

Sustaining Western Ghats landscape mosaic through valorisation of coffee

Delphine MARIE VIVIEN¹, C. GARCIA², C.G. KUSHALAPPA³, C.P. GRACIE⁴, G. DEVAGIRI³, N.NAGARAJ⁴, P.G. CHENGAPPA⁴ et P.VAAST⁵

1 : CIRAD, UMR Innovation, F-34 398 Montpellier/ French Institute of Pondicherry

2 : CIRAD, UR Ressources Forestières, F-34 398 Montpellier / French Institute of Pondicherry

3: College of Forestry, Ponnampet / University of Agricultural Sciences, Bangalore

4: University of Agricultural Sciences, Bangalore

5: CIRAD, UR Ecosystèmes Plantations, F-34 398 Montpellier / University of Agricultural Sciences, Bangalore

Summary

India produces about 4% of the world's coffee, and the district of Kodagu (Coorg) in the Western Ghats produces one third of the Indian coffee in diverse agro-forestry systems. The landscape is made of multi-storeyed plantations of coffee and associated crops (pepper, cardamom), grown in landscapes associated with terraced rice fields and fragments of evergreen rainforests. This landscape mosaic is subject to strong social and ecological dynamics. The forest has been reduced by more than 30% in 20 years because of the development of coffee plantations; the tree cover rich in native species is being progressively replaced by one single exotic tree species, *Grevillea robusta*.

In this context, we describe three strategies of adding value to localised products (here, coffee) based on the reputation of the locality and explore their possible links with the conservation of the cultural and biological diversity of the district. The first approach is based on the use of trademarks comprising the geographical name of the district, Coorg. Large corporate coffee estates use them to market their products. The second is based on geographical indications (GIs) widely promoted by the government of India since 2003. There are already GIs on products originating from Coorg (Coorg Green Cardamom and Coorg Orange) but none on its leading product, coffee. The reputation and the historical proofs are already established, but the specifications of the product and the area of production are yet to be defined. In this scenario, the Coffee Board of India could play a leading role, acting on behalf of the interests of the producers. The third strategy deals with environmental certifications. Most of them are only beginning to be implemented in India. This approach rests in the hands of private entrepreneurs, certifying bodies or non-profit organisations, which can be qualified as external stakeholders imposing their norms on the local supply chain.

In this paper we propose an analysis of the respective strengths and weaknesses of these three strategies and their possible use for the conservation of the cultural and biological diversity of the district.

Introduction

Adding value to localised products based on the reputation of the ecosystem they originate from and explore their possible links with the conservation of the cultural and biological diversity they are associated is a concept introduced during the negotiation under the Convention on Biological diversity and the discussions on Environmental Services. The concept raises two essential questions. The first, under what conditions can the patrimonial value of a landscape with its cultural and biological diversity be transformed into value added to local products? Second, how can this added value be shared between the various stakeholders so as to succeed in linking the conservation of cultural and biological diversity to the sustainable development of the locality.

For the consumers of these local products it is a question of paying a premium or giving priority to produces whose mode of production is certified as maintaining environmental services (Bérard and Marchenay 2006).

We propose to look deeper into these issues, using the district of Kodagu in India as an example. After having presented the area of study, its production systems and the conservation issues at stake we will focus on the three types of value addition strategies we have come across in this area: (1) the use of commercial trade marks, (2) the opportunities for geographical indications (GIs) and (3) the implementation of environmental certification. In this paper we propose an analysis of the respective strengths and weaknesses of those three strategies which raise questions about the stakeholders involved and their possible use for the conservation of the cultural and biological diversity of the district.

Area of Study

Kodagu is located in the Western Ghats, the mountain range that runs along the western coast of South India. Whereas India has forest cover of 22,8% (FAO 2007), 50% of the total surface of Kodagu is forested (Garcia, Marie-Vivien et al. 2007). State controlled forests cover one third of the district, forming two green belts on the eastern and western borders of the district. The central part is dominated by agricultural land, mainly coffee

plantations and terraced rice fields. The coffee plantations represent 30% of the territory and have developed considerably over the last 40 years.

