Wild coffee production in Ethiopia:

the role of coffee certification for forest conservation

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Abstract

The Ethiopian rainforests are internationally renowned for their high biodiversity and their wild coffee (*Coffea arabica*) populations, but are severely threatened by deforestation. The remaining rainforests are used for wild coffee production. This study quantifies wild coffee yields from local management systems without artificial inputs, and analyses the impact of wild coffee management on the natural forest vegetation. Subsequently, the role of coffee certification for forest conservation is evaluated. The results show that wild coffee yields from undisturbed forest with low management intensity are extremely small. Intensive management in semi-forest coffee systems removes 30 % of the canopy trees and most undergrowth vegetation. This stimulates wild coffee growth and almost triples coffee yields, while jeopardizing forest biodiversity. Premium prices for wild coffee through certification are seen as one possibility to halt the deforestation process by adding economic value to the natural coffee forests. Particular certification criteria for wild coffee, however, do not exist yet. This study reviews currently present coffee certification schemes under, e.g., Forest Stewardship Council (FSC), International Federation of Organic Agriculture Movements (IFOAM), Rainforest Alliance and Utz Kapeh, and explores to what extent they can promote sustainable use and conservation of the Ethiopian coffee forests.

1 Introduction

Arabica coffee (*Coffea arabica* L., Rubiaceae) has its centre of origin in Southwestern and Southeastern Ethiopia, where it occurs naturally in the undergrowth of Afromontane rainforests between 1,000 and 2,000 m above sea level (asl). Wild coffee is defined as coffee that grows and regenerates spontaneously in its natural habitat and is genetically different from known cultivars (DFSC and IPGRI 2001; Wiersum 1997). The gene pool of these wild coffee populations is of national and international importance, because it has high potential for the breeding of new coffee varieties (Hein and Gatzweiler in press; Kassahun Tesfaye **2006**). In addition, the original **forest** habitat of wild coffee is internationally recognized for its high plant diversity and large number of endemic species (Gil et al. 2004).

Indigenous communities have been utilizing wild coffee for centuries, and the art of preparing coffee is a central element of the Ethiopian culture. Furthermore, coffee is Ethiopia's most important export crop contributing 41 % of the country's foreign currency income (FAO and WFP **2006**). Modern type plantations only constitute 6 % of the total coffee

production area in Ethiopia, while the majority of the production area consists of montane rainforest with wild coffee (Demel Teketay 1999). Local farmers simply pick wild coffee fruits inside these forests, or manage wild coffee stands by removing competing undergrowth vegetation and some canopy trees. Coffee is their main source of cash income.

In the past three decades, however, large parts of the Ethiopian rainforests with wild coffee have been modified or destroyed by conversion to agricultural land, new settlements and timber extraction (Reusing 2000). They are therefore recognized as part of the Eastern Afromontane Biodiversity Hotspot (Gil et al. 2004).

Premium prices for wild coffee through **certification** are seen as one possibility to halt the deforestation process by adding economic value to the natural coffee forests, but particular **certification** criteria for wild coffee do not exist yet (Courville 1999). Furthermore, systematic studies on the performance and yield of wild coffee and on the impact of wild coffee management on the original **forest** vegetation are lacking although this information is important for the definition of sustainable management levels.

This paper therefore has two objectives. First, it evaluates the impact of coffee

management on the wild coffee populations and on the **forest** vegetation. Second, it reviews present coffee **certification** schemes and explores to what extent their environmental criteria can promote sustainable use and conservation of the Ethiopian wild coffee forests.

2 Impact of coffee management on wild coffee populations and forest vegetation

2.1 Study area

The study was carried out in Afromontane rainforest in the Bonga region (Kaffa Zone, Southwestern Ethiopia) at altitudes between 1,500 and 2,280 m asl. The **forest** in this region is fragmented with few undisturbed **forest** parts and large areas of degraded and disturbed **forest**. Climate and soils are highly suitable for coffee growth (Demel Teketay 1999; Schmitt **2006**).

The indigenous inhabitants of the Bonga region are the Kaffa people, although people from other ethnic groups also live in the region. The main town in the area is Bonga with around 16,000 inhabitants, but the largest part of the population lives in the countryside with population densities varying between 33 and 103 inhabitants per km ^{2}. Subsistence agriculture is the major occupation.

