

## Protected areas in Columbia – on track to sustainable development?

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### Abstract

On the way to sustainability the Colombian biosphere reserves, national parks and protected areas of civil society have changed their main goals from conservation to establishing regions of sustainable development. On the basis of studies in the southern and northern Colombian mountain ranges, this paper evaluates the concepts, strategies and measures in terms of the livelihood approach. The objective is to analyse if organic farming, tourism or export of cash crops can diminish the vulnerability of ecosystems and people. It becomes clear that only small-scale tourism (eco-tourism and farm tourism) may be regarded as sustainable solutions if they respect and enhance the livelihood of the people.

### Keywords

sustainable development, livelihood, tourism, subsistence, coffee, Sierra Nevada de Santa Marta, Cinturón Andino, Colombia

### Introduction

Biosphere reserves (BRs) are conceived as 'model regions of sustainable development' (LANGE 2005). Below we evaluate the development paths of Colombian protected areas in terms of how they adapt to global change by utilizing their opportunities and eliminating hazards and in how far they are capable of setting sustainable developments in train. The possibilities for adaptation are many and varied. They can add value to secure subsistence, to develop tourism or to emphasize exports. We chose protected areas with different legal status (BRs, national parks (NPs) and protected areas of civil society), different exposure to climate change (varying elevations) and different adaptation responses to globalization.

From this emerge the following questions:

*Which challenges must be met to reduce vulnerability, promote resilience and attain sustainability?*

*Can tourism in Colombian protected areas be run on sustainable principles? What is the value of incorporating farmers in ecotourism (Asofintur) proposals?*

*Can Colombian coffee plantations be run sustainable in the face of world market requirements? How important is the size of the enterprise?*

*Can organic farming and the formation of associations secure livelihoods sustainably and contribute to stabilizing the ecosystems?*

### Study area

For our study we chose Cinturón Andino BR and Sierra Nevada de Santa Marta BR. In 1979 UNESCO recognized the Cinturón Andino and the Sierra Nevada de Santa Marta as BRs. Cinturón Andino is located in the *Macizo Colombiano* and includes three NPs (Nevado de Huila, Puracé and Cueva de los Guacharos) with a total area of 855,000 ha (Figure 1). The highest elevation is the Nevado de Huilo with 5750 m. It includes a variety of geological formations, volcanic craters, mountain lakes, waterfalls, hot springs, fumaroles, sulfatares (BORSODRF et al. 2011).

Sierra Nevada de Santa Marta BR covers 2.1 million ha and includes the territory of Tayrona NP (56,250 ha) and Sierra Nevada de Santa Marta NP (675,000 ha), which is the highest coastal mountain range in the world (the summits of Cristóbal Colón and Simón Bolívar reach 5775 m). From coast to glacier it includes all altitudinal zones of the tropical climate (Figure 2) and of tropical vegetation (TRIBIN et al. 1999: 14, 18).