During the British administration this district was known under the name of Coorg and the reputation of the district as well as of its products is still associated to this name. In this paper we will use Kodagu to refer to the district and Coorg to refer to the products and services originating from it.

The reputation of the district lies as much on its biological as on its cultural features. An independent kingdom till it was annexed by the British in 1834, Kodagu retains a certain originality when compared to the rest of Karnataka. This singularity has marked the landscape, especially the private forest lands now turned into coffee estates, the rules regarding trees having retained certain restrictions imposed before and during the colonial times (Moppert, 2006).

Kodagu produces one third of Indian coffee and this crop has become the main economic driver of the region. Coffee has set its mark on the landscape as well as on people's minds. The image of the district is closely linked to it and also that of the Kodava community. (Moppert, 2006).

Paddy was the traditional crop in the area, before the development of large scale coffee cultivation by the British. Today coffee has taken over the place of other crops and most forested areas have been transformed over the years into plantations. In Karnataka, 3% of the coffee estates are larger than 10 ha and represent 32% of the coffee planted area, with a few large corporate plantations managing thousands of hectares. The small holdings (< 2 ha) represent 58% of the total number of holdings and 22% of the coffee planted area (Coffee Board of India 2008). The native forest species forming the canopy are being gradually replaced by the *Grevillea robusta*, a fast growing species of Australian origin. They represent today 20% of canopy cover and our surveys indicate that its rapid expansion is due to three factors: it grows fast, it is a good stand for pepper, it has good market value, for plywood industries essentially, and it can be felled, transported and marketed easily since it lacks the protective regulations that native species are subjected to. Another trend seen in the field is the diminution of the shade cover. This cover is necessary for maintaining a favourable microclimate so that the coffee flower buds can survive in March, before the monsoon sets when they begin to flower. But the development of sprinkler irrigation has freed the planters from this constraint.

Despite this, the coffee plantations retain an important part of the original forest biodiversity (Elouard and Guilmoto 2000; Bhagwat, Kushalappa et al. 2005) and are probably amongst the richest in the planet in terms of biodiversity. An inventory of 114 plantations was carried out in 2008 by the University of Agricultural Sciences, Bangalore in collaboration with CIRAD and the French Institute of Pondicherry under the joint BIODIVALLOC and CAFNET projects. This survey has identified 290 different tree species used in the forest cover and nearly 50 species of trees per hectare of plantation (Garcia *et al*, in prep.). Therefore, the landscape mosaic still supports high levels of biodiversity and viable populations of large flagship species such as elephants (*Elephas maximus*) and tigers (*Panthera tigris*). In this context, in one of the world's 34 biodiversity hot spots (Conservation International 2008), we describe various strategies to add value to local productions and link development and conservation with cultural and biological diversity.

I. Strategies To Transfer Territorial Value Into Product Value

A. Trademark

The majority of Indian coffee is marketed without mentioning its geographical origin of production. Coffee is marketed through brands of coffee roasters. However certain stakeholders do tend to use the name of a place more or less linked with the product, though it does not guarantee such origin.

Individual Trademarks

Tata Coffee Limited is the major landholder in the district, controlling 21 000 ha of coffee plantations. Tata registered a trademark "Coorg" for marketing 100 % pure coffee in 1996.² However, the coffee sold under this trademark "Coorg" does not come from Coorg only and is blended at the curing works which are mainly situated in Coorg and process coffee from all the neighbouring districts (Mercereau and Vignault 2008).

Another trademark comprising the name Coorg is used⁴ by the Coorg Coffee Supplies Company Pvt Ltd. The company was created by planters of Kodagu who roasted and sold coffee directly. Their coffee comes from the districts of Kodagu and Chikamagalur.⁵

² Brand n°722753, n°722757, n°722766, 722769 registered on 3 December and currently in use , register of Indian brands, consulted on 25 September 2008.

