Coffee Cultural Landscape of Tolima, Colombia: Heritage Valuation, Sustainability and Management

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Coffee Cultural Landscape of Tolima, Colombia: Heritage Valuation, Sustainability and Management

ABSTRACT

Purpose
The paper strives to put into value the Tolima Coffee Cultural Landscape (CCLT) by establishing its values, attributes (quantitative and qualitative) and its delimitation. It also proposes a social agenda to embrace, validate and improve the components with the communities and, finally, identifies specific key issues for management to establish strategies to establish participatory tools with the communities, so that the social groups assume their responsibility in the valuation of the landscape.

Design/methodology/approach
The methodology organizes a set of representative qualitative and quantitative attributes equal to the Colombian Coffee Growing Landscape (CCLC) inscribed on the UNESCO’s World Heritage List, and additional attributes not previously applied to Colombian coffee growing landscapes. The quantitative attributes were linked to a Geographical Information System and a model for the cartographic delimitation of the cultural landscape was achieved.

Findings
The paper is the first approach to the spatialization and valorization of the Tolima coffee cultural landscape. It defines a social agenda to widely validate the CCLT in the communities, and also the key issues management agenda with the participation of government and social entities. It contains the basic features adjusted to the current needs of achieving a regional policy as a positive strategy for the valorization of the heritage and for making cultural and environmental protection more sustainable.

Limitations/implications of research
Given that CCLT is a topic still unknown to policymakers and inhabitants, the results of the research should be validated with more representative members of the coffee communities along with the Tolima territory, with the support of the Tolima Coffee Growers Committee.

Social Implications
The proposed agenda will allow the CCLT to be inserted in the sphere of the representatives of the society, and the regional governments. The CCLT proposal contains the potential to reinforce the value of the coffee heritage as a tool for education and social appropriation in the current times of reconciliation for peace and post-conflict process.

Originality/value
The document provides the first results of research on the values, attributes, delimitation and management agenda of key issues for the conservation of the site.

Key words: cultural landscape, culture-nature linkages, coffee of Tolima, heritage management

INTRODUCTION
Since the incorporation of cultural landscapes into 1992, World Heritage Convention (UNESCO, 2017: 81) and their inscription on the World Heritage List, several issues of management discussion have emerged, as well as the challenges faced at the global level by these territories distinguished by their Outstanding Universal Values (OUV). UNESCO advisory bodies, such as ICCROM, ICOMOS, and IUCN, have produced normative reference documents on these heritages and climate change, risk management among others and scientific documents on nature-culture relations presented and published in world assemblies, capacity building workshops and in the international scientific committees of these bodies (Larsen and Wijesuriya,
Likewise, in the Latin American context (INPC, 2014, 2015; Ministry of Culture of Peru, 2017; Mujica and Holle, 2002; Rincón, 2016; Uribe and Velandia, 2013), the methodology of valuation, significance, and management of OUVs in landscapes do not adapt easily to the environments, nor does it manage to emphasize the deep relationships that persist in the symbolic landscape, which require more accuracy and precision methods for their delimitation, social construction and management. Another problem lies in the linking of the legal framework of international legislation and the various national or regional regulations.

Based on previous works author (Velandia, 2017, 2018), this paper provides the first proposal for the delimitation of the Coffee Cultural Landscape of the Tolima (CCLT), and how this technical part should be inserted in a previous social agenda and linked to the site management agenda, which will constitute a fundamental input for a management and valuation program. However, although there is a national landscape policy (NPD, 2014) applicable only to its territory, it should be clarified that there are no current initiatives (public or private) to manage the CCLC, therefore there is a lack of coordination with the coffee communities in this field and there is an impossibility of undertaking the financing and monitoring of the aforementioned program.

The initiative of CCLT was once considered during formulation process of the Coffee Cultural Landscape of Colombia (CCLC) nomination file for UNESCO (https://whc.unesco.org/en/list/1121). However, finally it was not included in the delimitation of the property inscribed in the World Heritage List in 2011.

Thus, Tolima missed the opportunity to have a heritage conservation agenda in its territory that would allow taking advantages such as the experience of CCLC, which, unprecedented in Colombia, established new references on the valuation of cultural landscape heritage. In this way, the challenges of dissemination, coordination and management were addressed by the Colombian government, which undertook specific actions with the National Federation of Coffee Growers of Colombia (NFGC) and regional governments to promote actions for the conservation of the CCLC site (See Figure 1).

