



## Case Study:

### Community Based Sustainable Development in Intag Ecuador

**Partner Organization:** Asociación Agroartesanal de Caficultores Río Intag, Defensa y Conservacion Ecologica de Intag, HydroIntag, Mujer y Medio Ambiente, and Red Ecoturistico de Intag

**Country:** Ecuador

**Authors:**

Martin Zorrilla, Cornell University

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ConservationBridge is a collaborative effort led by Cornell University's Department of Natural Resources.

ConservationBridge is a collaborative effort directed by James P. Lassoie, Department of Natural Resources, College of Agriculture & Life Sciences, Cornell University.



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## Introduction

The Intag river valley in Northwest Ecuador is a landscape faced with dramatically distinct visions of the future. Since the early 1990s the prospect of open-pit copper mining in the area has caused conflict and an active resistance calling for alternative forms of livelihood development. What follows is an exploration of Intag's ecological, geographic, and social landscape and how it has been shaped by promises and perils of extractive industries. In a country that recently introduced the 'rights of nature' into their constitution, the future of Intag has become part of a national debate on human well-being, poverty, environmental justice, and the definition of progress. At the forefront of Intag's case against extractive development are its fragile alternatives, ambitious bids at creating sustainable livelihoods that balance human needs with ecosystem health. Currently, four local non-governmental organizations form a cornerstone of Intag's push for sustainable development:

1. Asociación Agroartesanal de Caficultores Río Intag (AACRI) (*Río Intag Agro Artisanal Coffee Farmers Association*) (Appendix A).
2. Defensa y Conservacion Ecologica de Intag (DECOIN) (*Ecological Defense and Conservation of Intag*) (Appendix B).
3. La Asociación de Productoras Agro Artesanales: Mujer y Medioambiente (Myma Cabuya) (*The Association of Agro artisanal Producers: Women and The Environment*) (Appendix C).
4. Red Ecoturistico de Intag (REI) (*Intag Ecotourism Network*) and Intag Tours (Appendix D).

## Geography and Ecology

Intag is a region in the Cotacachi County, Province of Imbabura, in the Andes of Northwest Ecuador (Figure 1). It is a system of river valleys on the western slopes of the Andes, with an elevation ranging between 1200 and 2300 meters (3937 and 7546 feet).

The Intag region falls within two of the world's 25 most important biodiversity hotspots: the Tropical Andes and the Choc/Darien/Western Ecuador hotspots (Myers et al. 2000). The predominant ecosystem is tropical montane cloud forest (TMCF), although pre-montane humid forests dominate lower-elevation across the region. TMCF ecosystems compose less than 3% of global woodlands worldwide and are recognized by conservation practitioners as areas of high conservation priority for their high levels of endemism and biological diversity. The unique hydrology of this ecosystem has significant impacts on water availability within the Intag valley (Jarvis and Mulligan 2011). Understanding this relationship is key to understanding conservation goals and social issues within Intag.



These forests typically occur in heterogeneous distributions across mountainous regions, which leads to high rates of endemism as well as species richness. For example Balslev (1988) found that half of Ecuador's plant species are found in mid-elevation forests, the majority of which are TMCs, although they constitute only 10% of the land area. Of those species, 39% were found to be endemic to Ecuador.



**Figure 1.** *The Intag Region illustrated in red within the black silhouette of the Imbabura Province.*

In a cloud forest, consistent low-level cloud-cover condenses on trees and the epiphytes growing on them (Figure 2). This constant availability of water creates and sustains a hyper-diverse biome of canopy-inhabiting flora and fauna. Epiphytes play a key role in maintaining forest humidity during dry seasons, with some mossy epiphytes having been found to store two to five times their dry weight in water (Köhler et al. 2007). The presence of mist results in decreased evapotranspiration by reducing incoming radiation and lowering vapor pressure deficit. This translates into consistently moist soils and increased stream flow (Jarvis and Mulligan 2011). In areas with lower rainfall this relationship becomes even more important, with the canopy of some forests doubling the water yield from precipitation (Ataroff and Rada 2000).