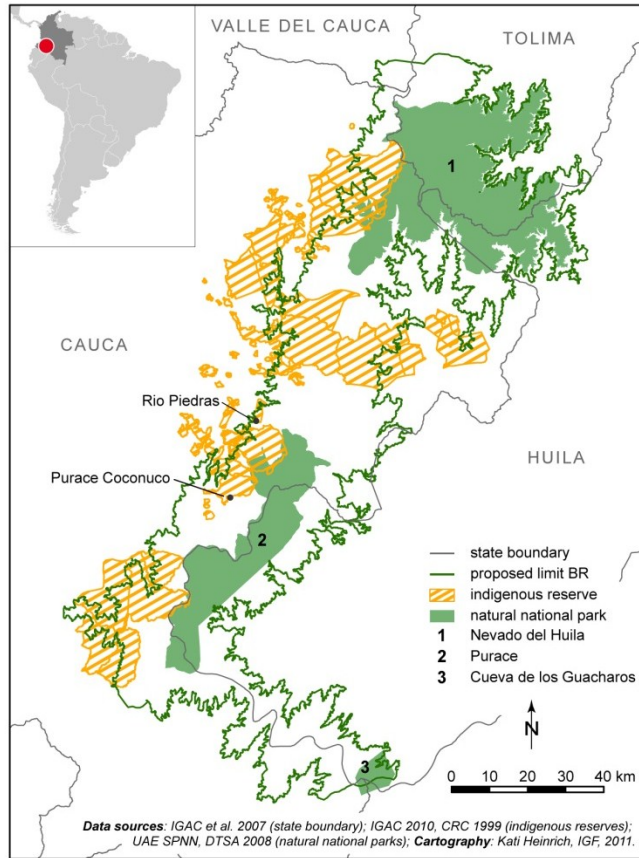


Figure 1: Cinturón BR, Southern Colombia

The BR also includes various protected areas of civil society, of which we selected the protective corridor of Rio Toribio as a case in point. It covers ca. 20.000 ha and is designed to protect the habitat of rare and endangered birds (STREWE 2005) as well as the mountain landscape, plus encouraging sustainable development for small farmers (WÜST 2006). It stretches from the headwaters of the river on the San Lorenzo ridge (3.000 m) to its estuary on the Caribbean Sea west of Santa Marta.

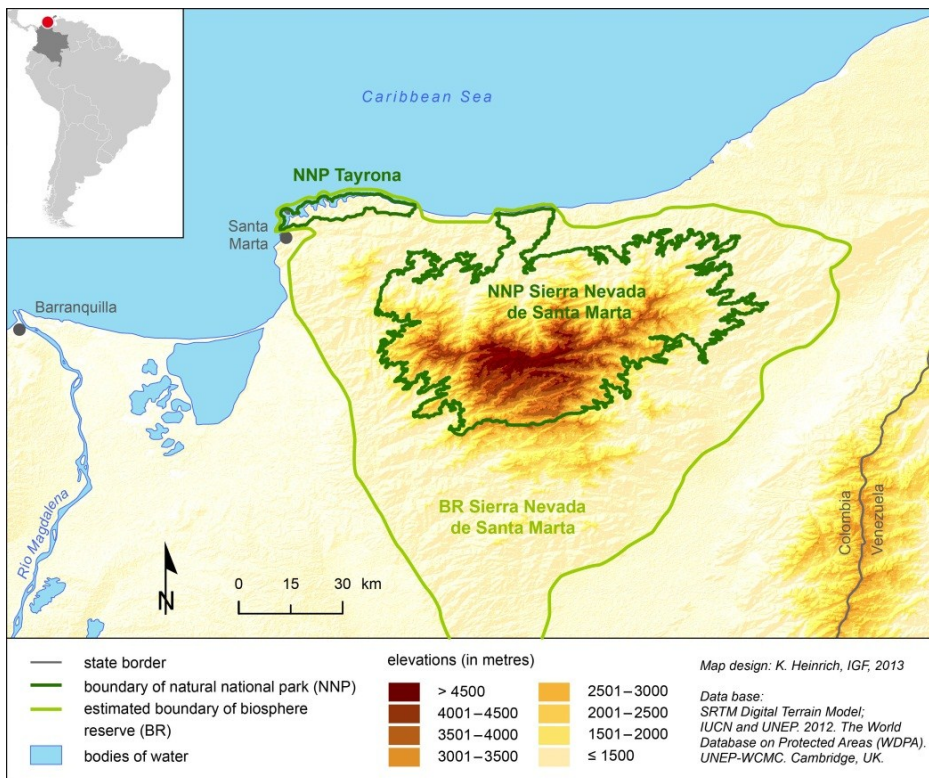


Figure 2: Sierra Nevada de Santa Marta

## Theoretical framework

The livelihood approach is an analytical framework that aims to make livelihood systems more sustainable and less vulnerable: “A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.” (CHAMBERS & CONWAY 1991).

The framework (Figure 3) attempts to present the interdependencies of assets, framework conditions and livelihood outcomes. RAUCH (2009) describes the framework thus: “The livelihood framework adheres to the logic that people will react to environmental conditions with strategies for action that make use of their potentials and take into account the framework conditions, all aimed at attaining secure living conditions.”

