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Source: Mountain Research and Development, 41(1)

Published By: International Mountain Society

URL: <https://doi.org/10.1659/MRD-JOURNAL-D-20-00039.1>

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Indigenous-Driven Sustainability Initiatives in Mountainous Regions: The Shuar in the Tropical Andes of Ecuador

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Land use change in tropical places with variable topography followed an elevation-sensitive pattern during the last 3 decades of the 20th century. Deforestation, driven by farmers, was concentrated in

accessible, lowland settings, while sustainability initiatives, promoted by natural scientists, occurred in remote, upland settings. This lowland deforestation–upland sustainability pattern persists, but the drivers of sustainability initiatives have recently changed with the emergence of organizations of rain-forest–dwelling indigenous peoples that promote upland sustainability.

This article describes and, by means of a case study, explains this shift in sustainability dynamics. Indigenous groups have gained more control over the lands they inhabit, and their populations have increased. With these changes, indigenous peoples' organizations have assumed pivotal roles in upland sustainability initiatives. The history of indigenous control over sustainability efforts where the Andes meet the Amazon in southeastern Ecuador, an area inhabited by the Shuar, illustrates this pattern of change.

Keywords: sustainable development; tropical deforestation; Shuar; mountains; Salesian priests.

Received: 27 May 2020 **Accepted:** 19 November 2020

Introduction

Nongovernmental organizations (NGOs), international organizations, and some states have recently pledged to redouble their efforts at conserving natural resources and practicing sustainable development (United Nations 2015). A novel historical geographical pattern has characterized a substantial number of these recent efforts at sustainability. Indigenous peoples have led these efforts, and they have focused on montane environments (Brondizio et al 2019; Sneed 2019). Why would a montane, indigenous-driven pattern of sustainable development have become more common? I try to answer this question through a historical narrative of the events surrounding the emergence of this pattern in one very biodiverse place, the tropical Andes of southeastern Ecuador.

The article begins with a theoretical argument about the likelihood of montane, indigenous-driven efforts at sustainability. After brief descriptions of the setting and research methods, I present a historical narrative about the emergence of this pattern in one place: the Shuar-inhabited regions of southeastern Ecuador. The narrative is divided into 2 periods. During the first period, from the 1940s until 1975, *mestizo* colonists from the Andean highlands wrested control of some lowland rain forests from the Shuar. The loss of lands to the colonists and the associated deforestation prepared the ground for a Shuar initiative during the second period, after 1990, to assert control over sustainability initiatives in 2 nearby, auxiliary mountain ranges of the

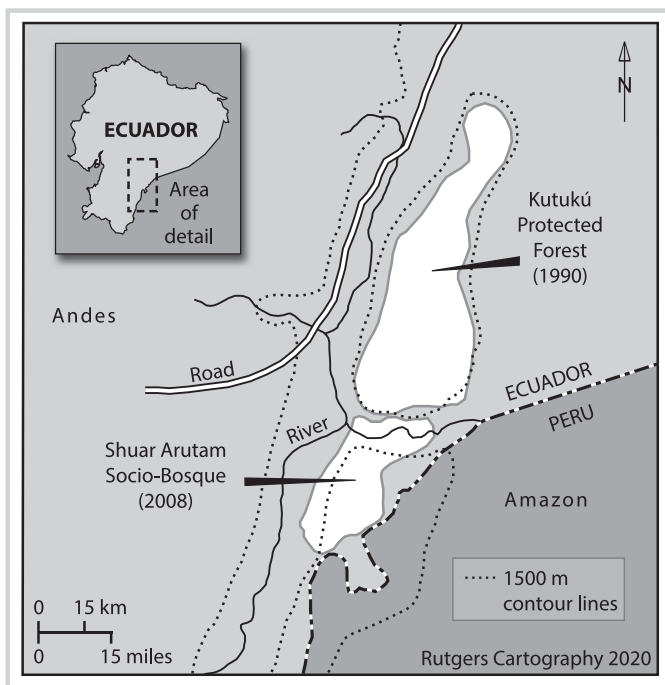
Andes. The article concludes with a consideration of the range of places where this recent montane, indigenous-driven historical dynamic might occur.