The ecohydrology of TMCs magnify the impacts of human disturbances such as deforestation. Studies have linked deforestation to decreased steamflow and, more troubling still, the decrease of cloud formation (Bruinjzeel et al. 2011, Ledo et al. 2012).

Clean water from TMCs is an important resource for those who live in and near them. The Latin American cities of Tegucigalpa, Honduras; Mexico City; and Quito, Ecuador draw upon on water from cloud forests as part of their potable water (Bubb et al. 2004). In Intag, TMCs are the primary source of clean water, with the majority of communities relying on local watersheds rather than wells or aqueducts. Intag is also living the impact of deforestation on TMCs, as community watersheds have been significantly reduced over the past 30-50 years as a result of deforestation for cattle ranching.





**Figure 2.** *Cloud Forests are moist tropical or subtropical forests characterized by persistent low-level cloud cover. Photo: Carlos Zorrilla*

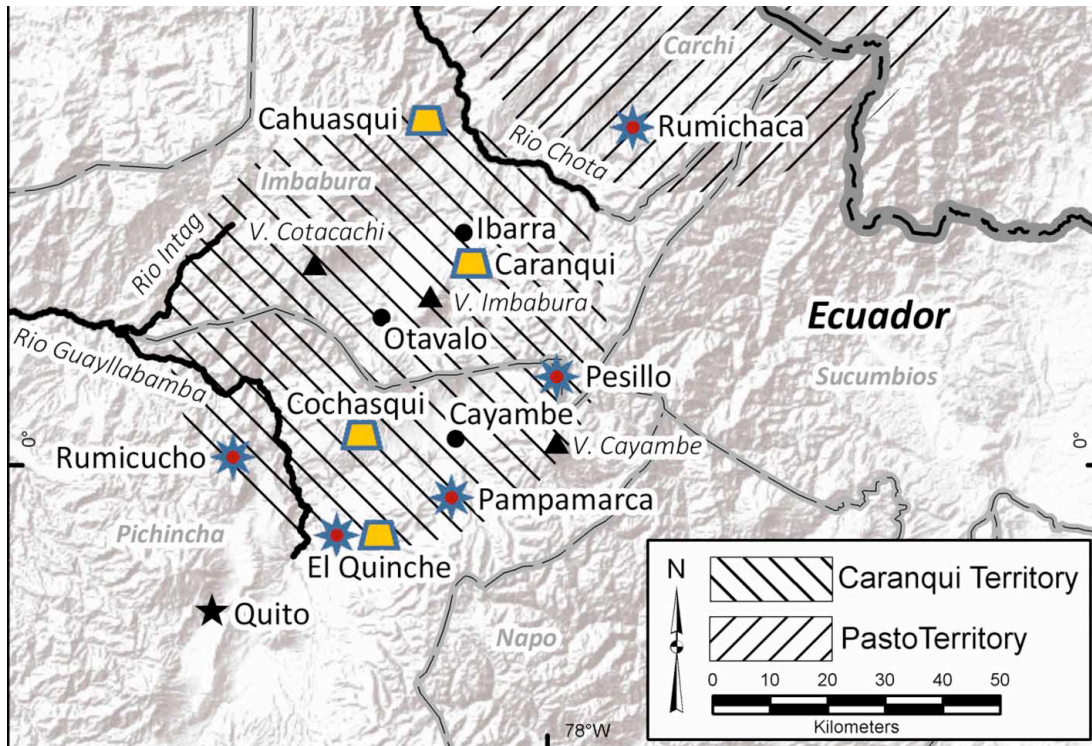
A number of communities have worked to counter this trend by reforesting watersheds (see Appendix B). However, the largest current threat of disturbance is the proposed open pit mine known as ‘Llurimagua.’ Of particular concern is the impact that large-scale deforestation may have on cloud formation, and therefore the local climate, ecology, and livelihoods. In 1996 the first mining company to enter Intag, Mitsubishi metals, wrote in their environmental impact study that the project would lead to, “...massive deforestation which would progress to dry conditions (desertification) influencing the local climate...” (Kocian et al. 2011).

