studies showed that the price for GEPA bio- fair-trade and bio-coffee in New York coffee feature had always attained at higher price than the coffee produced from conventional farms (Fig.5). Moreover, there was high market volatility and increased risks for conventional coffee production. The price of conventional coffee moved up and down rapidly over short time periods. Contrarily, the low risks and market volatility for market feature of organic Arabica coffee was recorded, the price had almost never changed over several years. Such good market opportunity have even had a significant reflection on local growers. Surveyed small scale organic farmers in Ethiopia have developed positive perceptions. They believed in payments achieved for their organically produced green bean and were valued three times better than the farmers who had not converted or had been not certified as organically. On average, the payments fixed to organic growers in market chains as farm-gate prices were 1.26 and 1.20 cs/lb for washed and unwashed organic green beans, respectively.

The impacts of the global coffee crises and market fluctuations on conventional farmers practically induced the so-called "green drought", a drought seldom occurs as green berry-falls as a result of factors like extreme moisture conditions and insect pest damages. Some farmers were forced to uproot coffee trees and replace them by other local cash crops like 'tef'(*Eragrostis tef*) and 'chat' (*Chata edulis*). The fall in coffee prices also caused an entire insolvency of the larger state owned Limmu Coffee Plantation (Gomma II, Jimm/Agaro), which normally possessed

27.000ha coffee trees and capability of $1x10^4$ tones of green coffee production per annum. Coffee plantations were left unharvested due to the low local prices offered for green beans.

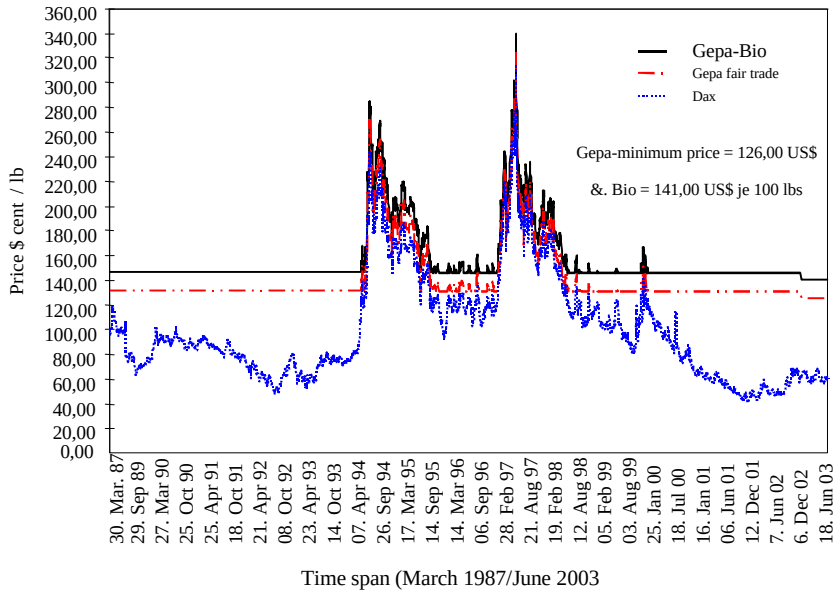

Fig.5 : Comparative feature of African Arabica coffee price in New York, as an example, GEPA fair trade and bio-coffee payments for the periods 1987/2003 (Source: GEPA).

The conclusions drawn from this trend is that the high premiums allocated for organic coffee are encouraging more small-scale farmers and large-scale producers towards conversion. The quality assured organic products have increased the confidence of consumers, which also ensures market stability for organic coffee.

The increasing growth of the organic Arabica coffee sector in Ethiopia might contribute to a better economic situation of small-scale farmers and the conservation of the genetic diversity of high quality Arabica coffee land races. However, a missing and improper knowledge on sustainable organic farming practices may counterbalance this development.

The status of research progress in the organic coffee sector, on the other hand, is at its infancy, and it is difficult to find a holistic technological innovation which is able to provide for farmer's immediate solutions to basic problems. An average coffee harvests under research, state farms and traditional farmers conditions are at the thresholds of 10 - 20 q/ha, 8 - 12 q/ha and 4.5 q/ha. respectively. Similarly, certified organic farmers claimed to produce 5 to 6 q/ha of clean coffee beans. Such wide gaps need to be marginally reduced by promoting alternative methods such as improvement of soil fertility management, cultivar selection and crop protection.