Coffee export from the Bonga region started as early as in the 1850ies (Schmitt **2006**). At present, farmers produce garden coffee and wild coffee for home consumption and the international market. Coffee is their most important cash crop. They sell it to private traders or through the Kaffa **Forest** Coffee Farmers Cooperative Union, which marketed around 130 tons of wild coffee in 2003/04. Private investors manage several small coffee investment

areas in the Bonga region ranging from 10 to 500 ha each, and there is one organic coffee plantation (1,000 ha).

The Ethiopian government owns all land in Ethiopia and grants use rights for farmers regarding agricultural activities. **Forest** is considered *de jure* as a public good. *De facto*,

however, the Kaffa communities have complex traditional systems of **forest**-use rights. In the case of wild coffee production these traditional use rights acknowledge that defined areas of managed coffee **forest** belong to individual farmers (Stellmacher in prep.; Urich 2005).

2.2 Data collection and analysis

Coffee populations were studied in 85 study plots (20 m x 20 m) covering managed and unmanaged **forest** parts. Height and diameter at breast height (dbh) were measured only if height > 0.5 m or dbh > 2 cm. Clean coffee (cc) yields, i.e. dried coffee fruits without pulp and parchment, were calculated on the basis of counts or estimates of fruit numbers per coffee tree in selected study plots. Informal interviews with local farmers supplemented the field observations.

2.3 Results and discussion

In the Bonga region, wild coffee was observed throughout the **forest** up to an altitude of 2,040 m asl. Three levels of wild coffee management were identified on the basis of **forest** disturbance, coffee abundance, and observed management activities (Table 1).

Table 1 Coffee performance in unmanaged **forest** (UF), **forest** coffee (FC) and semi-**forest** coffee (SFC) systems

	UF	**FC**	**SFC**
Management intensity	zero	low	high
Forest structure	undisturbed	undisturbed	disturbed
Average density of coffee plants (> 0.5 m)	32	341	761
Average density of large coffee trees (> 1.5 m; dbh > 3 cm) 1		6	21
Range of coffee yields per study plot (kg ha $^{-1}$ a $^{-1}$)	0 - 3	1 - 15	3 - 54

Unmanaged **forest** (UF) and **forest** coffee (FC) systems are both characterized by undisturbed **forest** structure. This means that the **forest** has dense canopy cover and a deeply shaded **forest** understory. Due to the low light intensity, the vegetation cover in the **forest** understory is quite low and the herb layer is not well developed.

Coffee density in unmanaged **forest** is very low because coffee is not as competitive as other shrub and small tree species under low light conditions. The majority of coffee plants is thin and tall, has very low growth rates and carries only few fruits. Unmanaged **forest** is mostly confined to remote and inaccessible **forest** areas. Farmers go there on a casual basis to collect coffee fruits. Green and red coffee fruits are collected at the same time because the

cherries ripen asynchronously in the shaded **forest**, yields are low, and the walking distance from the villages is usually large.

FC systems are situated in more accessible areas. Coffee density is increased as compared to unmanaged **forest**, because local farmers remove competing undergrowth vegetation at least once a year and systematically collect coffee fruits. Some coffee plants develop into large trees and the yields improve. The overall **forest** structure remains undisturbed, however, and the management impact is low.

Intensively managed **forest** areas, where farmers carry out management interventions several times per year, are mostly located close to villages or footpaths. These semi-**forest** coffee (SFC) systems have disturbed **forest** structure, because farmers remove 30 % of the canopy trees and most understory vegetation except coffee plants. Due to the removal of the shading canopy cover and competing vegetation, coffee density increases. The coffee trees grow larger in size and coffee yields are much higher than in undisturbed **forest** (Table 1). Although management intensity is high in SFC systems, coffee regeneration is predominantly spontaneous, and the coffee populations can therefore be considered as wild. Few farmers transplant wild coffee seedlings from adjacent **forest** areas or add seedlings of improved coffee cultivars distributed by government extension workers and non-governmental organizations. Artificial inputs such as fertilizers and pesticides are not used.