Considering the current processes of formulation of cultural landscapes (not necessarily associated with the UNESCO methodology) but created with their own guidelines by the INPC (2015) and the Ministry of Culture of Peru (2017), these are of importance for the development of knowledge on the “valuation of the coffee heritage of Tolima” (Velandia, 2018: 48). Consequently, the paper intends to formulate a technical method for the delimitation and to determine bases for a proposal of agenda for its management.

THE THEORETICAL FRAMEWORK

Despite Colombia has an inclusive definition of heritage by law, it is a need to build an accurate concept of cultural landscape deeper than UNESCO definition. Isaza (2014: 2) embodies heritage as “the natural sites, cultural landscapes and even countless intangible manifestations of the present culture of any people in the world, regardless of their degree of cultural, economic, political or technological development”. This inclusive, diverse and participatory vision of heritage corresponds to the notion of Colombian heritage, as defined in the Culture Law. Therefore, according to Article 4 of Law 1185 (Republic of Colombia Congress, 2008) is constituted:

[…] by all material assets, immaterial manifestations, products and representations of culture that are an expression of the Colombian nationality, such as the Castilian language, the languages and dialects of the indigenous communities, black and Creoles, tradition, ancestral knowledge, cultural landscape, customs and habits, as well as material goods of a movable or immovable nature to which special historical, artistic, scientific, aesthetic or symbolic interest is attributed, inter alia, in fields such as plastic, architectural, urban, archaeological, linguistic, sound, musical, audiovisual, filmic, testimonial, documentary, literary, bibliographic, museological or anthropological interest (Republic of Colombia Congress 2008: 1).
According to UNESCO (1999), the balance between cultural and natural heritage was discussed, as “the joint works of man and nature” and also referred as cultural assets. Cultural landscapes “illustrate the evolution of human society and its settlements over time, conditioned by the limitations and/or physical opportunities of its natural environment and the successive social, economic and cultural forces, both external and internal” (UNESCO, 1999: 9). The term cultural landscape “embraces a diversity of manifestations of the interaction between humankind and its natural environment.” According to the Committee “it should be selected on the basis of its outstanding universal value and their representability in terms of a clearly defined geo-cultural region and consequently their ability to illustrate the essential and distinct cultural elements of such regions” (UNESCO, 1999: 88).

But in Latin American countries context this set up may not always do allows to fully interpreting scientifically. The question is ¿what is the cultural part of landscape? Man-nature relationship interlinkages with nature and culture are expressed in a symbolic-anthropological space (Cleere, 1995, Cosgrove, 1984, 1985, 1994; Cosgrove and Daniels, 1988; Wagstaff, 1987) This is referred in a framework since indigenous people developed an understanding of territory by setting living, funeral, agricultural spaces across thermal floors (due to ecuatorial zone) and broad communication systems of paths across the Andean Cordilleras.


The study of mentioned interlinkages refers to the binding “living” aspects between its dimensions; concentrated in the symbolic values of traditions and their biocultural diversity intertwining. (Larsen and Wijesuriya, 2015). Therefore, the cultural is the “living” feature of landscape. A model to its comprehension “as a living expression must remain exposed for social apprehension and for its preservation through time. This is very significant in the agricultural landscape” (Velandia, 2017: 49). In this way, cultural landscape is a social construction of a territory, based on the historical transformation of nature through collective work and enriching modifications such as adaptation practices of different crops as maize, potato or coffee. Practices are represented by ethnic work over time and located in a given space, where it manifests a dynamic vision of cultural change. Agreeing with INPC (2015: 29) cultural landscape is “a part of the territory that comprises a system articulated of natural and human interactions integrated by its geography and historical processes developed producing spaces of singular characteristics with historical, socio-cultural, ecological, aesthetic, visual, productive, economic, religious and symbolic values of local, municipal, regional, national and international recognition.”

Understanding the origins of landscape, its patterns and coffee farms settlements scattered in the territory presupposes an explanation from microverticality theory of Murra (1975). Studies on land occupation in the Andes (Argüello, 2016; Cuéllar, 2009, 2011; Mujica and Holle, 2002; INPC, 2014; Quattrin et al, 2001) are based of “vertical economies” or “vertical archipelago” (Murra, 1974; 1975) of how indigenous groups are articulated and settled in the territory of the Colombian Andean Cordilleras. The occupation of Central and Eastern Cordilleras refers to a process of broad knowledge of the thermal floors and using temperate zones for living and producing traditional crops higher or lower according to their knowledge and experience of soil and water management.