⁴ The register of trademarks doesn't include this brand name

⁵ Interview with Coorg Coffee Supplies, 2008

Common trademarks are not accompanied by any specification as to the origin of the product and therefore do not guarantee its origin. The registration of Coorg as a trademark rises the problem of granting a monopoly on the use of the name Coorg to the proprietor of the trademark, precluding thus all other stakeholders from using the name. Although, bearing in mind the descriptiveness and the deceptiveness of the trade mark Coorg for coffee which is only partially from the region, the validity of the trademark seems unsure. For a trademark to be valid it shall be distinctive to avoid abusive appropriation of necessary terms and it shall not deceive consumers.

Trademarks of the Coffee Board

The Coffee Board is a government body, created by the government and placed under the authority of the Ministry of Commerce. It undertakes various operations to help the entire coffee industry and to promote Indian coffees in the domestic market as well as for export.⁷ One of the steps taken in this direction is to register trademarks for 13 logos, identifying 13 coffee producing regions. These logos consist of a drawing associated to the geographical name of the region. Another logo for “Indian coffee” and 3 logos for speciality coffees have been applied for registration as trademarks as well. There aren’t any specifications accompanying the registration and use of these logos since this is purely a marketing initiative and isn’t related to technical standards. One of these trademarks applied by the Coffee Board is for the logo “Coorg Coffee.”⁸ The Indian office of trademarks requested the trademark application to be changed to an application for a certification mark because of its descriptive nature. This entails that the technical regulations should be submitted as well.

B. Geographical Indications

Geographical indications (GIs) help to identify a product as originating in the territory of a country, or a region or locality of this territory, in the case when a specific quality,

⁷ In a liberal economy the Coffee Board has to become more powerful to promote domestic consumption , increase export and aid the industry in terms of marketing and technical aid for the production of speciality coffee, instant coffee, etc. ,” Kulkarni, V. (2006). New Coffee Act in the offing: Minister. The Hindu Business Line.

⁸ Trademark registered on 10 March 2003, n° 1181814.

reputation or other determining characteristics of the product can be attributed essentially to this geographic origin.⁹

The applicant has to represent the interest of the producers¹⁰ and once the GI has been registered, all the producers registered as authorised user and complying with the specifications can use the GI¹¹. The GI application shall include the description of the product, its history, its geographical environment including natural and human factors and all elements which justify its uniqueness, as well as a map of the area.¹² As of now 166 GIs have been registered. The Coffee Board has registered two GIs for coffee: the GI “Robusta Monsooned Malabar” and the GI “Arabica Monsooned Malabar” two speciality coffees having high quality due to the process of “monsooning”, a rewetting which changes the colour of the beans. Traders have been aware of the reputation of this coffee for a long time and consequently this speciality coffee benefits from higher price. There is not yet any GI on Coorg Coffee. To see whether a GI could be drafted, one has to assess if Coorg Coffee has a given quality, reputation or a special characteristic due to its geographical origin. These three criteria are not cumulative but alternative. The criteria of quality and characteristics are intrinsic to the produce and should be indicated on the product. But the criterion of reputation seems to be more general. Reputation does not depend only on quality or characteristics of the product, and might well depend on other factors. Finally, to find out to what degree Coorg coffee may qualify as a GI, it is useful to see how these criteria have been interpreted by the Indian GI registry for agricultural products.

A specific quality or characteristics of Coorg coffee

According to surveys conducted amongst the different stakeholders of the coffee industry, including those involved in processing, roasting, distributing coffee in the domestic market, agents, exporters, Coorg coffee doesn't have any specific quality or uniqueness when compared to the coffee of Chikmagalur, the neighbouring district (Mercereau and Vignault 2008). On the contrary, the South Indian Robusta coffee has a reputation in the international market, because it is cultivated at a high altitude (Mercereau and Vignault 2008). The robusta coffee of these regions is one of the best in the world and called “Indian Robustas” without any further details about its origin.