A montane, indigenous-driven pattern of sustainable development

Agricultural expansion spurred deforestation in tropical biomes throughout the 20th century (Gibbs et al 2010). Both large- and small-scale farmers showed a preference for clearing level, lower-elevation lands when they expanded agriculture (Jepson et al 2001; Aide and Grau 2004). The level contours of the land facilitated the cultivation of crops and the grazing of cattle. Moderate grades of land also made road building easier, and the new roads raised the value of nearby, recently deforested tracts of land. In contrast, in montane settings, the rugged terrain often prevented road building, which in turn reduced the number of economic livelihoods available to people. Landowners in montane settings found it difficult to get crops, livestock, and timber to markets. These impediments to economic activity impoverished people. They also reduced the opportunity costs associated with conservation projects in the highlands (Grau and Aide 2007). The small number of viable alternative economic opportunities in the mountains made local residents more willing to preserve their forests in return for modest payments for environmental services (PESs).

Formal organizations of indigenous peoples became forest caretakers during the latter part of the 20th century.

FIGURE 1 Protected forests in the *Cordillera de Kutukú* and the *Cordillera del Cóndor*. (Map by Mike Siegel, Rutgers Cartography)



Beginning in the 1960s, indigenous organizations, with assistance from NGOs and multilateral development programs, acquired titles to approximately 250 million hectares of forest (an area equivalent in size to Argentina) in the Global South (Barry and Meinzen-Dick 2014). At the same time, indigenous peoples' organizations became more powerful as they built a presence in national political coalitions and found allies in multilateral organizations like the United Nations and the World Bank (United Nations 2015). At the same time, population growth among indigenous peoples sharpened their concerns about maintaining access to remote, sparsely populated, and forested uplands (McSweeney 2005). The poverty of indigenous peoples may have spurred them to expand their settlements into the undeveloped highlands. The opportunity costs of moving into the highlands seemed less daunting to people with few economic opportunities in their existing lowland homes.

Increased support for sustainability initiatives from international organizations, growing populations of impoverished indigenous peoples, increasing indigenous organizational capacity, and the legacy of earlier waves of settler colonialism in which indigenous people lost lands to colonists together explain why indigenous-driven sustainability initiatives in montane environments have become more common. In multiple regions, indigenous leaders became participants in "meso-level social orders" of organizations that interacted repeatedly and strategically with one another in efforts to create conserved lands in very biodiverse, montane places (Fligstein and MacAdam 2011). These sustainability-focused strategic action fields included indigenous organizations, environmental NGOs, government agencies, and big multilateral organizations like the United Nations. Coalitions of these organizations provided the impetus behind recent efforts at sustainability in montane settings.

The setting: the eastern slope of the Andes in southern Ecuador

This case study focuses on sustainable development where the Andes meet the Amazon in southeastern Ecuador. Figure 1 outlines the area. Dramatic topography characterizes the region. Moving from east to west, tropical lowlands give way to auxiliary ranges of the Andes, the *Cordillera del Cóndor* and the *Cordillera de Kutukú*, which rise to approximately 2500 to 2900 masl, about 1500 m above the Amazon plain at the base of the mountains. Further west, across valleys carved by eastward-flowing rivers that drain the Andean highlands, the *Cordillera Oriental* of the Andes rises to elevations between 4000 and 5230 m. Orographic rainfall from westward-moving weather systems produces 2500 to 4000 mm of precipitation per year. The rivers run fast, eventually emptying into the Marañon and then the Amazon. These rivers are not navigable, except for short stretches.

The region's accentuated topography contains abundant niches for different plant species. According to a recent survey, the tropical Andes contains some 23,000 species of vascular plants, the greatest assemblage of plant biodiversity in the world (Mittermeier et al 2000). Within this region, the highest elevations, above 2000 m, and the lowest elevations, below 1000 m, contain less biodiversity than the sloped lands at middle elevations (Balsey 1988; Gentry 1995; Borgtoft et al 1998). With abundant orographic rainfall and altitudinal niches for flora and fauna, these sloped lands contain the greatest concentrations of biodiversity in the tropical Andes. The sub-Andean *Cordillera del Cóndor* and *Cordillera de Kutukú* contain extensive areas in the 1000 to 2000 masl elevational range, so they constitute global biodiversity hot spots.