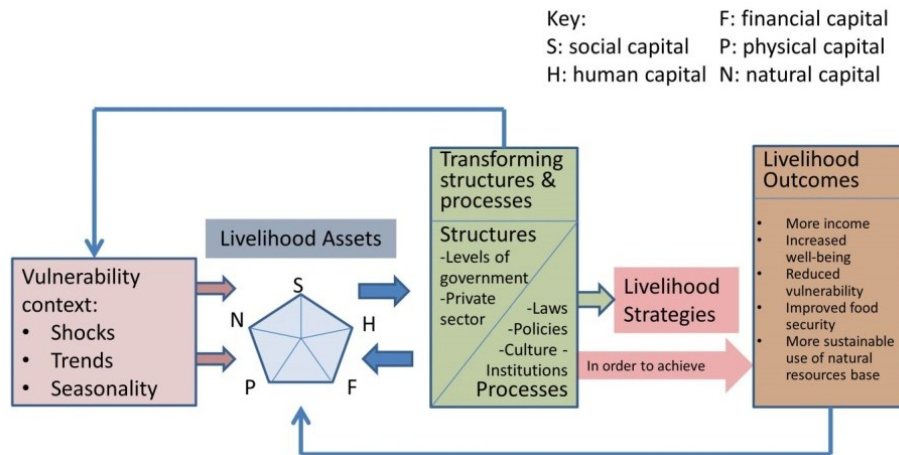


Figure 3: The sustainable livelihood framework (DFID 1999a), modified.

Central element of the framework is an analysis of the livelihood assets, shown here as a pentagon (Figure 3). They are made up of human capital (knowledge, skills, capabilities, health), social capital (social networks, social security systems), physical capital (infrastructure, means of production, transport), financial capital (savings, access to loans) and natural capital (soil, climate, water; ASHLEY & CARNEY 1999).

## Methods

Diverse methods were used in this study. The captured data were integrated using a triangulation of methods to mitigate the weaknesses of one method with the strengths of another (Figure 4).

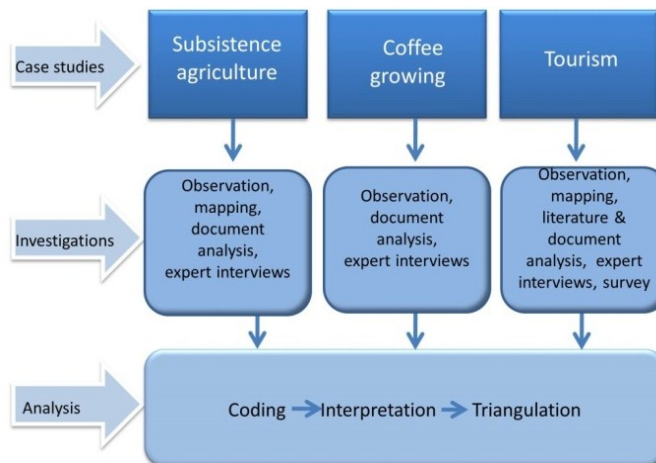


Figure 4: Methodology

## State of the art

UNESCO BRs (LANGE 2005) modified their objectives with the introduction of the Seville Strategy (1995) and the Madrid Plan (2008). In Seville demands were made for zoning and for concrete development measures, in Madrid it was decided to include urbanized regions. In Colombia other protected areas exist besides BRs. The most important are the NPs, which fulfil the IUCN categories (DUDLEY 2008), and the protected areas of the civil society, which are run by private individuals or by NGOs (MCNEELY 1999).

Issues of tropical agriculture were first presented in aggregated form by MANSARD (1968). In this context, subsistence economy plays an important role (WERLHOF et al. 2003). In many Colombian protected areas *campesinos* and *indigenas* still practice this form of economic activity, which aims for self-sufficiency with only marginal involvement in the market (BORSORF et al. 2013). In these and other protected areas, however, you can also find strategies of tourism development (SCHUNCK 2009) and of exporting agricultural products.

This is especially true of coffee export. Coffee as cash crop has undergone dramatic changes in recent decades, triggered by the development of new hybrid varieties (BORSORF 2006) and the emergence of new producing countries in Asia, as well as by changes in consumer behaviour and new marketing strategies of the coffee roasters in industrial countries (high-pressure devices, coffee capsules). To compete better, the *Federación Nacional de Cafeteros* has switched Colombian coffee production completely to the new hybrid varieties. RAPPOLE et al. (2003) have compared and discussed the pros and cons of shade-grown vs. sun-grown coffee.