### **History and Culture**

As a region encompassing a huge elevation gradient along the flanks of the Andes, Intag’s history and culture is defined by the isolation of its rugged landscape and shifting alliances with surrounding population centers.

#### Pre-Colonial Period

The pre-Columbian (i.e., pre-Colonial) history of the Intag region is poorly understood, having received little archeological study. Due to its location in a transition zone between the western lowlands and the densely populated highlands, Intag likely fell within the pre-Incan territories of both the Yumbo and Caranqui peoples (Figure 3). The Yumbo originally inhabited a large expanse of the lowlands and flanks of the northwestern Andes and were never subjugated by the Inca.



**Figure 3.** Map of the northern highlands indicating the Caranqui territory. Symbols indicate fortresses (stars) and tolas (trapezoids), western regions were likely within Yumbo territory. (Adpted from Bray and Almeida 2014)

The Caranqui culture is better understood, and represents a series of chiefdoms falling within a single ethnicity in the northern highlands, and who represented the last peoples conquered by the Incan empire before its demise (Bray 2015, T. J. Bray personal communication, June 23, 2015).

The Yumbos were thought to be merchants controlling trade networks that connected lowland coastal populations with more densely populated regions in the central highlands. Yumbos traded salt and cotton among other goods, and appear to have, to some extent, maintained their trade routes through Incan and later Spanish conquest (Almeida 1993). Archeologists suspect that diseases such as smallpox brought by Europeans in the 16<sup>th</sup> century, among other factors, decimated the Yumbo population in Ecuador- and today this ethnic group is considered extinct.

The Caranqui are a better understood culture known for fiercely resisting the Incan advance in the early 1500s. The Caranqui created alliances with the neighboring Cayambes to resist the Inca advance. After a ten-year war the Incan emperor Huayna Capac (1493 - 1525/1527) defeated the Caranqui, and punished their resistance by killing their entire male population and disposing of their bodies in a lake, known today as Yahuaracocha or 'blood lake.' The region under Caranqui control in northwest Ecuador became one of the last conquests of the Incan empire, and subsequently only



persisted under Incan rule for approximately 50 years before the Spanish conquest.\* As with many other highland peoples, the Caranqui descendants did not suffer total ethnic extinction and today form part of a diverse cultural heritage of the Quechua speaking communities of Imbabura (Bray 1992, Romero and Bray 2014).

However, the portion of Caranqui territory within which Intag is thought to have fallen did not maintain a continuous population throughout the Spanish conquest. It is thought that the region was less densely populated to begin with, although the region contains numerous earthen mounds called *tolas*, serving as platform for the dwellings of leaders or *casiques* as well as ceremonial purposes. One site in particular, known as Waliman, within the Intag region contains one of the largest ramped *toLa*, and is thought to have a significant ceremonial purpose (Bray 1992, Romero and Bray 2014).

### Colonial and Post-Colonial Period

It is not known why pre-Columbian peoples did not continue to occupy Intag, and other nearby regions in the western Andes. However, it is most likely that a combination of diseases brought by the Spanish as well as enormous changes in the socio-political systems brought on by early colonial rule caused population collapse and out-migration from these regions. The Yumbo people disappeared completely and it appears that Caranqui presence in the region retreated to upland population centers, leaving Intag unpopulated until about the mid-1800s. It was not until the period of 1930-1950 that most of Intag's towns and community centers were formed. The population growth was motivated by government incentives to put land into productive uses and land reform laws. As a result Intag's early population was a diverse mix of settlers from various provinces in Ecuador. This early pioneering culture was one of expansion and survival, something that has had profound impacts on the natural resource in the region. A stark example of this is an agrarian reform law in 1964 that defined land with as much as 80% forest cover to be 'unproductive' and open for others to colonize or expropriate. As a result, landowners were forced to deforest up to 50% of their land to establish ownership (Almeida 1993, Kuecker 2007, Kocian et al. 2011)