Data and research methods

Over the course of 50 years of repeated visits to Ecuador's tropical Andes, I slowly accumulated the information about the historical dynamics described here. My involvement with the peoples of this region began as a Peace Corps volunteer, when I helped to carry out a new lands settlement program in the region. During a series of research projects on sustainable development that began 15 years later, I collected data through key informant interviewing, 3 household surveys, and archival research. In the 1980s, 1990s, and 2010s, I carried out, with collaborators, household surveys of Shuar and *mestizo* smallholders in an area at the northern base of the *Cordillera de Kutukú*, one of the 2 mountainous areas under study. Comparative cross-sectional analyses of the findings from the 3 surveys indicate why some Shuar chose to move into these mountainous regions. Finally, research reports about biodiversity and the livelihoods of Shuar settlers provided information about recent land management practices in the 2 mountainous regions.

The emergence of montane, indigenous-driven sustainability initiatives: a narrative

Preparing the ground for indigenous-driven sustainable development: missionaries, the Shuar, and colonists in the 20th century

The shift in sustainability initiatives after 1990 had its origins in the region's early history of settlement and deforestation.

FIGURE 2 A Shuar homestead. (Photo by Gary Hill)



The state had little presence in the Amazon region at the beginning of the 20th century. The national government, headquartered in Quito, had several small garrisons on eastward-flowing tributaries of the Amazon river. A few settlements of *mestizos*, with no more than several hundred inhabitants, existed at the base of the Andes. Peruvian traders from downstream centers, like Iquitos, made occasional visits to these settlements. The Peruvian presence provoked concern among Ecuadorian elites. In 1889, to strengthen Ecuador's claim to these lands, the government authorized Salesian priests, an order of Catholic missionaries, to evangelize among the region's Amerindians (Bottasso 2011).

The Amerindians, who self-identified as "Shuar," resided on dispersed homesteads in the forest. Fruits, vegetables, and root crops from their gardens, along with fish and game from the rivers and forests, provided Shuar families with a subsistence (Harner 1972). The homesteads occupied relatively little space (see Figure 2), and the population densities of the Shuar were low during the first half of the 20th century, so the Shuar's subsistence practices did not degrade the surrounding forest.

The Salesians, through the creation of missions to minister to the Shuar, extended the authority of the state to these remote places. For the first few decades of their missionary work, Salesians had only fleeting contacts with the Shuar. Meanwhile, small groups of impoverished *mestizo* migrants from the Andean highlands, attracted by the presence of the priests in the Amazon region, began to settle around the missions. Figure 3 shows colonists walking into the Amazon lowlands. The Salesians ministered to the *mestizo* settlers. The priests built churches, established schools, and promoted the construction of trails between the missions (Ulloa Dominguez 1999; Bottasso 2011). The small numbers of Shuar living in these valleys lost land or sold land to the more numerous *mestizos*. Some of the displaced Shuar then moved eastward into more sparsely populated regions.

Others found work on colonists' farms (Amaluiza and Segovia 1977). By 1950, the province of Morona Santiago in southeastern Ecuador had 21,046 inhabitants, of whom only 4137 persons, most likely an underestimate, were Shuar (INEC 1951; Rubenstein 2001; Jokisch and McSweeney 2011).

When the Salesians began to speak and teach in the language of the Shuar during the late 1930s, the frequency of contact and the scale of Salesian interventions into Shuar life increased (Toscano 1999). Beginning in the late 1950s, the Salesians tried to counter the loss of Shuar lands to *mestizos* by encouraging the Shuar to establish villages (*centros*) and acquire legal title to the land surrounding the *centros*. The political efforts to protect the Shuar's access to the lowlands expanded in the early 1960s when, working with Salesian advisers, Shuar leaders formed a federation of Shuar *centros*, known in later years as *Federacion Interprovincial de Centros Shuar* (or FICSH; FICSH 1976). Shuar leaders also founded smaller, regional associations of *centros* under the larger, umbrella-like FICSH organization.