A research programme should include the following priority aspects:

- Analysis of current organic coffee production
- Designing of sustainable fertility management strategies
- Developing strategies against pests and diseases with special emphasis on biological methods
- Identification and promotion of organic coffee based on naturally inherited high quality land races and wild gene pools
- Establishment of quality management aspects for organically grown coffee based on endogenous and exogenous factors determining quality
- Diversification of rural income by fostering organic cash crop production, spices and ornamentals

- Establishment of a centre of excellence for Organic Agriculture focusing on innovational knowledge transfers and direction of rural economic growth

FUTURE PERSPECTIVES

Promotion and production of high quality coffee along with diversification of farms is expected to play a key role in developing of consistent performances under a wide range of economic conditions. Interestingly, the quality of Arabica coffee in Ethiopia has its own reputation, not only because of the richness in coffee genetic diversity but also in agro-ecology and vegetation covers, which are conducive to coffee growth and production. Other perspectives for optimisation of the organic coffee sectors include the following:

- Diversity of natural resources to be integrated with organic farming concepts
- Biodiversity of speciality Arabica coffee reserves to find varieties with naturally decaffeinated coffee and off from mycotoxin contamination
- Conducive edaphic and climatic conditions to grow organic coffee
- Indigenous know-how on coffee culture fostering a better knowledge dissemination
- Growing perceptions to disseminate further the concept of organic coffee sector

ACKNOWLEDGMENTS

We are grateful to Ethiopian Agricultural Research Organisation (ERAO), Ethiopian Institute of Biodiversity Centre (IBC), Oromia (OCFCU) and Yirga Chefe (YCFCU) Farmers Co-operative Unions for effective collaboration during our survey in Ethiopia. We extend also our thanks to GEPA (Germany) for providing piles of information on New York feature of Arabica coffee market. Mr. Million Abebe and Dr. Tadesse Woldemariam-Gole have rendered us with delightly and devotedly. Thanks a lot.

REFERENCES

Bayetta B. (2001) Arabica coffee breeding for yield and resistance to coffee berry disease (*Colletotrichum kahawae* sp. nov.). *Dissertation*, University of London, Imperial College Wye, U. K.

Chane A. (1999) Management of coffee processing by-products for improved and sustainable coffee production in Ethiopia. *Dissertation*, Justus-Liebig-Universität Gießen, Germany.

Chevalier A. (1947) Les cafeiers du Globe. Fasc III. Systematique des caféiers at Faux cafeiers. Maladies et insect nuisible. *Encyclopedie de biologique* 28, Paul Lechevalier ed. Paris, Pp. 356

David K. (1997) *Environment-friendly Coffees*. *In* Coffee:a guide to buying, brewing and enjoying (David K., 1996 ed.), St. Martin Press, U.S.A.

Demel T., Ababu A., Getahun M. and Mehari E. (1998) Study on forest coffee conservation. *Coffee Improvement Project*, Ethiopia.

Demeter (1986) International Demeter guidelines on agriculture, horticulture and fruit growing. Demeter, Darmssadt, Germany.

FAO (1987) World crop and livestock 1984-1985. Food and Agricultural Organisation of the United Nations, Rome.

Fernie L. M. (1966) Some impressions of coffee in Ethiopia. *Kenya Coffee* 31: 115-121.

Fritsch P. (2002) Robust coffee profits aren't trickling down to Nicaraguan growers: falling prices benefit markets while farmers face insolvency. *A Global Journal Report*, The Wall Street Journal Europe, Monday July, 2002.

Gemechu D. (1977) Aspects of climate and water budget in Ethiopia. Addis Ababa, University Press.

Höfner W. (1987) Nährstoffstatus der Böden in den Kaffeeanbaugebieten Äthiopien. In: *20 Jahre Agrarforschung des Tropeninstituts in Äthiopien*, ed. H. E. Matter and A. Westpal. Tropeninstitut Giessen, Pp. 55-56.

IFOAM (1998) Basic standards for organic production and processing. Decided by the IFOAM general assambly at Mar del Plata Argentina, November 1998.

Kilcher L., Schäfer M., Richter T., Van den Berg P., Milz J., Foppen R., Theunissen A., Bergleiter S., Stern M., Staubi F., Scholer M., (2002) Organic coffee, cocoa and tea: market certification and production for producers and international trading companies. FIBL, IFOAM, Naturland and Sippo.

Kotschi J. and Adelhelm R. (1984) Standortgerechte Landwirtschaft zur Entwicklung kleinbäuerlicher Betriebe in den Tropen und Subtropen. GTZ, Eschborn, Germany.

Paulos D. (1994) Mineral fertilisation of coffee in Ethiopia. Institute of Agricultural Research, Addis Ababa.

Raworth K. and Wilson D. (2002) Poverty in your coffee cup. Oxfam International, U. K.

Tura K. (2002) A glance at the Ethiopian export sector: Problems and performances. The African Economist, Vol 1(3): 10-13.

Van der Graaff N. A. (1978) Selection of resistance to coffee berry disease in Arabica in Ethiopia: evaluation of selection methods. Neth. J. Plant Pathology, 84: 205-215.

Woods M. T. D. (2003) Project Report on Ethiopia, Houses of the Oreachatas, Joint Committee on foreign affairs, July 2003.

Yussefi M. and Willer H. (2003) The world of organic agriculture- statistics and future prospects. Stiftung Oekologie & Landbau (SOEL), Forschungsinstitut fuer biologischen Landbau (FiBL), Tholey – Theley, International Federation of Organic Agriculture Movments (IFOAM).