According to Cuellar (2009: 8) from Murra (1972), it is a “model of ecological complementarity” developed from a strategy of domination of chieftdoms (political units) for the use of altitudinal environments of the mountain range to generate “an invariable microeconomic and social autonomy by a single ethnic group” (Cuéllar, 2011: 43) clearly presented in the Northern Andes or in the Páramo in Colombia, in which the inter-Andean corridors are very narrow, in which there is a higher ecological variability expressed in contiguous patches of great diversity, making it possible for families to have access to different ecological zones and varied agricultural production.
In the lowlands of the Magdalena River valley, the indigenous people had fishing and crops such as sugarcane and maize (Zea mays); in the middle areas of temperate climate they had housing and cultivation of citrus fruits, bananas and potatoes and beans in the highlands. Archaeological evidence indicates that the transverse journeys to the cordilleras were made by ancient roads originally walking by the edges of the ridges contrary to the valleys of the streams.

Result of this approach, CCLT is a result of 12,000 years of human activity (Cano and López, 2017; Dickau et al, 2015; Salgado and Varón, 2019). Archaeological evidence of agricultural practices is located especially between 900 and 1,800 meters of altitude that coincides with the coffee space later developed at end of the 19th century. This responds to a principle of microverticality. CCLT farms are the result of patterns of living, cropping, and funeral spaces developed since pre-Columbian times (See Figure 2).

METHODS
The geographical context of the CCLT is very similar to UNESCO’s CCLC case: a sample of a unique, productive and sustainable landscape “that represents the Colombian coffee tradition” (Velandia, 2017: 44). The coffee landscape, per se is the manifestation of nature-culture links represented in a century-old tradition, illustrated “by the adaptation of smallholdings, the intelligent use of water sources, the development of traditional construction materials, the symbolic understanding of landscape and coexistence with disaster risk” (Velandia, 2017: 44). It was valued by UNESCO due to the continuous use of land where farmers applied innovative management practices of natural resources and produced tangible and intangible cultural manifestations that characterize the region.

As a result of a research project initiated in 2018, fieldwork was carried out in the coffee regions of Tolima, in addition to processing information from the Tolima Coffee Growers Committee geodatabase (NCGF, 2019) and from the characterization of the denomination of origin (NCGF, 2015). But especially from the management experience of the CCLC management plan where the author had the experience of working in several workshops with the community (Mincultura, 2009, 2016). The approach to CCLT as comprehensive topic is discussed and defined by setting these following:

a) Identification of the historical and geographic context
b) Understanding of cultural systems for the transmission of traditional knowledge through landscape attributes (Qualitative and quantitative)
c) Building a delimitation model from quantitative attributes
d) Organizing the basic social agenda
e) Defining a management agenda according to the key issues for management

Then, promoting a subsequent agenda can be based on the background of ongoing processes such as the CCLC’s management plan and the reflection of experiences around it (CARDER, 2002; Isaza and Velandia, 2018; MINCULTURA-NCGF, 2009, 2016; Rincón, 2016; Uribe and Velandia; 2013).

HISTORICAL AND GEOGRAPHIC CONTEXT OF TOLIMA COFFEE
Coffee of Tolima is strategic for Colombia’s production. It is the third producer of Colombian coffee and one of six designations of origin by NCGF (2019). Departments of CCLC (called “the Coffee Axis”) are Caldas (fifth place), Valle del Cauca (sixth), and Risaralda (seventh) and Quindío which is not even in top 10 producers (https://huila.federaciondecafeteros.org).