As early as 1964, Shuar leaders and Salesian priests agreed that the Shuar would become self-governing, and the priests would confine themselves to spiritual and educational activities (FICSH 1976). In practice, this reorganization of Shuar and Salesian responsibilities took place gradually over several decades, so, during the 1960s, the Salesians continued to occupy an influential, interstitial position between Shuar and colonists in the politics of land acquisition in Morona Santiago. While the Salesians directed the bulk of their resources to defending the Shuar's access to tropical lowlands, they also retained a residual commitment to helping impoverished colonists.

The Salesians resolved their conflicting commitments to Shuar and colonists, at least in one rapidly deforesting zone, through an elevation-sensitive apportioning of *terrenos baldios* to the 2 groups. This church-supported scheme delivered the lowest elevation lands to newly formed Shuar *centros* and confined new *mestizo* settlements to level, higher-elevation

FIGURE 3 *Mestizo* colonists on the trail into Amazon lowlands, 1960s. (Photo by Gary Hill)



lands to the west. An agroecological rationale underlaid this scheme. The Salesians had begun promoting the adoption of cattle ranching among the Shuar as a device for strengthening their claims to land through the conversion of forests into pastures, but Shuar livelihoods remained focused, at least initially, on producing root crops like cassava (*Manihot esculenta*) and fruits like plantains (*Musa* sp) for household consumption. The growth of these plants slows at elevations above 1000 masl, so the Shuar preferred to establish their gardens and *centros* at lower elevations. *Mestizo* colonists followed a somewhat different calculus, given their focus on converting forests into pasture for cattle (Salazar 1986). While they did not want to convert sharply sloped land from forests into pastures for fear that the steep slopes would endanger grazing cattle, they regarded less sloped, higher-elevation lands as desirable for raising cattle.

The Salesians created a land use plan from these preferences. Shuar got land with collective titles at lower elevations where, in addition to grazing cattle, they could grow familiar crops in their gardens, while *mestizos* got land with individual titles at slightly higher elevations where they could pasture cattle. No one claimed the sharply sloping lands, just to the west in the *Cordillera Oriental* and just to the southeast in the *Cordillera de Kutukú* and *Cordillera del Cóndor*.

Despite the something for everyone appeal of the Salesian plan for new land settlement, it disadvantaged the Shuar. They did (eventually) get collective titles to 3000 to 4000 hectares around each *centro* in the valleys, but the colonists' clearing of the nearby forests with a slightly higher elevation to create pastures deprived the Shuar of valuable hunting grounds. Shuar leaders in the 1980s came to see the loss of these higher-elevation hunting grounds as a dispossession and demanded the return of these lands.

By the mid-1970s, colonists and the Shuar had made commitments to improve their livelihoods by clearing land

in western Morona Santiago. Road construction by a regional development agency, Centro de Reconversion Economica de Azuay, Canar, and Morona Santiago (CREA), south to north along the base of the Andes, added value to cleared land near the new road (Rudel and Horowitz 1993; Rubenstein 2001). Only to the east of the *Kutukú* range, where, without roads, Shuar continued to pursue forest-based livelihoods did they express a reluctance to build roads and a corresponding desire to conserve forests (America Indigena 1988).

As with many other indigenous groups in the Amazon basin, disputes over land ownership left a legacy with Shuar leaders (Little 2001). During the 1980s, the expansion of *mestizo* settlers into higher-elevation lands inclined Shuar leaders to think that they could lose access to the higher-elevation lands in the *Cordillera del Kutukú* and the *Cordillera del Cóndor*. These concerns shaped subsequent settlement patterns and planning processes among the Shuar who lived in and around the *Kutukú* and *Cóndor* highlands.

Shuar activism and post-1990 sustainability initiatives in the Andean foothills

The arrival of a narangilla (*Solanum quitoense*) blight in 1990 reduced the returns from agriculture in Morona Santiago and altered migration patterns among *mestizos* and Shuar. *Mestizo* men began moving overseas or to urban places in search of jobs, and fertility rates among *mestizo* women declined. Shuar populations in the existing *centros* continued to grow, through high fertility rates and, relative to *mestizos*, lower rates of rural to urban migration (Borgtoft et al 1998; Rudel 2018). Population trends in racially segregated rural parishes diverged between 2001 and 2010. Populations in *mestizo* communities grew by 4.2%, while populations in Shuar communities grew by 35.1% (INEC 2010). Population

growth among the Shuar spurred declines in the average extent of household landholdings. Household surveys indicate a decline in the size of Shuar landholdings from 66 hectares in 1986 to 21.7 hectares in 2011. Parallel declines took place in the numbers of cattle owned by Shuar: from 5.8 head per household in 1986 to 2.8 head in 2011 (Rudel 2018).