Today Intag's scattered farms, communities, and hamlets are occupied by a mix of people with indigenous, African, and mestizo backgrounds. The name Intag is a non-political label for region dominated by the river valley of the 'Rio Intag.' The region is administered by the Cotacachi County and contains seven parishes, with a total land area of 150,000 hectares (~370,660 acres) Intag has a current population of roughly 15,000 people, most of whom are small-scale landowners. Although mestizos make up the majority of the population, indigenous cultural influence is relatively strong in the area. One example of this influence is the *minga*, or work-party, an Andean concept that pre-dates the Inca. A community will call a *minga* for a variety of reasons, road maintenance and work on public infrastructure being the most common. Every family is

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\* The warrior Rumiñawi defended the northern Incan empire against the Spanish, but was ultimately defeated by one





expected to send men to work, women to cook, and food. At midday the workers share a communal meal.

The official numbers place upwards of 80% of Intag's population below the poverty line, although many Inteños do not self-identify as poor. Public forums have emphasized access to clean water, a strong family, and the right to live in peace as aspects of well-being that are highly valued by Inteño culture. In this sense, the attitude of many Inteños about wealth and prosperity aligns with a current movement in Latin America called 'Buenvivir.' Buenvivir, or *sumak kawsay* in Quechua, is a complex concept that can be superficially translated as 'the good life.' It implies a carefully balanced existence, where measures of success are relative to the health of the environment as well as the person (Villalba 2013, Buchanan and Encalada 2014).

Buenvivir represents a Latin American response to globalization, coming about through the fusion of leftist Latin American philosophy and indigenous social movements (Novo, 2014). In 2008 the term was embodied in the 2008 Ecuadorian constitution (see Box 1). In the 2014 local elections, five out of the seven parishes in Intag supported a small party called Vivir Bien. Its officials ran on a platform of achieving the Buenvivir of Intag through opposition to large-scale mining and support of economic alternatives. It is interesting to note that the Ecuadorian state mining company ENAMI also uses the term to describe a future made possible by large-scale mining projects. One of ENAMI's slogans is "Construimos una minería responsable para el *buen vivir*" or "We build responsible mining for the buenvivir."

#### **Box 1: Excerpts from the 2008 Ecuadorian Constitution**

##### Preamble

Hereby decide to build A new form of public coexistence, in diversity and in harmony with nature, to achieve the good way of living, the *sumak kawsay*;

##### Article 14.

The right of the population to live in a healthy and ecologically balanced environment that guarantees sustainability and the good way of living (*sumak kawsay*), is recognized.

##### Chapter 9. Responsibilities

6. To respect the rights of nature, preserve a healthy environment and use natural resources rationally, sustainably and durably.