According to Palacios (1980) the Dutch introduced the coffee shrub to South America for commercial purposes. In 1714 it was planted in Suriname and from there it seemed to move imperceptibly to Venezuela and Brazil. Guhl (2008: 136) explains how coffee expanded through to departments of Santander and Norte de Santander region in Colombia, in the first decades of the 19th century (Velandia, 2018). From there it
slowly spread southwards along the Eastern Cordillera. “In the period between 1840 and 1860 it reached Cundinamarca, Tolima, some parts of Huila and Cauca, and its production was in the hands of large landowners. By 1870, it had already reached the department of Antioquia and between 1880 and 1910; it extended from there towards the south departments of Caldas, Risaralda, Quindío and north of Valle del Cauca” (Velandia, 2018: 49). National Federation of Coffee Growers of Colombia (NFCG, 2015) confirms that coffee appeared in 1870 in the municipalities of Venadillo, Santa Isabel and Rovira in Tolima, and became dominant in the Chaparral area in the south of Tolima (Palacios 1980). The fast territorial expansion and the greater economic-social importance of coffee were remarkable.

Between 1870 and 1910 the coffee economy was consolidated. It implied not only a displacement of coffee production zones, but the presence of these new forms of social and productive organization was associated with an exponential growth after Colombian Civil War. At that time the most arduous stages and tasks of the settlement in the Cordillera Central were surpassed. The region was contained between the most fertile soils and the most ecological conditions and finally, it articulates a network of commercial and financial enterprises on the basis of which the high business bourgeoisie. The processes of the distribution of wastelands, internal migration and the investment of urban capital in the colonization zones were decisive processes in the consolidation of the Colombian coffee culture. The expansion of the coffee industry was the result of a productive specialization in agrarian structures (Ramírez, 2002: 40).

At the same time, the complete line of the Girardot Railway came into service. The port of Girardot and the bridge over the Magdalena consolidated its role as a distribution centre for a vast region of central Tolima and Huila. Trade houses, threshing machines and coffee exporters established. Tolima was at that time one of the most characteristic areas of production in the coffee industry (Hall et al, 1931).

Petre (1906) already referred to the chronicle of the quality of Colombian coffee and its importance in the world agricultural sector, pointing out that the Tolima region was connected to the newly installed railway system between Ambalema and La Dorada, for the export of the grain. At northeast of Tolima established large coffee plantations such as Arabia, La Aurora, Nuevo Mundo, Varsovia and Valparaiso haciendas (Ramírez, 2002; NCGF, 2019).

The coffee farm represented a fundamental attribute of the landscape and the peasant family unit, which by definition is oriented to subsistence reproduction and decisions related to the management of nature. It is the motor of coffee development and indirectly of capitalist development in Colombia (Palacios, 1980). With time the set of farms will be giving shape to the veredas.

The great precedent of the period called “The Violence” has its origins in the Colombian civil war. In Tolima, large coffee-producing haciendas were affected by this agrarian conflict. Bergquist (1978) blame to fall of coffee exportation prices caused agrarian revolution of 1885. Later, in 1951 the armed conflict intensified and as a consequence, the large haciendas were abandoned. In the early sixties, small landless peasants pressed the division of the abandoned latifundia. Palacios (1980) states violence came to mask a pendant of accounts. It was, in fact, a generalized process of manipulation of armed gangs in the redistribution of properties and crops, and of labor insurance that has been studied judiciously in El Líbano, Tolima.

Ramírez (2002) studied one of the most complex conformations of the region largest farm called La Aurora (1907-1934) located in Libano, Tolima. His approach took into account historical circumstances and processes that affect the hacienda system: expansion and consolidation of coffee cultivation and the direct agro-export operation with Sweden, Germany and England where the so-called Libano-Excelso coffee was well priced.

**The Coffee Natural Landscape**

The Tolima region is defined by the river basin of the Magdalena River, to which the Coello, Gualí, Recio, Saldaña and Totare rivers are tributary. “Comprised by the Eastern slope of the Central Cordillera and the
western slope of the Eastern Cordillera, and characterized by the agricultural and cattle production. Its aquifer units are the result of the accumulation and consolidation of fluvial-volcanic sediments and deposits, such as the Ibágué, Guamo and Espinal geological fan" (Velandia, 2018: 52). It originated by strong volcanic activity (CARDER, 2002). (See Figures 2 and 3)