The growing poverty of many Shuar households, the occupation of the last unclaimed lands by Shuar families in the lowland *centros*, and frictions between households within the *centros* together encouraged the creation of offshoot Shuar settlements in previously unclaimed territories in the accentuated terrain of the *Cordillera de Kutukú* and the *Cordillera del Cóndor*. In this manner, the number of Shuar *centros* in the *Cordillera del Cóndor* increased from 3 to 16 between 1970 and 2007 (Neill 2007; Rudel 2018). By 2012, the *Cordillera del Kutukú* had 18 small settlements. Most of these settlements had Shuar populations, but several communities adjacent to the highlands, like Patuca, had *mestizo* colonists (CARE et al 2012). Under these historical circumstances, the status of the unclaimed and unoccupied lands in the *Cordillera del Kutukú* seemed uncertain.

Driven in part by concerns over where *mestizos* might next try to settle and by a desire to expand their control over lands that Shuar had begun to settle, the leaders of FICSH petitioned in 1990 for the creation of a Protected Forest in the *Cordillera del Kutukú* (see Figure 1). The government agency in charge of parks approved the FICSH request, creating the *Bosque Protector Kutukú Shaimi* (BPKS), which was a park in name only for its first 2 decades. It had no land use regulations. Its boundaries extended approximately 100 km north to south and 30 km east to west. The boundaries followed the physical contours of the accentuated terrain. Narrow lines of human settlement existed within the BPKS, in mountain valleys and the northernmost portions of the designated protected area. The 2010 census estimated 18,000 inholders in the BPKS, 85% of whom were Shuar. One road crossed the northern portion of the BPKS. Elsewhere in the BPKS, mule trails provided the only means of traveling from place to place (CARE et al 2012).

With financial and organizational assistance from CARE International, the Ecuadorian Ministry of the Environment, the Tinker Foundation, and the European Union, 4 Shuar organizations, including FICSH, worked with NGO representatives to produce a master plan for the BPKS in 2012, which created 3 zones of land use. In a small zone around the existing settlements, inholders had titles to land, cultivated gardens, and maintained small pastures. The largest zone, covering more than 80% of the protected area, mandated complete forest protection (CARE et al 2012).

These prescribed zones did not disrupt Shuar land use in the *Kutukú*. Shuar households managed without roads and vehicles. Via mule trails, they walked small numbers of cattle out to the end of the nearest road where trucks took the cows to urban markets. Logging followed a similar pattern. Shuar men would fell a commercially valuable tree, cut it into boards, and strap the boards to the sides of mules. The mules would then drag or carry the boards out to a designated spot on the road. Most other essentials for living, like food and construction materials, came from the gardens and secondary forests close to Shuar homes (Borgtoft et al 1998). The small scale of these Shuar activities made it possible to incorporate them into a plan for the sustainable development of the BPKS that would leave its biodiversity

intact while accommodating small increases in the Shuar population. This circumstance made it possible to create a land use plan for the BPKS that was acceptable to Shuar inholders, donor NGOs, and government agencies.

A second sustainability initiative emerged between 2008 and 2012 in the *Cordillera del Cóndor*, just to the south of the BPKS (see Figure 1). The *Cordillera del Cóndor*, like the *Kutukú* range, features rough, forest-covered terrain with Shuar *centros* in narrow valleys. As in the *Cordillera del Kutukú*, the valleys in the *Cordillera del Cóndor* contain trails that link the 16 Shuar settlements in the region with one another (Neill 2007). Other than a recently constructed road that accesses a large copper mine on the western edge of the *Cordillera*, there are no roads in the *Cóndor* region and very little cleared land (Rudel 2018). The 16 Shuar communities in the region belong to a regional association of Shuar *centros*, the *Pueblo Shuar Arutam* (PSHA). The PSHA represents 47 *centros* from 6 different associations, including several *centros* along the north shore of the eastward-flowing Santiago River, which separates the *Cordillera del Kutukú* and the *Cordillera del Cóndor*. The PSHA communities contain 233,000 hectares of mostly forested land.