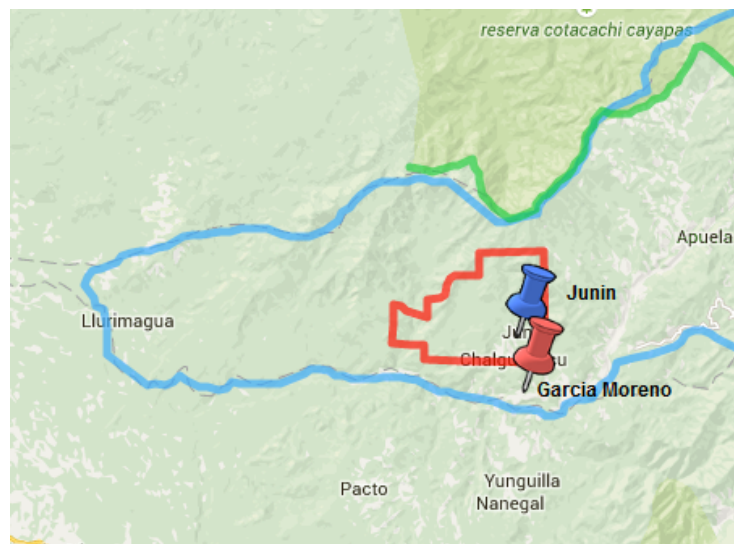
## The Mining Struggle

### Mitsubishi Corporation (1993-1997)

The Intag area includes a small mountain range called the Cordillera Toisan, under which lies ~2.3 million tons of copper (Figure 4). The Intag copper deposit was discovered in the early 1990s by Bishimetals, a subsidiary of Japan's Mitsubishi Corporation. The discovery of copper in Intag was part of a larger survey called PRODEMINTA, which was funded by a US\$14 million loan from the World Bank. By 1995 early stages of mining 'exploration' had begun in Intag. During that same year a group of concerned Inteños founded DECOIN (see Appendix B), in order to organize their opposition to the perceived mining threat. To this day there are no open pit mines in Ecuador, fueling an ongoing debate of what large scale mining would involve for Intag. DECOIN and various other small non-governmental organizations worked to raise awareness of potential social and environmental impacts of mining. An early action by activists in the region was a trip by Inteños to Peru in 1996, where they witnessed an active open-pit mine. The anti-mining movement in Intag rapidly grew afterwards, and included such people as the local mayor among its ranks. The epicenter of Intag's opposition to mining was the community of Junin, located just downstream of the potential site of the pit (Figure 4), as they had the most to lose should the mine be developed (Kuecker 2007, Kocian et al. 2011).

The community of Garcia Moreno (Figure 4), however, sits just outside the impact zone and has a high concentration of vocal pro-mine advocates. Although the majority of people in Intag oppose mining, the issue has proven extremely divisive for many formerly close-knit communities. Within Intag those who are in favor of mining are known as *Mineros* (Miners) and those who oppose are known as *Ecologistas* (Ecologists). *Ecologistas* often base their opposition to mining on social rather than environmental grounds, but nearly all agree that water is a fundamental reason for their opposition. Water is a pivotal resource in many Andean

cultures. It is seen as an important communal right and its health is a reflection of the health of society. Common slogans for a number of environmental campaigns in Ecuador are "El Agua es Vida" (water is life) and "El Agua No Se Vende" (water is not for sale) (Kuecker 2007, D'Amico 2012).



**Figure 4.** *Red* boundary: Llurimagua Mine Concession; *Blue* boundary: Intag region; *Green* boundary: southern edge of the Cotacachi Cayapas Ecological Reserve.



In the early 1990s the conflict with Bishimetals was becoming increasingly heated. The company had commissioned an Environmental Impact Study that, with surprising frankness, stated that the mine would lead to contamination of water sources, desertification, and the dislocation of more than 100 families. The exploratory camp established by the Japanese was not helping to win support, as they had built a latrine directly upstream from a communal swimming area for Junin. In 1997 community members, frustrated by a lack of government regulation or advocacy, took to civil disobedience as way to expel the company. It is important to note that particularly during that time period civil disobedience was a common way to gain concessions for under-represented rural communities in Andean Latin America. On May 5, 1997 local community members and the county mayor burned the mining encampment to the ground. Sensitive to their international reputation, Bishimetals, quickly left Ecuador.

#### Ascendant Copper Corporation (2004-2006)

The people of Intag were engaged in a second conflict between 2004 and 2006, this time with a Canadian mining corporation called Ascendant Copper. The company was smaller than Bishimetals and was most likely planning on quickly reselling the concession to a larger company after the exploratory phase. Once again the company began the exploration process without granting the community's right to prior consultation, a violation of the then constitution. The company also began work despite having failed to gain approval for an Environmental Impact Study. While attempts were being made to deflect the company using the Ecuadorian court system, residents of Junin blocked the company from accessing community owned land. This complicated Ascendant's work, as the center of the mining concession sits on a forest reserve owned and managed by the community of Junin. The result was a rapidly escalating conflict (Figure 5). Ascendent Copper employed a number of tactics commonly used by mining and petroleum companies in developing concessions (Zorrilla 2009). These included creating a number of sub-companies and organizations that served to either 'mirror' or compete with existing organizations or to intimidate their opposition. These organizations included CODEGAM, whose members actively threatened several activist leaders and attempted to bribe others into leaving the country.