## Results

### Case study Cinturón Andino

The results of this study have already been published (BORSORF et al. 2011). Here we only discuss the livelihood assets of subsistence farming *campesinos* in the Asocampo cooperative in the Río Piedras region. Jointly they try to face the challenges of climate change by organic farming, bioengineering and education. The natural (NC), social (SC) and human capital (HC) of the region is high. Fertile soils, abundant water, the (normally) good climate conditions and the variety of possible agricultural products across the different elevation levels provide a favourable basis for agriculture. Local expertise and openness for innovations form an important basis for future developments. Social and economic networks (*cabildos*, cooperatives) increase the strengths of the region. Music bands enhance social contacts. However, financial capital (FC) is precarious (state subsidies, low capital in the *fincas*) and physical capital is reduced to land ownership, the farms and their livestock. Thus the livelihood pentagon is reduced to only three pillars, i.e. the natural, social and human capital, of which the natural capital is vulnerable to climate change effects (Figure 5).

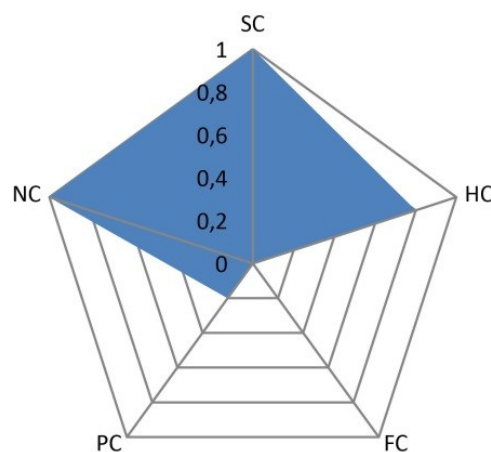


Figure 5: Livelihood assets in the Río Piedras region, Cinturón Andino BR

### Case study coffee-growing Hacienda La Victoria

Today the whole area of the Hacienda la Victoria, founded in 1892, covers 800 ha in the *tierra templada* and the *tierra fría* of the Sierra Nevada de Santa Marta. 400 ha of it are protected forests (*reserva forestal*). At elevations between 800 m and 1450 m, Arabica and hybrid varieties like Castilla, Caturra and Colombia are grown. Most of the coffee, including the hybrid varieties, is grown under the canopy of other trees.

Despite good basic conditions for coffee growing, some fertilization is necessary, but no pesticides or artificial fertilizers are used. Hybrid varieties grown as monoculture without shading trees need regular applications of fertilizer. The tropical soil cannot hold the nutrients due to its low capacity for exchange. In shade-grown cultures this deficit is mitigated by the large quantities of leaf fall of the shading trees. The nutrients remain in the topsoil and reach the coffee plants via mycorrhizae. The plants are doused with a concoction that is rich in microorganisms, both to supply the plants with nutrients and to ward off diseases. In addition, a mixture of earthworms and the hulls of the coffee cherries is spread on the ground and contributes to a closed nutrient cycle.

Currently all the coffee produced at the hacienda is exported to Europe via one large customer. The plan for the future is to market the coffee via e-commerce, work on the marketing is under way.

Figure 6 shows that La Victoria has good natural capital that is not diminishing. The human capital is very good, given the experience of the owner, similarly to the social capital. The workers are well cared for and conflicts with guerrillas and paramilitaries have ceased. The physical capital is old but still functions well and is suitable for producing high-quality coffee. The only vulnerability of the system and the people involved stems from the lack of financial capital. Direct marketing to Europe is a step in the right direction.



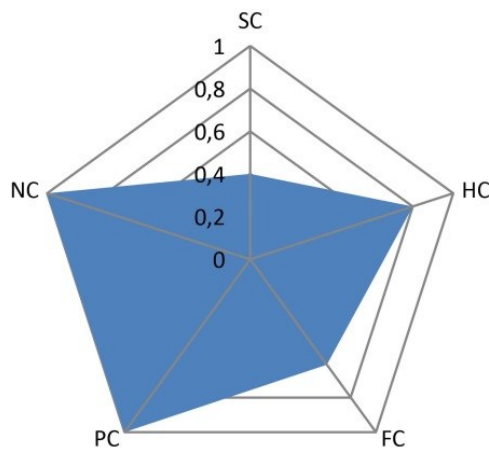


Figure 6: Livelihood assets of Hacienda La Victoria

### Case study tourism

The most important region for tourism in Colombia is the Caribbean. Visitor numbers for the NPs make the value of tourism for the study areas clear. In 2011 Tayrona NP had a total of 241,460 visitors, while Sierra Nevada de Santa Marta NP has hardly been touched by tourism. Only 325 visitors were counted there in 2011 (Ministerio de Ambiente y Desarrollo Sostenibilidad 2011). This puts the overall number of visitors for the BR at almost 242,000.