⁹ Art 2.1.e. of the GI Act 1999

¹⁰ Art 11.1

¹¹ Art 17

¹² Art 11.2 and the completed columns in the applications for GI published in the GI journal.

The Robusta coffee of Kodagu is generally mixed with other coffees of the Western Ghats region, especially the coffee from Chikamagalur, when it arrives at the coffee processing plant. Seventy four percent of coffee producers from Kodagu district sell their coffee directly (Achoth 2005) to agents who transport this coffee to the processing plant where the blending is done. Most of the processing plants in Kodagu process coffee from Kodagu as well as from the adjoining districts. Forty percent of the total volume of coffee bought by these processing plants may come from outside Kodagu. The coffee is then sorted according to criteria related to generic qualities (bean size and % of defects).

The Director of the Coffee Board¹⁴ himself suggests that compared to coffees in neighbouring districts, Coorg coffee lacks uniqueness. Indeed, the reason behind these blends is that coffee coming solely from Kodagu does not have specific organoleptic qualities. This is the reason for the Coffee Board to register trademarks for each region of coffee production from purely a marketing point of view and not to register GIs, thus avoiding demonstrating the uniqueness.¹⁵

Based on these issues of organoleptic quality, a potential GI on “Coorg Coffee” should include the districts of Chikmagalur and Hassan. For example, the specifications for the GI “Coorg Green Cardamom” include the districts of Kodagu, Chikamagalur, Hassan and North Canara, all situated in Karnataka. But there is the issue of a lack of common history between the inhabitants of the three districts. And it is not certain that the inhabitants of Kodagu wish to share their historical reputation and their ecosystem for a GI on coffee, which is much more emblematic than orange or cardamom.

Reputation based on the ecosystem and history of Coorg

For the criterion of reputation of the GI definition, coffee from Coorg can be considered as far as reputation is based on a factor other than a specific quality or characteristics of the product. For example, can the reputation of the product be supported by the reputation of the ecosystem of Kodagu and the history specific to Coorg? Is the reputation of the ecosystem (natural factors) and history sufficient given the lack of quality coffee?

A study of 25 GIs already registered in India for agricultural products demonstrates that generally the natural factors described in the application for the GI include climatic factors, the composition of the soil, the altitude and the nature of the genetic resources. For

¹⁴ Private interview

¹⁵ idem note 7.

products cultivated in associated crops, associated crops are mentioned. For example, the GI application for the Betel leaf of Mysore, describes the system of cultivation as an association of Betel and Coconut palms. If the crop is cultivated under shade, this fact is also mentioned in the application. For example the GI application for Coorg Green Cardamom indicates that the cardamom is planted under a forest canopy, exposed and oriented to the north for optimal lateral shading. But the nature of the shading, in terms of density or of forestry species is never specified. Yet it is this shading, remarkable for its diversity of native species that gives Coorg its reputation.

Therefore, a GI application based on a reputation of the ecosystem would encourage the protection of threatened biological diversity by attracting the consumer towards a coffee cultivated in a zone which preserves native trees. Achieving this objective would imply that only coffee produced in the specific Kodagu ecosystem, from plantations which maintain a minimum level of biodiversity can benefit from the GI 'Coorg Coffee'. The first results of the tree biodiversity inventories in the coffee plantations of Kodagu allow drawing preliminary scenarios about the content of a GI application and its possible impact on the landscape and on the inclusion/exclusion of producers. First, it appears that there is a high variability between plantations but not much differences across the different types of plantations (small medium and large). Tree species richness per hectare is high in all plantations, since each is made of a variety of management blocks each contributing to the overall richness of the plantations. In terms of structure, we also find a high variability. The range of densities runs across 0 to more than a thousand trees per hectare. Similarly, the crown cover exhibits a similar range of variability, with estates ranging from fully open canopies to 100% of tree cover. But perhaps surprisingly, there is no correlation between density and crown cover, suggesting a high level of variability of the shade management practices. Likewise, when we look at the distribution of *Grevillea robusta* (on average 20% of the trees in the landscape), we can see that there are still a high proportion of management blocks without *G. robusta* (35%). But 13% of the blocks have been totally overtaken by it.