**Figure 4.** *Inteños protest Ascendant's mining bid in the capital, Quito in July 2006. Photo by Carlos Zorrilla*

The anti-mining movement maintained non-violent protests and began an international campaign to pressure Ascendant into leaving Intag. Human rights violations by company employees, culminated in an invasion of community land by illegally-armed paramilitaries in May 2006. Despite entering with helicopters, attack dogs, rifles, and tear gas, the company failed to immediately access the community reserves. Hundreds of Inteños traveled to Junin in solidarity with the community, patrolling the forest and roads and watching for paramilitary groups. After Inteños captured a group of 50 paramilitaries and held them in the community church, the Ecuadorian state sent in police and government representatives. After assessing the situation the Minister of Energy and Mines ultimately revoked Ascendant's concession, banned them from the country, and upheld a general amnesty for environmental defenders (Kuecker 2007, Buchanan 2013). The events in Intag also inspired a national moratorium and review of all active mining concessions. Ascendant Copper Corporation faced intense international criticism, was delisted from the Toronto stock exchange, and ultimately declared bankruptcy. In 2012 Ascendant Copper (then renamed as 'Copper Mesa Mining') attempted to sue the Ecuadorian government for allegedly breaking the 'Promotion and Reciprocal Protection of Investment Agreement' with Canada in the process of revoking their concession. Members of Intag's anti-mining movement were asked by the Ecuadorian government to testify in their favor. The US\$100 million





lawsuit has not influenced the current government's desire to open the mine. Indeed, as described below, President Rafael Correa's administration has pursued many of the same strategies used by Copper Mesa while defending the actions of previous administration (a point not lost to Copper Mesa attorneys) (Zorrilla, 2012, January 23).

#### CODELCO and ENAMI (2012-Present)

The Chilean mining corporation CODELCO purchased the Intag concession in 2012 to be explored jointly with the Ecuadorian state company ENAMI. The re-opening of the Intag area for exploration forms part of a continent-wide push for natural resource extraction fueled in part by the high price of copper created by heightened Chinese demand. The social and political spectrum of the mining conflict in Intag has also shifted dramatically due to the influence and power of the populist regime of President Correa. New legislation severely limits non-governmental organizations, and anti-mining activists have lost allies wary of running afoul with the increasingly authoritarian national government. However, new allies include indigenous organizations, principally the Confederation of Indigenous Nationalities of Ecuador (Spanish Acronym: CONAIE) (Davidov 2013). Opposition to destructive environmental exploitation is particularly strong at the national level, in part due to the failure of Ecuador's attempt to protect a portion of the Amazon in exchange for financial payments by the international community.\*\*

Local community activists are once again suffering from intimidation tactics. On April 8, 2014 the community of Junin suffered a police occupation when 800 officers were deployed to escort ENAMI personnel into the area. For the first time since Mitsubishi involvement, a mining company gained unrestricted access to community-owned reserves. A few days later the President of Junin, Javier Ramirez, was arrested on charges of inciting rebellion against the state. His accusers, ENAMI employees, charged him with rebellion and throwing a rock at a company car. Despite legal irregularities, eyewitnesses that placed him miles from the confrontation, and biting criticism by journalists and human rights advocates, Mr. Ramirez served 10 months of 'preventative detention' before his release in early 2015. Community opposition remains strong despite these setbacks. Most notably, the political party that grounds its platform in opposition to mining won five out of seven parishes in the Intag region. With a new county mayor who opposes mining and new allies the Intag's *ecologistas* remain dedicated to defending their region and promoting their vision of the future.