In 2008, the Ecuadorian government decided to create a PES program called *Socio-Bosque* that would pay landowners an annual fee for the carbon sequestered in their forests that year. The initial *Socio-Bosque* contracts paid landowners a high price, around \$30.00 a ton, for sequestered carbon on their lands. By 2015, landowners had enrolled approximately 13% of all Ecuadorian land in the program. The price paid for the sequestered carbon has declined in recent years, but the PES program has continued, in part because several organizations from Norway and Germany purchased carbon offsets through it. The PSHA now has one of the largest contracts in *Socio-Bosque*, with 93,000 hectares of enrolled forests.

The rationale for the Shuar's participation in *Socio-Bosque* hinges on the rough, inaccessible terrain in the northern portions of the *Cordillera del Cóndor*. With no roads and no navigable rivers, it is difficult for landholders to market crops or livestock from these places, so commercial agriculture and large-scale land clearing make little economic sense. The poverty of most Shuar households makes residence in this type of setting feasible. Forest products continue to be available in small amounts. The secure tenure of the *centros* qualifies Shuar households for PESs, and the poverty of the recipient households makes the PESs economically significant.

In both the protected forest of the *Kutukú* and the conserved *Socio-Bosque* forest in the *Cóndor*, the absence of competing economic opportunities, coupled with the poverty of the indigenous peoples, and the assertiveness of their indigenous organizations, enabled sustainable development in these mountainous districts. A vertical pattern of sustainability has emerged in the region. The more sustainable landscapes, often shaped by indigenous peoples, occur at higher elevations, while the more environmentally degrading, largely agricultural activities occur at lower elevations (see Figure 4).

This pattern of montane sustainable development does not pertain everywhere. Just to the south of the region under study, in the southern reaches of the *Cordillera del Cóndor*, mining companies have developed large-scale copper mines (Warnaars 2013; Rudel 2018). These interventions by extractive enterprises, with support from government officials, have made it very difficult for nearby indigenous

FIGURE 4 Lowland pastures and upland forests. (Photo by Thomas Rudel)



populations to unite around a program of sustainable development. Conflict between these actors has marked the governance of land use in these zones, and it has varied with proximity to the mines (Vela-Almeida 2018). The landscape has become territorialized, with distinct zones of land use, including sacrifice zones close to the mines.

Conclusion

Montane environments have long served as regions of refuge for indigenous peoples. The arrival of Cortez and the conquistadores in Mexico in 1521, and the European diseases they carried, precipitated the flight of indigenous peoples into the southern highlands of Mexico in the ensuing decades (Aguirre Beltran 1979). With the concentration of land clearing in the lowland tropical forests of Southeast Asia and interior South America during the last 3 decades, the regions of refuge title has taken on a biological and an anthropological meaning. Rain forests, with their assembled biodiversity, have persisted in montane settings at the same time that, at least in this instance, small numbers of indigenous people have moved into these places, and indigenous organizations have assumed prominent roles in planning and implementing sustainable development in these locales.

Where else might this montane, indigenous-driven pattern of sustainable development occur? The increased salience of indigenous peoples in montane sustainability initiatives certainly reflects a worldwide increase in the organizational capacity of indigenous organizations that occurred after they received collective titles to land, beginning in the 1960s. Outside of Ecuador, in the outer islands of Indonesia, similar coalitions of environmental NGOs and indigenous organizations have opposed the expansion of large palm oil plantations into their ancestral highlands (Wakker 2006). A similar pattern of environmentally friendly sustainable development, but more focused on tree planting, has characterized ethnic minorities

living in the uplands of mainland Southeast Asia (Sikor et al 2011). While these instances of indigenous-driven, upland conservation do not cover an extensive area of the humid tropics, their emergence in a wide variety of locales in Latin America and Southeast Asia suggests that this ethnically and geographically identified form of conservation could make a significant contribution to the global conservation of biodiversity in the 21st century.

ACKNOWLEDGMENTS

The author is grateful to Diana Burbano and Mike Bandiera for comments on an earlier draft of this article. Financial support from the Fulbright Commission and from grants P1009499 and SBR9618371 from the US National Science Foundation facilitated this research.

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