Colombia focuses on ecotourism to promote sustainable development. One way of achieving this is the association of several farmers in cooperatives with a joint range of ecotourism offers. The *Asociación de Fincas Turísticas* (ASOFINTUR) is such a cooperative in the study area.

Surveys of tourists and tourism experts have shown that substantial improvements in information policy are necessary if the park is to fulfil its education mission. To a degree this is already happening in the eleven *fincas* affiliated to ASOFINTUR (Figure 7). In addition to the accommodation, they offer low impact activities such as horse riding, walking or mountain biking. Such additional income strengthens the financial capital of the *fincas*. Average stay of the mostly foreign visitors is between 14 and 30 days.



Figure 7: Location of the *fincas* affiliated to ASOFINTUR.

Tourism in the BR does not adequately strengthen the physical and financial capital because it is too small, particularly in the mountains. Nor is it easy on the valuable natural capital, except on the ASOFINTUR *fincas*. Given the low visitor numbers, this is not yet a problem. The human capital with extensive local knowledge is not being

leveraged and the social capital is only strengthened at ASOFINTUR (Figure 8). Tourism does not fulfil the criteria of sustainability unless great improvements are made in information policy, cooperation of the stakeholders and environment-friendly tourist infrastructure.

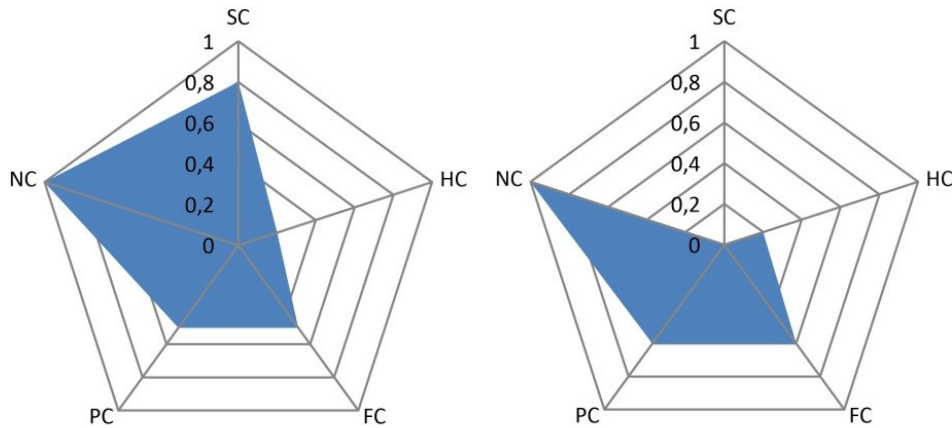


Figure 8 a & b: Livelihood assets in tourism at Sierra Nevada de Santa Marta, left: coast, right: ASOFINTUR

### Case study protective corridor Río Toribio

In the hydrographical basin of the Río Toribio tourism plays only a subordinate role. In our study we analysed the Finca La Cumbre and the Finca Vega as typical examples (Figure 9). La Cumbre has 62.5 ha land, of which 30.5 ha are used as pasture, the remainder is natural forest reserved as bird sanctuary. In terms of elevation the used area ranges from 1850 m to just under 2600 m, which means that most of the area falls into the *tierra fría* zone (above 2000 m). Animal husbandry with cheese production is adapted to these conditions. Slightly below this *finca* is the Finca Vega, a triangular farmstead at nearly 1600 m with a small coffee plantation of 2.5 ha reaching up to 1700 m, thus situated in the altitudinal zone of the *tierra templada*, which is very suitable for coffee growing.