In addition Los Nevados National Natural Park (LNNP) “comprises an approximate area of 58,300 hectares and in the municipalities of Anzoátegui, Casabianca, Herveo, Ibágué, Murillo, Santa Isabel and Villahermosa”. Its ecosystems are linked to CCLT have a large number of native forests “considered strategic for the conservation of global biodiversity. South American Andes is one of the most important biodiversity hotspots in the world, called Tropical Andes Hotspot (TAH). According to Critical Ecosystem Partnership Fund (CEPF), TAH is one of the highest species richness and endemism” (Velandia, 2018: 52). From endemic flora as Wax Palm forests \textit{(Ceroxylon quindiuense)}, Frailejón \textit{(espeletia)} extensions in páramo (moorlands) fauna with a variety of amphibian, birds, specially endemic Tolima Blossomcrown \textit{(Anthocephala berlepschi)} and Yellow-eared Parrot \textit{(Ognorhynchus icterotis)} among mammal species and reptile diversity. Also, giant bamboo woods or \textit{Guadua (Angustifolia Kunth)} is also under protection and conditioned for sustainable use (CORTOLIMA, 2014).

CCLT locates in the sub-Andean life zone (1,100-2,350 masl) (Holdridge, 1992), configured by a primary ecological structure for its climate, volcanic soils, water sources and biological diversity. Main natural threats have been identified by mass movements, flood, volcanic and seismic and risks from forest fires and landslides. CCLT territory has a high seismic risk, due to the triple union that occurs in the corner of the South American tectonic plate where the Nazca and Caribbean plates converge between them. The region is affected by five active volcanoes belonging to the Machín-Cerro Bravo Volcanic Complex, on the eastern side of the Central Cordillera (Velandia, 2018; SGC, 2012). (See Figure 4).

On the other hand, coffee activity is affected by climate variability phenomena associated with ‘El Niño’. For example, as a result of the stronger winter wave in 2010 and 2011, phytosanitary problems developed: it increased of rust infection in historical levels, coffee soils were eroded and plantation productivity decreased considerably (NCGF, 2012).

Gómez et al (1991), delimited agro-ecological microregions or “coffee ecotopes” in particular conditions classified as 206B, 207B, 208B, 209B, 210B, 211B, 315A, 316A, 317A, specified in topography, altitude, type of coffee cultivation, precipitation, type of soils and minerals. This classification corresponds to 2B Central Cordillera - Eastern slope and 3A Eastern Cordillera - Western slope (See Table 1).

Tolima coffee is located in altitude range between “900 and 2,100 meters above sea level […] at 02º52’59’’ and 05º19’59’’ North Latitude, and 74º24’18’’ and 76º06’23’’ West Longitude at the Eastern and Western piedmont of the Magdalena River Valley” (Velandia, 2018: 50). It belongs to Holdridge’s Sub-Andean life zone or very humid premontane forest (bmh-PM) located in hillside areas, with rainfall ranging between 2,000-4,000 mm and temperatures between 18-24 °C, characteristics of a very humid climate. It also presents the very humid low montane forest (bmh-MB) life zones located in the mountainous formations framed by the moors and the premontane floor. This is located in areas where the temperature fluctuates between 12 and 18°C, and rainfall varies between 2,000-4,000 mm, conditions typical of the very humid cold climate (CORTOLIMA, 2014: 34). Throughout the year, “flowering season in CCLC has plenty availability of coffee, which defines two zones with different harvest times. The first one (in 75% of the municipalities) harvested between periods of March and June–October and November” (Velandia, 2018: 50).

BUILDING AN AGENDA FOR CCLT

Due to the fact that CCLC is composed of quantitative and qualitative attributes, and compared with CCLC (See Table 2) subsequently, a GIS model is built starting from mapping quantitative attributes for delimitation. Using ESRI ArcGis 10.3 engine, it is developed from a geodatabase (NFCG 2019) and geotiff images (Georeferenced Tagged Image File Format obtained from https://earthexplorer.usgs.gov/). Through
GIS tools processing, physiographic features modelled by digital elevation, contouring, and then applying hillshade and slopes algorithm analysis retrieved from data values and feature class ordered by two big ranges: altitude data plus high slopes (45%) between 1,200–1,800 m.a.s.l., and medium slopes (30%) between 1,000–1,200 m.a.s.l. and 1,800–2,000 m.a.s.l. Finally, delimitation model and ranges (See Table 3) is constituted by 2 zones: Main zone concentrating the largest number of attributes with an area of 339,698 hectares; and buffer zone with an area of 231,626 hectares (See Figures 5 and 6).