Wild coffee yields are highly variable in all management systems, because the **forest** environment is heterogeneous with small-scale differences in the amount of shade and the density of vegetation that competes with coffee. Yields from SFC systems with disturbed **forest** structure are high (up to 54 kg clean coffee ha $^{-1}$ a^{-1}) when compared to undisturbed **forest**, but low when compared to conventional plantations with average yields of 750 to over 1200 kg clean coffee ha $^{-1}$ a^{-1} (Demel Teketay 1999). Yields in coffee plantations are high because coffee trees are high-yielding varieties, fertilized, spaced adequately, pruned and coppiced when yields start getting less. Farmers usually do not have the means to buy fertilizer. With few exceptions, they are also reluctant to carry out pruning and to remove old coffee trees with declining productivity.

Statistical analysis of additional vegetation data shows that SFC management not only

disturbs **forest** structure, but also modifies the original plant species composition of the **forest** (Schmitt **2006**). Undisturbed **forest** is characterized by typical Afromontane **forest** species adapted to shade and humidity. These comprise large numbers of fern species including tree-ferns, which are only known from few locations in Ethiopia, and tree species with the ability to persist in the shaded **forest** understory. High light penetration caused by disturbance of **forest** structure in SFC systems leads to a replacement of typical **forest** species by ruderal species common in open habitats such as roadsides, degraded forests and **forest** edges. The composition of the **forest** canopy changes because primary **forest** species are replaced by quickly growing pioneer trees. Selective cutting of trees used for construction and fuel wood also contributes to the change in species composition and to a reduction of tree species richness in the canopy.

In summary, the studies in the Bonga region show that wild coffee management does not lead to an over-exploitation of the wild coffee populations. The genetic diversity of the wild coffee populations is also not jeopardized, because coffee regenerates spontaneously in all described management systems. However, intensive management in SFC systems disturbs the original **forest** structure and endangers the particular plant species composition of the Afromontane rainforest. Against this background the question arises to what extent **certification** is a useful measure to promote sustainable wild coffee production. Another question is to what extent already existing coffee **certification** schemes can be applied to the three different wild coffee management systems. These issues will be tackled in the following chapter 3.

3 Review of coffee certification schemes

In the last decades, **certification** has become a more and more important tool for encouraging environmental and social responsibility in trade. Generally, **certification** is a voluntary and market-driven approach by which products are assessed and confirmed as conforming to stated requirements. It is based on the idea that consumers are willing to purchase a relatively

more expensive certified product, which adheres to certain environmental and/or social criteria. Similarly, producers can choose to continue producing according to their current standards or to invest into the production of goods, which comply with certain environmental and/or social standards and will be labeled as such. The key elements of **certification** are thus (1) a standard, i.e. a set of environmental and/or social principles, criteria, and indicators, (2) a custodian of the standard, (3) auditors or monitors, and (4) an award, in form of a price premium, to producers or traders acknowledging that they have achieved the standard (NRET 2001; Grote, Basu and Chau **2006**).

Certified coffee is a product already well established in the international market and renown amongst consumers. Coffee **certification** schemes include for example the Fair Trade coffee, organic coffee, bird-friendly coffee, or the 4C Initiative (Common Code for the Coffee Community) [1]. The prime concern of fair-trade **certification** is human well-being and criteria focus on the organization of producer groups, the price paid and structure of the trade. Environmental criteria may be mentioned but are not a priority.

The **certification** schemes discussed in this paper put an emphasis on environmental criteria or regard environmental and social criteria as equally important. They include programs of the **Forest** Stewardship Council (FSC), the International Federation of Organic Agricultural Movements, Rainforest Alliance / Sustainable Agriculture Network as well as Utz Kapeh. The basis for selection was the question to what extent the environmental criteria

[1] An overview of coffee **certification** systems is given by Slob and Oldenziel 2003.

of these programs are applicable to wild coffee production in Ethiopia. Except for FSC **certification**, the programs are already being implemented in Ethiopia.

3.1 **Forest** Stewardship Council

The **Forest** Stewardship Council (FSC) is a global umbrella organization, established in 1993 by a group of timber users, traders and representatives of environmental and human-rights

organizations (FSC 2003). The FSC International Center in Germany ensures that international, national and sub-national FSC policies and standards development processes are transparent, independent, and participatory. Ten principles and criteria form the basis for all FSC **forest** management standards. They ensure that forests are managed in ways that are environmentally sound, socially beneficial, and economically viable. Forests and products that meet the standards are awarded a label with the FSC logo.