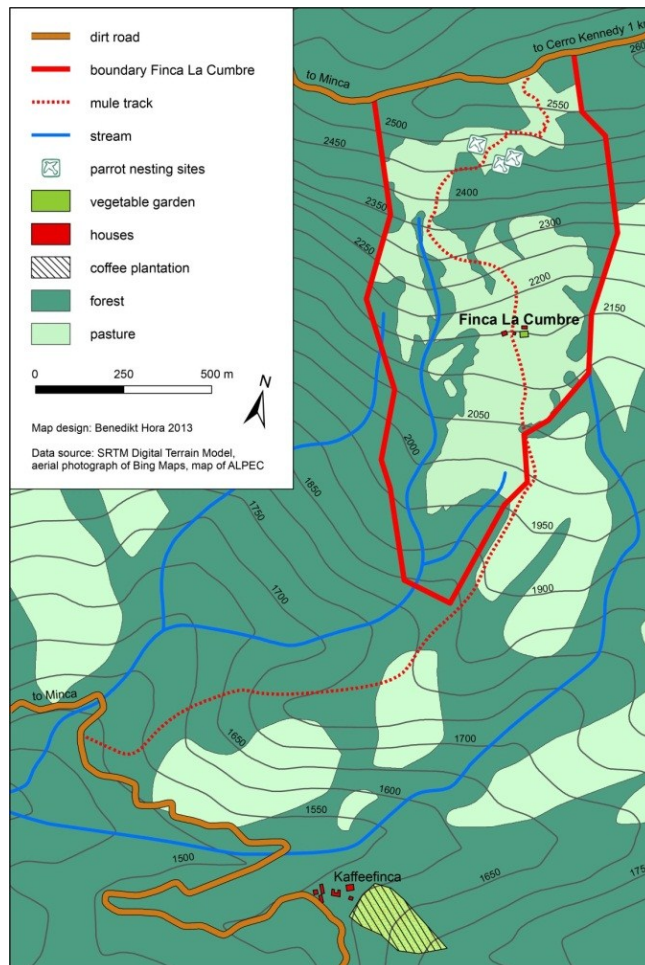


Figure 9: Map of the fincas in the upper part of the Río Toribio basin

The coffee variety grown here is Caturra, a hybrid variety of Arabica. In 2008 the plants had matured enough to produce the first harvest. In the coming years the production is to be converted completely to organic farming. To this end shading trees have already been planted to protect the vulnerable coffee plants from coffee rust, which currently is an occasional problem. A shelling and washing system for the coffee berries has already been purchased.

The problem for small producers is the fact that powerful actors dictate the market conditions for selling the beans, which reduces the potential profit for the producers. The *Federación Nacional de Cafeteros de Colombia* in particular is keen to push its monopoly for coffee export to the world market. Many small producers, however, prefer to deal with actors like the German organization Kaffee K.U.L.T. (THIEL & EIFFLER 2011) as this is the only way to make a profit from the more demanding organic growing method.

From this *finca* a rutted track leads to Minca and Santa Marta. In contrast, the Finca La Cumbre has no direct link to the road and can only be reached on foot or on horseback (Figure 8). The mountain scenery and the tropical vegetation and species diversity in the valley might attract adventure tourists and bird watchers. However, tourist infrastructure is only beginning to emerge. A guesthouse was built at La Cumbre and initially attracted many groups of students but by now visitor numbers have dwindle to just a few.

Hence the *finca*, like everybody in the protective corridor, depends on earnings from agriculture and particularly from dairy farming. At 3 l/cow, milk production is very low and only processed into cream cheese, which only yields small incomes. The earning situation could be improved if the *fincas* succeed in producing hard cheese that can be stored and transported (WÜST 2006).

In addition, the members of ASOTORIBIO endeavour to replant the slopes with indigenous species. Tree nurseries have been established and by August 2005 some 28,000 trees had been planted (WÜST 2006). The project includes education *in situ*, which takes place in *socios* meetings and in schools.

Here, too, we find a mixed result in terms of the livelihood approach (Figure 10). The natural capital is now adequately protected and even improved by reforestation. Physical and financial capital are weak and make for a vulnerable livelihood of the valley population, but they do have high human and, through the *Asociación*, social capital.