Achieved the previous, must formulate basic (general) social agenda. Then it is proposed the following 8 steps:

1) Validate delimitation with community and Government and elevate it to a Tolima regional policy (in accordance with the legal framework)
2) Establish a committee to convene interested parties (stakeholders)
3) Develop processes with the community to complement the valuation of the heritage contained in the delimitation.
4) Apply participatory tools (social mapping) with the community to identify the aspirations and challenges of the valued landscape.
5) Share and agree challenges and goals on a management agenda
6) Approve by the committee then run management agenda and following up
7) Measure progress indicators set out in the agenda, disseminate them and discuss their achievements.
8) Evaluate the agenda every 3 or 5 years for continuous improvement.

Extensively, a management (specific) agenda of 6 key issues it is needed to define strategies establishing participatory tools with communities aimed at the social organization assuming its responsibility in the valorization of the landscape. It will be important to share the methodology with the community so that they understand that this is a process of knowledge coming from an in-depth study of unique nature-culture links with them (as seen from archaeological data, through symbolic-volcanic culture systems or microverticality), and setting social interlinkages between (nature) ecosystems-(culture) heritage to which they will contribute with their valuable contributions. Foreseeing this, the following can be proposed:

1) Build a shared knowledge with communities: generating an own methodology of valorization about CCLT, constructed from the ancient condition as it is demonstrated by INPC (2015) and the study of the origin of the pre-Hispanic space with the help of a team of experts and the departmental government. (INPC, 2014).
2) Declare CCLT delimitation: as a Property of Cultural Interest of the Departmental Scope and promote a regional policy for its conservation and dissemination through public education by Tolima government.
3) Develop a GIS for planning management: to allow definition of determining rules for territory that provide the basis for normative instruments for managing agro-biodiversity. According to Colombian Law management plans, only it is possible for Land use, food security rural plans, heritage protection and environmental reserves. Reinforce management of the agro-productive base will guarantee material- immaterial values conservation.
4) Reinforce post-conflict process: to include peace agreements on agrarian reform, equity and justice in the return of land to people displaced by the conflict (Molano, 2015) and new agricultural development policy is allowed in an Integral Rural Reform (RRI) for development of peasant, family and communitarian agriculture (Isaza and Velandia, 2018).
5) **Improve sustainable cultivation practices for climate change**: Recently a contribution as a policy response for its vulnerability in World Heritage Sites (Markham, 2018) can be reviewed to regional implications as in Tolima. At national level Colombia has developed actions from policy by “Intelligent Climate Coffee” initiative (Uribe and Velandia, 2013: 143) and “Sustainability 2027 Strategy” (NCGF, 2017: 10; Isaza and Velandia, 2018: 237).

6) **Reinforce potential local initiatives to development of policymaking in culture and education**: Local governments and social organizations have a lack of cohesion through culture and peace. To build heritage knowledge of CCLT will be a strong educational and appropriation value for identity and reconciliation between indigenous, displaced afrocolombian groups, peasants and former guerrilla among others. In this sense, the solutions must intensify transmission of CCLT values to the next generations.

**CONCLUSIONS: CCLT KEY ISSUES FOR MANAGEMENT**

Having reference in CCLC’s management plan (MINCULTURA-NCGF, 2009) first topic on interest is sustainable development. The general vision resulting from a reflection on the values in the CCLC will be obliged to answer to food security, sustainable agriculture practices, and soil and water conservation measures among others.

These will become the key issues for a management agenda. They can be enforced on the knowledge acquired through mentioned social eight-step process. Tolima as a region with agricultural and coffee production quality at national level needs a CCLT management agenda as an opportunity to articulate the cultural dimension of the territory and to allow an improvement in the quality of its people’s rural life.

The strengthening of the cultural links of the communities with the territory is essential for mountains traditional knowledge, social conditions improvements and the cohesion with the peace policy of Tolima communities. Therefore, CCLT protection becomes a key element for linked socio-environmental development and an articulating axis of the regional initiatives of natural conservation.

Colombia has empowered a national policy since the CCLC conservation through Conpes (NPD, 2014). From there Tolima can support the above in a regional policy and operate actions with participation of the secretariats of environment, education, culture, and rural development. It is, therefore, necessary to have the will and interest of politicians to innovate in the proposed processes and take advantage of the natural cultural potential.

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Figure 3. Tolima and the Coffee Ecoregion. Source: Creative Commons Attribution-Share Alike 4.0 International license.