Intag's continuing ability to prevent large mining projects is a remarkable success story that has its root in effective community organizing. Inteños were able to block access to concession, and delay the exploration process while non-governmental organizations pursued legal action and denounced the companies to the international community. However, the long-term goal of keeping Intag free of mining depends on a

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\*\* See more on the Yasuni Initiative at <http://amazonwatch.org/news/2013/0816-ecuador-president-pulls-plug-on-innovative-yasuni-itt-initiative>





different form of community organizing. Key leaders in the anti-mining movement decided that ‘saying no was not enough,’ they had to create economic alternatives to mining so as to strengthen their cause and protect the region in the long-term (Davidov 2013). A strong economy based on sustainable practices and protection of ecosystem services would boost community resilience to extractive development and decrease the incentive to mine from a policy standpoint.

### **Economic Alternatives**

Economic alternatives to open-pit mining within Intag began soon after the rejection of Bishimetals from the region in 1997. Alternatives and activism have gone hand-in-hand in the region, with many community activists transitioning to the field of sustainable income generation. The shade-grown coffee farmers association AACRI was founded in 1998 and has rapidly become one of the more successful of these ventures (Figure 5; see Appendix A). Myma Cabuya was established in 1995 as a women’s artisan business cooperative within Intag (see Appendix C). The community-run ecotourism venture Cabanas Junin supported by REI (see Appendix D) was founded about the same time by community members in the epicenter of the mining conflict. Since the founding of the Junin cabins the number of community-run ecotourism providers has grown, prompting the creation of REI in 2012, as an umbrella organization.

In addition, HydroIntag emerged in the early 2000s as a micro-hydro venture that could approach competing with the high revenues generated by open-pit mining (Kocian et al. 2011). The initiative was

a remarkable collaboration between community members, small local non-governmental organizations, universities, and local governments. Despite promising high revenues with limited environmental impact and high community-participation the project was blocked by the national government due its incompatibility with the national development plan.



**Figure 5.** *A member of the AACRI cooperative tends to his coffee.*



### **Concluding Comments**

The mining conflict has created a polarized debate on how differing models of economic development relate to human well-being, poverty reduction, and community rights. The national government has argued that despite its negative impacts extractive development in the region will contribute to poverty-reduction and economic growth on a national scale. The opposition contends that valid economic alternatives in the area will outlast the 30-40 year lifespan of the mine and bring benefits that go far beyond income generation. In a 2011 study *Earth Economics* (Kocian et al. 2011) supported the later stance by contrasting the economic value of maintaining ecosystem services in the area with revenue from a potential mine. The study found that Intag's ecosystem services currently provide US\$477 million per year and would outpace mining revenues. The calculated value of many of these ecosystem services is not likely to lead to a payment for ecosystem services anytime soon. Nonetheless the study by Kocian and colleagues adds to a growing list of evidence that, while Intag's current economic initiatives are not yet strong enough to supersede extractive development in the eyes of national policy makers, they represent a viable development strategy for a small country like Ecuador. The choices facing the Intag valley are a stark reflection of those being made by communities of people across the globe and the consequences of their outcomes reach far beyond the small community of Junin. In a playing field that is a far cry from being even, Intag's *Ecologists* will need all the support they can get to realize their own vision of progress.



## References Cited

Almeida Reyes, E. 1993. *Los yumbos de Rumicucho*. Quito, Ecuador: Abya-Yala.

Ataroff, M., and Rada, F. 2000. Deforestation impact on water dynamics in a Venezuelan Andean cloud forest. *Ambio* 29: 440–444.

Balslev, H. 1988. Distribution patterns of Ecuadorean plant species. *Taxon* 37: 567-577.

Bray, T.L. 1992. Archaeological survey in Northern Highland Ecuador: Inca imperialism and

the Pais Caranqui. *World Archaeology* 24(2): 218-233. DOI: 10.1080/00438243.1992.9980204

Bray, T.L. 2015. At the end of empire: Imperial advancements on the northern frontier. In: I.