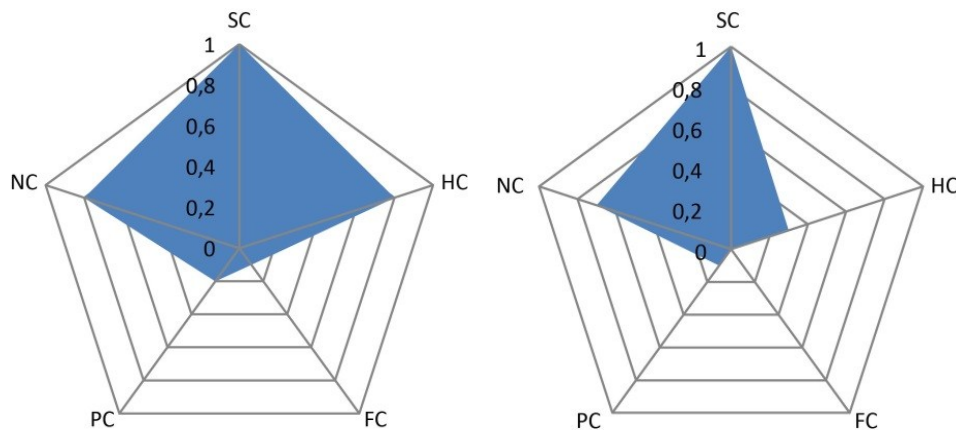


Figure 10 a & b: Livelihood assets of the Finca Vega (left) and the Finca La Cumbre (right)

## Discussion

The three case studies present an uneven picture. In conservation terms, both the efforts at La Victoria and those of ASOTORIBIO must count as positive. While the *hacienda* also has high physical capital, ASOTORIBIO does not and in both cases there is very little financial capital. However, both boast high human and social capital.

Assessment of tourist developments is less positive. Neither is the educational mission of protected areas fulfilled nor are the simplest control mechanisms in place. This vulnerability affects not so much the humans but the natural world. In contrast to the love of nature and the environmental awareness of the Weber family on La Victoria and the families living in the protective corridor of Rotoribio, responsibility for the vulnerable and in parts already impaired environment falls by the wayside in tourism, as does any sense of community and participatory ways of cooperation, with the exception of the members of ASOFINTUR, who combine business sense with idealism.

So we are left with a varied result. Compared with a study on Río Piedras in Cinturón Andino BR, the uncontrolled tourism, particularly on the coast, cannot be called sustainable. The situation is different in coffee growing, particularly of organic shade-grown coffee. This method emulates the natural ecosystem and can be profitable if marketed directly in Europe.

Considerable improvement is needed in management. Currently the protected areas are administered by the Colombian ministry of agriculture, which has awarded the license to run Tayrona NP to a private operator whose interest is in making profit. There is not local management for either the NP nor for Sierra Nevada de Santa Marta BR. While the NP is at least sign-posted, this is not true for the BR, whose boundary is not even exactly defined. If

the criteria of the Madrid plan were applied, the urban centres of Santa Marta and Cienaga could be integrated into the BR. However, this would necessitate strict management and on-going quality control as well as the introduction of rangers and scouts. The civil society regulated protective corridor is managed in a participatory fashion by the small farmers involved, yet here, too, there is no control by a higher level.

## Conclusion

The answer to our initial question is therefore: in an effort to reduce vulnerability, promote resilience and achieve sustainable regional development, organic farming and – given the difficult national marketing paths in the coffee sector – direct export need to be expanded. If conservation concerns, which currently centre on the habitats of rare birds, can successfully be expanded to cover the preservation of the whole ecosystem and the economic basis is strengthened through refinement and export, then vulnerability will be reduced and sustainability achieved.

Tourism can be a main or additional source of income, but it will only meet the criteria of sustainability if information about conservation and diversity is improved, infrastructure expanded and visitor flow channelled. Small scale visitor management, for instance in the *Asociaciones* of the small farmers is easier on the environment than mass tourism on the beaches.

Colombian coffee has its own global niche market if it is organically grown and offers the traditional Arabica variety, which has all but disappeared from the world market. Coffee growing is ecologically viable if the natural ecosystem of the mountain rainforest is emulated by mixed crops and canopy trees. The size of the farm is irrelevant.

*Campesino* associations strengthen the economic foundations as well as the human and social capital. They reduce the vulnerability of individual small farmers and can contribute to the preservation of ecosystems if they are oriented on protected area criteria. Tourism in the shape of individual and ecotourism may strengthen the economic base.

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