With these results in mind, in order for the GI to have an impact on biodiversity, the application should focus on at least three variables. It should mention a minimum tree density, a minimum of set of native species and a maximum percentage of *G.robusta* at the level of the plantation. Our results suggest that no matter the density and canopy composition, farmers are able to adapt their shade management practices to match the shade requirements they consider optimal. But increased tree density entails more costs (shade management) which are one of the main limiting factors today, according to the farmers themselves. While shade as until

now being considered as necessary for the farmers, this might well change in view of new set of practices introduced in the last 10 years comprising open canopy.

Indeed, there is a cost in controlling the minimum of native species as the extent of shade cover influences coffee yields and there is no premium price for coffee grown under shade crop. The yield of coffee is around 12 bags (1 bag = 55kg) per acre in high shade conditions as compared with low shade conditions, which is around 18 bags per acre (Chetana A.N. 2008).

Such a specification would only exclude from the GI those farmers that decide to intensify their systems by opening totally the canopy, or the ones that totally convert the canopy to *G. robusta*, the two trends that pose a threat to the conservation of biodiversity in the district. Controlling for a minimum species set of native species ensures that other exotic species similar to *G. robusta* do not become a problem in the future.

Yet the absence of traceability remains an issue, as the lack of cup quality of the coffee. The cup quality could be improved thanks to the specification of the GI application which might comprise standards on post harvest treatment. In any case the reputation is local to Southern India and this strategy would therefore be aimed for the national market. The GI for Coorg coffee could be one mechanism for establishing and popularizing the genuine reputation of the produce and in turn price premium in the market places.

C. Environmental Certification

During the last three decades, a multitude of green labels (or eco-labels) have been introduced worldwide with the objective of promoting coffee cultivation which respects the environment, but is also socially responsible for improving the living conditions of rural communities and for responding to the growing demand of mostly western consumers. Many of these eco-labels have been developed in Latin America.

Today ten such initiatives exist: 1) 'Organic' coffee (beginning of the 1960s), 2) 'Fair Trade' Coffee (beginning of the 1970s), 3) 'Bird Friendly coffee (promoted by the Smithsonian Institute of Washington DC at the end of the 1990s), 4) Coffee certified by the Rainforest Alliance (established towards the end of the 1990s) and more recently 5) Utz Kapeh (which has recently changed its name to Utz Certified in order to certify products other than coffee), 6) C.A.F.E. Practices (by the Starbucks company), 7) the Common Code of the Coffee Community (initiated by the private sector in the beginning of 2000), and 8) the AAA label of Nespresso (initiated in 2003). A certification on the field by an independent

organisation (except for AAA of Nespresso) guarantees consumers that the norms are applied from the production in the coffee plantation down to the primary transformation. However, sanitary, social and environmental norms defined by these labels are rarely in accordance with those of the producers or the scientific community.

The penetration of eco-certified coffee remains very weak in India despite the fact that agro-forestry coffee systems count among the most diverse and rich in biodiversity in the world can be found there.

In India the only certifications present are Organic, Fair Trade and Utz Certified (Table 1). The Rainforest Alliance certification should be in force from 2009 under the initiative of TATA .