FSC has so far accredited 15 independent, "third-party" **certification** bodies or "certifiers" that assess companies and landowners according to FSC policies, principles and criteria (FSC **2006**). Accreditation covers plantation and natural **forest certification**, and verification of the chain of custody of certified **forest** products.

Forest plantations are also certified under FSC standards, because they are considered as a way to complement the management of, reduce pressure on, and promote the restoration and conservation of natural forests (principle 10). Initially, **certification** focused mainly on timber, but since 1998 FSC allows usage of the FSC label on non timber **forest** products (NTFPs) from certified forests on a case-by-case basis. Coffee grown under shade using agro-forestry techniques is also considered as NTFP. It is being test-certified by FSC according to Principle 10 of the FSC criteria on plantations (Courville 1999; NRET 2001).

In Africa, 1.73 million ha of **forest** in seven countries (Cameroon, Namibia, South Africa, Swaziland, Zimbabwe, Uganda, and Kenya) have been certified by FSC (January **2006**). The largest part of these certified forests are plantations (86 %), and most are private forests (86 %) (UNEP-WCMC et al. **2006**). The large amount of certified private forests is related to the fact that the FSC system is expensive to implement and difficult to apply to informal community-based projects, which would also be the case for wild coffee harvesting in Ethiopia. Although FSC is beginning to look at new models of community-based **certification** where a number of harvesters are certified as a group or where a resource manager is certified to oversee multiple harvesting operations, it is probably still most appropriate for large-scale industrial NTFP operations (Mallet and Karmann 2001).

3.2 International Federation of Organic Agricultural Movements

Established in 1997, the International Federation of Organic Agricultural Movements (IFOAM) sets internationally accepted basic standards for organic agriculture (IFOAM 2005). IFOAM accreditation is carried out by the International Organic Accreditation Service

(IOAS), which has already accredited 33 **certification** bodies worldwide. The range of criteria addressed under organic **certification** is narrower than under FSC. While FSC standards concentrate on the broader ecosystem perspective and on the management systems in place, organic standards emphasize the environmental impacts within the production and processing systems (Courville 1999). They have an explicit focus on agricultural sustainability criteria such as renunciation of synthetic fertilizers and pesticides, and building soil fertility.

Organic management guidelines referring to coffee cultivation include, e.g., diversification strategies (agro-forestry), organic fertilizer management, soil protection, plant protection, preparation of new plantations, weed management, and processing requirements (SIPPO, FIBL and Naturland 2002). However, organic certifiers are beginning to look at landscape level issues as well as social concerns.

Most organic products originate from cultivation, which has to comply with the respective organic production requirements. Many NTFPs, however, are not cultivated, but collected where they grow naturally as is also the case for wild coffee. Therefore, **certification** as organic wild collection is a further option. Organic wild collection requires that the plants are collected by trained collectors who comply with certain rules, e.g., concerning the collection area, the collection method, the quantity of plants harvested, processing techniques, and adequate documentation (IMO and SIPPO 2005). Specific regulations such as production ceilings for particular plant species are defined by the accredited organization carrying out the **certification**. Given the relatively low cost of **certification** and strong consumer recognition for organics, this **certification** may be most appropriate for many NTFP harvesting operations (Mallet and Karmann 2001).

In Ethiopia, organic coffee **certification** is carried out by the German BCS-•o Garantie GmBH. **Certification** is conducted at three different levels of the marketing chain in the producing country, including also group **certification** of currently 130,000 coffee farmers [2]. To date, one coffee union and 28 private coffee exporters hold organic certificates. Only one coffee farmers cooperative in Southwestern Ethiopia (Gizmeret) has so far gained the certificate for organic wild collection.

3.3 Rainforest Alliance / Sustainable Agriculture Network

The Sustainable Agriculture Network (SAN) is a coalition of non-profit, independent

conservationist organizations promoting the social and environmental sustainability of agricultural activities in the tropics by developing a standard, and certifying farms that comply with that standard (SAN 2005). The SAN includes environmental groups in Belize, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras and Mexico, with a watchdog group in Denmark and many associated academic, agriculture and social responsibility groups around the world. The principles of sustainable agriculture and the

[2] Information given by BCS-representatives in Ethiopia in April **2006** and in Germany in October **2006**.

supporting standard were developed by a process that involved many key players in Latin America from 1991 to 1993. Currently, there are social and environmental standards for coffee, bananas, cocoa, citrus, ferns and cut flowers.