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421x444mm (72 x 72 DPI)
Figure 4. Photo-composition of the Coffee Cultural Landscape of Planadas, Tolima. Source: XXXX (2018).
Figure 5. Digital Elevation Model, slopes and hillshade processing. Source: Author.
Table 1. Characteristics of coffee ecotopes in Tolima

<table>
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<tr>
<th>Ecotope</th>
<th>Topography</th>
<th>Altitude m.a.s.l.</th>
<th>Crop Tipology</th>
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</thead>
<tbody>
<tr>
<td>ECOTOPE 206 B</td>
<td>Steep, slopes greater than 75%</td>
<td>1,300-1,900 Higher coffee concentration: 1,300 – 1,800</td>
<td>Concentrated mostly under the sun; sectors with shading</td>
</tr>
<tr>
<td>ECOTOPE 207 B</td>
<td>Steep, slopes greater than 70%</td>
<td>1,000 – 1,800 Higher coffee concentration: 1,400 – 1,750</td>
<td>Full sun exposure</td>
</tr>
<tr>
<td>ECOTOPE 208 B</td>
<td>Undulated to strongly undulated, slopes from 25% to 60%</td>
<td>1,200 – 1,800 Higher coffee concentration: 1,400 – 1,800</td>
<td>Shadowed. There are coffee plantations under sun exposure (volcanic ashes)</td>
</tr>
<tr>
<td>ECOTOPE 209 B</td>
<td>Steep topography, slopes from 50% to more than 75%</td>
<td>1,000 – 1,800 Higher coffee concentration: 1,400 – 1,800</td>
<td>Shadowy, very scattered. Small sectors under the sun.</td>
</tr>
<tr>
<td>ECOTOPE 210 B</td>
<td>Steep topography slopes above 75%</td>
<td>1,000 – 1,800 Higher coffee concentration: 1,450 – 1,750</td>
<td>Shady coffee plantations (avocados, ambers, guamos and bananas). High sectors (greater than 1,500 meters) with full solar exposure.</td>
</tr>
<tr>
<td>ECOTOPE 211 B</td>
<td>Steep topography slopes above 75%</td>
<td>1,000 – 1,800</td>
<td>Relatively dense shadow. With low-density shade</td>
</tr>
<tr>
<td>ECOTOPE 315 A</td>
<td>Strongly undulating (25% and 50% slopes) and dissected by steep areas (100% slope)</td>
<td>1,400 – 1,900</td>
<td>With shade, predominance of guamo trees</td>
</tr>
<tr>
<td>ECOTOPE 316 A</td>
<td>From strongly undulating to steep (slopes 50% - 75%)</td>
<td>1,200 – 1,800</td>
<td>Shadowed and in full exposure to the sun</td>
</tr>
<tr>
<td>ECOTOPE 317 A</td>
<td>Strongly undulating (25% - 60% slope)</td>
<td>1,500 – 1,900</td>
<td>Dense shadowed</td>
</tr>
</tbody>
</table>

Figure 6. CCLT delimitation: Main zone - buffer zone and veredas (territorial units). Source: Author.
Table 2. Quantitative and qualitative attributes of CCLC-CCLT

<table>
<thead>
<tr>
<th>CCLC Attributes</th>
<th>Quantitative</th>
<th>CCLT Attributes</th>
<th>Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Designation of Origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Special coffees</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author, Mincultura-NCGF.
Table 3. Quantitative attributes of CCLT

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominance of coffee: tecnified crops, traditional crops, renovated crops</td>
<td>60% - 75%</td>
</tr>
<tr>
<td>Average crops density</td>
<td>(4,000 – 6,000 coffee trees per hectare)</td>
</tr>
<tr>
<td>Solar exposition and shade covering</td>
<td>(25-45% ratio)</td>
</tr>
<tr>
<td>Cenifcafé’s Castillo coffee variety density</td>
<td>(77.9% average)</td>
</tr>
<tr>
<td>Coffee age</td>
<td>(2-9 years-old)</td>
</tr>
<tr>
<td>Soil coffee use range</td>
<td>(6.25-18 hectares per km2)</td>
</tr>
<tr>
<td>Coffee crop area range</td>
<td>(1.5 to 6 hectares per crop unit - coffee farm)</td>
</tr>
</tbody>
</table>

Source: Author.