	Utz Certified	Organic	Fair Trade
Certified « Organisations »	6	38	1
Total Surface certified (ha)	10 428	2 736	1 200
Certified Production (t)	15 000	1 710	59

Table 1: General information on certified coffee in India (Coffee Board, 2008)

Utz Certified

Utz certified is the most common certification in India. However, it only covers six industrial groups of plantations which are well structured and integrated from production to marketing (Table 2). The certified surfaces represent a total of 10 500 ha, almost 3% of the national coffee surface.

Producers	Certified Surface (ha)	Location
Tata Coffee	6672	Kodagu, Chikmagalur, Hassan
ABC Group	2022	Chikmagalur
BBTC	912	Kodagu
Carrara Group	447	Shevaroys, Tamil Nadu
Manamboli-		
Savamalai	268	Anamalais, Tamil Nadu
BCK Plantations	107	Kodagu

Table 2: List of Utz Certified industrial groups of plantations (Source: (Mercereau and Vignault 2008))

Commentaire [MV1] : Source?

Organic Coffee

As in other coffee producing regions, the organic sector is not gaining popularity in India and only represents a small surface of 2,736 ha (574 ha for Karnataka) and 38 plantations (12 plantations for Karnataka) (source: Coffee Board, 2007) and small volume of exported coffee (<0.5%) because of difficulty in finding markets offering a substantial premium to compensate for the increased cost of agricultural practices and the drop in productivity.

Fair Trade

We know of only two cooperative is certified 'Fair Trade' in India. One is in Kerala, the other is situated in the Araku Valley in the heart of the so called 'tribal' area.

II. Strengths and weaknesses of strategies, role of the stakeholders

The three strategies that have been described, the use of trademarks, GIs and environmental certifications are based on specific configuration of stakeholders.

The trademarks are used in an individual manner by planters who have the funds, the knowledge of the trademark system and who have invested in coffee quality. These trademarks do not guarantee the origin of the coffee. Trademarks on the name Coorg question the exclusion of other producers in Kodagu from using the word Coorg for their own coffee.

In India, proprietors of GIs are usually government bodies (75% of GIs already applied). The Coffee Board can position itself as the natural representative of the interests of producers. It has already started the process of identifying origins by the registration of logos associated to geographical names as trademarks. This process has been interrupted not by the lack of general reputation of origins, but by the lack of an explicit and recognised intrinsic quality of the coffees. Nevertheless, the reputation of Coorg coffee based on the history and the landscape of the district exists. Therefore a possible scenario would be that the intrinsic quality of the coffee, the cup quality, is progressively built up as the producers and those

involved in the industry start using a GI which includes good practices leading to good quality coffee, especially in the domain of post harvest process.

However, this scenario requires that the producers and the others stakeholders involved in the sector adhere to the leadership of the Coffee Board. Other GI, such as the GI Coorg orange, registered in 2003 by the Department of Horticulture of the State of Karnataka suggest that the uptake by the producers can be very low if the GI is introduced from top down.

Another requisite is that consumers need to recognise the GI product and agree to pay a premium for it. Interestingly, Indian consumers closely link coffee to the identity of Kodagu. This domestic market represented 30% of the volume of exchanges in 2008 and has been growing since 2000, (Economic and Market Intelligence Unit CBI 2008). In light of the different initiatives to use the name Coorg as trademarks, added to the fact that GI tool is rapidly spreading across all products of Indian identity, we believe this scenario to offer good opportunities and that Indian consumers will be ready to pay for Coorg Coffee.

Environmental certification is also promoted by specific stakeholders who are certification organisations or sometimes even industrial groups (Starbucks and Nespresso). The international sector of eco-certified coffee is already developed, the market is already there, and although it remains modest, it is growing. In order to reach this market, some producers of Kodagu seem interested in getting their coffee certified. The environmental characteristics of the production system are such that the costs of undertaking an initiative related to the environmental criteria will be relatively low for the majority of plantations. However, conformity to the social criteria of these eco-labels is not assured for the time being and may therefore be costly to obtain.

Whatever the strategy considered, some obstacles will need to be over passed.