Each SAN member provides **certification** services for farmers and agricultural companies in their respective countries, while offering knowledge and experience in working towards the development of the Sustainable Agriculture standard. Rainforest Alliance is the SAN Secretariat and administers the **certification** systems. The Sustainable Agriculture Network uses the Rainforest Alliance-certified seal.

At present, coffee has already been certified at more than 3,400 farms in ten Latin American countries. The first Rainforest Alliance coffee **certification** outside Latin America was carried out in the Jimma region of Ethiopia in April **2006** after one year of intensive capacity-building. Here, a private Ethiopian coffee exporter acts as project leader for a group of 678 family farms (Rainforest Alliance **2006**).

3.4 Utz Kapeh

Utz Kapeh is a worldwide **certification** program that sets the standards for responsible coffee production and sourcing. Utz Kapeh, which means "good coffee" in a Mayan language, gives the assurance of socially acceptable and environmentally friendly quality in coffee production. The Utz Kapeh program started in 1997 and opened its head office in the Netherlands in 2002 (Utz Kapeh **2006**).

The Utz Kapeh Code of Conduct was originally based on the EurepGAP Protocol for Fruits and Vegetables developed by leading European retailers. It contains 100 % of the EurepGAP 'coffee reference code' and includes additional social criteria such as from International Labor Organization (ILO) Conventions. The Utz Kapeh Code of Conduct includes elements such as standards for recordkeeping, minimized and documented use of agrochemicals for crop protection, protection of labor rights and access to health care and education for employees and their families.

An independent certifier approved by Utz Kapeh determines that the coffee producer is in compliance with the requirements of the Utz Kapeh Code of Conduct. This inspection is repeated annually. Currently, Utz Kapeh **certification** is carried out by 17 independent certifiers in 18 countries, including Ethiopia, Kenya, Tanzania, Uganda and Zambia in Africa. In Ethiopia, three private companies and three coffee farmers cooperatives hold Utz Kapeh certificates in **2006**.

3.5 Applicability in the Ethiopian context

To what extent these **certification** schemes are applicable to the three wild coffee management systems, as identified in chapter 2, needs further analysis. At this stage, it can be stated that all three Ethiopian wild coffee management systems are virtually organic, because they are

managed without artificial fertilizers and pesticides and maintain a shading canopy cover. They thus fulfill the environmental requirements stipulated by the presented coffee **certification** schemes with the exception of organic wild collection. **Certification** according to organic wild collection criteria can certainly be done for coffee that is simply collected from unmanaged **forest** (UF). Whether this scheme is also applicable to **forest** coffee (FC) systems needs an in-depth evaluation. The impact of semi-**forest** coffee (SFC) management on the wild coffee populations and the **forest** seems to be too large to fulfill the requirements for organic wild coffee collection.

The issue whether wild coffee management systems fulfill the socio-economic requirements for **certification** is beyond the scope of this paper. Some difficulties likely to

arise concern, e.g., the high costs of **certification**, complex documentation requirements and the specification of tenure and use rights in the case of FSC **certification**. In general, **certification** of coffee plantations with a central management unit is much easier than **certification** of wild coffee produced in scattered small **forest** plots by many individual farmers. These problems can be overcome, however, as shown by the group certifications issued under the programs of Rainforest Alliance, IFOAM and Utz Kapeh (see subchapters 3.2 – 3.4).

4 The role of wild coffee certification for forest conservation

The last wild coffee forests of Ethiopia are under great threat of deforestation. The **certification** of wild coffee harvested from these forests seems a simple solution to increase their economic value and thus encourage farmers to avoid **forest** destruction.

This paper shows that different wild coffee management systems exist with different levels of impact on the **forest** ecosystem. **Forest** conservation in the strict sense should consider not only the protection against deforestation, but also the conservation of **forest** authenticity, i.e., the conservation of the authentic species composition and **forest** structure as well as original biodiversity functions and processes (IUCN and WWF 1999). In addition, the conservation of the genetic diversity of the wild coffee population is important.