The first issue is the concordance between the actual practices and the practices to be fulfilled to benefit from the specific tool of valorisation. For environmental certifications, the full range of criteria considered is completely exogenous and will be imposed on the producers who will have virtually no possibility to negotiate. This method risks being restricted to the large producers with the financial capacity and the knowledge of the system and who have the capacity to ensure a minimum volume of production. In the case of the GI, the specifications are drafted by the applicant, with the opportunities of oppositions from third parties in case of conflict. The chance of exogenous imposition of norms and practices are reduced but not absent in that case.

The second issue is the weakness of the associations of producers in the Indian coffee sector. These associations only have one role, limited to lobbying actions aimed at public authorities, and therefore primarily play a role as political unions of producers rather than cooperatives. Stimulating the creation of cooperatives with the support of exporters prepared to collaborate in the promotion of different ways of valorising coffee seems a needed step, but the challenges, especially those of the governance of the system, are not to be underestimated.

Currently the sector is totally dominated by intermediaries (factory agents, roasters and exporters). These intermediaries risk having to concede some of their financial margin and having to negotiate with producers assuming that the producers are able to effectively organise themselves. However, these intermediaries can gain in the medium term from an improvement of the quality of the coffee and an increasingly secure access to international markets. We believe it is possible to drag them in the process, forging an alliance of mutual interests.

The environmental impact of the various strategies explored here is likely to vary. The trademark, due to its individual character, will only have an impact at the level of the plantation, and even then the link between biodiversity and the practices of these plantations, not guaranteed by the trademark is not obvious. Only in the case of strategies based on specifications incorporating practices respecting the environment can one hope to see positive impacts at the landscape level. In order for this to happen, in the case of a GI, the applicant must incorporate the environmental practices, and the adherence to this specifications need to be checked quite strictly. This would bring the GI closer to the norms of environmental certification, and make it an exogenous, if it describes practices not widely disseminated. A specification negotiated with the stakeholders of the sector, which is the principle of the GI concept, might have a less effective impact on the environment as the actual change in the practices are not sustainable to the environment

Achoth, L. (2005). Report on surveys on coffee holdings and coffee market chain in India in relation to mould contamination in coffee. Rome, Coffee Board of India, Bangalore & Food & Agricultural Organization of United Nations.

Bérard, L. and P. Marchenay (2006). "Local products and geographical indications: taking account of local knowledge and biodiversity " International Social Science Journal **58**(187): 109-116.

- Bhagwat, S. A., C. G. Kushalappa, et al. (2005). "A Landscape Approach to Biodiversity Conservation of Sacred Groves in the Western Ghats of India." Conservation Biology **19**(6): 1853-1862.
- Conservation International. (2008). "Biodiversity Hotspots - Western Ghats - Overview." Retrieved 06/05/2008, from <http://www.biodiversityhotspots.org/xp/hotspots/ghats/Pages/default.aspx>.
- Economic and Market Intelligence Unit CBI (2008). Database en coffee. Bangalore, Coffee Board of India: 109.
- Elouard, C. and C. Guilmoto (2000). Vegetation Features in relation to Biogeography. Mountain Biodiversity, Land Use Dynamics and Traditional Ecological Knowledge. P. S. Ramakrishnan. New Delhi, Oxford & IBH Publishing: 25-155.
- FAO (2007). State of the World's Forests. Rome, Food and Agriculture Organization: 166.
- Garcia, C., D. Marie-Vivien, et al. (2007). "Geographical Indications and Biodiversity in the Western Ghats, India. Can labeling benefit producers and the environment in a mountain agroforestry landscape?" Mountain Research and Development **27**(3): 206-210.
- Kulkarni, V. (2006). New Coffee Act in the offing: Minister. The Hindu Business Line.
- Mercereau, D. and C. Vignault (2008). Coffee Value Chain and Geographical Indications in India: Origin, reputation and marketing of Indian coffees, Cirad: 103.