Although there are certainly great differences between the discussed **certification** schemes regarding the strictness of environmental criteria, e.g., regulations for artificial inputs under organic and Utz Kapeh **certification**, they consider coffee production within the context of agriculture. Their environmental criteria are designed to ensure the sustainable management of coffee plantations and thus, do not give justice to the special situation in Ethiopia where wild coffee grows naturally in an intact rainforest environment. With the exception of organic wild collection, they do not have appropriate criteria to ensure the maintenance of **forest** authenticity.

This paper shows the large difference between species composition and structure of unmanaged wild coffee forests and intensively managed SFC systems. Although SFC systems are certainly more sustainable than conventional coffee plantations or deforestation, they are not appropriate to conserve the original species composition of the Afromontane rainforests in Ethiopia. In South America, **certification** of shade coffee plantations is an acknowledged incentive for coffee producers to maintain environmentally friendly management practices. Certified forested coffee farms constitute bio-rich buffer zones for protected areas (Courville 1999; Rainforest Alliance **2006**; SAN 2005). Just like in Latin America, certified SFC systems can act as buffer zones for unmanaged **forest**, but should not be confused with **forest** conservation *per se*.

The discussed **certification** schemes are also applicable to wild coffee that is simply collected in the unmanaged **forest** and to FC systems with low management intensity. Unlike SFC management, simple coffee collection and FC management do not jeopardize the original plant diversity and structure of the **forest**. Most **certification** schemes, however, do not have criteria to ensure that management levels stay as low as to ensure the conservation of the original Afromontane **forest** vegetation. Only organic wild collection prohibits the use of any agricultural measure and would thus ban coffee management activities from the **forest**. It can also ensure the conservation of the wild coffee genetic resources because it forbids the planting of the certified species.

When considering **certification** of wild coffee from unmanaged **forest**, care needs to be taken to set adequate production ceilings and to ensure their control, because as other experiences have shown, commercialization of NTFPs will automatically result in intensification of production (Moussouris and Regato 1999). Other difficulties are, e.g., that the yields of wild coffee from unmanaged **forest** are very low and the collecting efforts to obtain high quality beans are high (chapter 2).

Initiatives were started to sell wild coffee from Southwestern Ethiopia on the international specialty market not by gaining any of the renowned **certification** schemes, but by emphasizing the fact that the coffee is wild. Consumers proved to be willing to pay higher prices for this specialty coffee. In the Bonga region, farmers have already profited from increased revenues from their wild coffee harvests. Experience in this region has also shown that increasing coffee prices are strong incentives for farmers to manage wild coffee forests more intensively.

The attribute “wild coffee” should not be confused with a certificate, because independent and transparent **certification** processes are not in place. One problem is, e.g., that there is no universally valid definition of wild coffee. It is doubtful that all coffee that is

currently sold as wild coffee comes indeed from genetically wild coffee populations. Claims that the marketing of wild coffee contributes to **forest** conservation have to be regarded with caution since there are not yet any common guidelines and standards for management activities in wild coffee production, and the level of coffee management is usually not indicated by the processors.

5 Conclusion

Organic wild collection is the only **certification** scheme that has criteria in place, which ensure the protection of the genetic diversity of the wild coffee populations and the conservation of **forest** authenticity. This **certification** scheme is applicable to wild coffee collected from unmanaged **forest**. The other discussed **certification** schemes consider coffee production as an agricultural activity, and their environmental criteria are met by all three wild coffee management systems present in Ethiopia. **Certification** of wild coffee from semi-**forest** coffee (SFC) systems can increase farmers' incomes, but since SFC management strongly modifies the original **forest** vegetation, it can only complement, not substitute **forest** conservation.

Recent initiatives have shown that wild coffee can attain high prices on the international specialty market by emphasizing its wild provenance. Similarly to the established **certification** schemes, the marketing of wild coffee does not *per se* contribute to **forest** conservation in the strict sense. To ensure that it contributes to the conservation of the original Afromontane **forest** vegetation, the definition of explicit guidelines and standards concerning the intensity of wild coffee management is necessary. These should include, for example, production ceilings to avoid an intensification of coffee management in up-to-date unmanaged or little managed coffee forests.

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01LM0201). This project is currently working on an appropriate **certification** scheme for wild coffee. Further information is available at: www.coffee.uni-bonn.de

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