Shimada (ed.). *The Inka Empire: A Multidisciplinary Approach* (pp. 325-344). Austin, TX: University of Texas Press.

Bray, T.L. and Almeida, J. E. 2014. The late imperial site of Inca-Caranqui, Northern Highland

Ecuador: At the end of empire. *Ñawpa Pacha: Journal of Andean Archaeology* 34(2): 177-199.

Bubb, P., May, I., Miles, L., and Sayer, J. 2004. *Cloud Forest Agenda*. UNEP-WCMC, Cambridge, UK. Retrieved July 2, 2015 from:

[http://www.unepwcmc.org/resources/publications/UNEP\\_WCMC\\_bio\\_series/20.htm](http://www.unepwcmc.org/resources/publications/UNEP_WCMC_bio_series/20.htm)

Bruijnzeel, L. A., Mulligan, M., and Scatena, F. 2011. Hydrometeorology of tropical montane

cloud forests: emerging patterns. *Hydrological Processes* 25(5): 465-498. DOI: 10.1002/hyp.7974

Buchanan, K. 2013. Contested discourses, knowledge, and socio-environmental conflict in Ecuador. *Environmental Science and Policy* 30: 19-25. DOI:

10.1016/j.envsci.2012.12.012

Buchanan, K. and Encalada, A. C. 2014, Land use and water quality in a rural cloud forest

region (Intag, Ecuador). *River Research and Application* 30: 385–401. DOI: 10.1002/rra.2634

D'Amico, L. 2012. 'El Agua es Vida/Water Is Life': Community watershed reserves in Intag,



Ecuador, and emerging ecological identities. In: L. Hiwaski, I.J. Klaver, A.R. Castollo, and V. Strang (eds). *Water, Cultural Diversity, and Global Environmental Change* (pp. 433-452). The Netherlands: Springer.

Davidov, V. 2013. Mining versus oil extraction: Divergent and differentiated environmental subjectivities in 'Post-Neoliberal' Ecuador. *The Journal of Latin American and Caribbean Anthropology* 18: 485–504. DOI: 10.1111/jlca.12043

Jarvis, A. and Mulligan, M. 2011. The climate of cloud forests. *Hydrological Processes* 25(3): 237-343.

Kocian, M., Batker, D., and Harrison-Cox, J. 2011. *An Ecological Study of Ecuador's Intag Region: The Environmental Impacts and Potential Rewards of Mining*. Tacoma, WA: Earth Economics.

Köhler, L., Tobón, C., Frumau, K.F.A., and Bruijnzeel, L.A. 2007. Biomass and water storage dynamics of epiphytes in old-growth and secondary montane cloud forest stands in Costa Rica. *Plant Ecology* 193: 171–184.

Kuecker, G. D. 2007. Fighting for the forests: Grassroots resistance to mining in northern Ecuador. *Latin American Perspectives* 34(2): 94-107. DOI: <http://dx.doi.org/10.1177/0094582X06299081>

Ledo, A., Condes, S., and Alberdi, I. 2012. Forest biodiversity assessment in Peruvian Andean montane cloud forest. *Journal of Mountain Science* 9(3): 372-384. DOI: 10.1007/s11629-009-2172-2

Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G.A.B., and Kent, J. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403(6772): 853-8. DOI: <http://dx.doi.org/10.1038/35002501>

Novo, C. M. 2014. Managing diversity in postneoliberal Ecuador. *Journal of Latin American and Caribbean Anthropology*: 19(1): 103-125. DOI: <http://dx.doi.org/10.1111/jlca.12062>

Romero, B. E., and Bray, T. L. 2014. Analytical applications of fine-scale terrestrial lidar at the imperial Inca site of Caranqui, northern highland Ecuador. *World Archaeology* 46(1): 25-42. DOI: 10.1080/00438243.2014.890910



Villalba, U. 2013. Buen vivir vs development: A paradigm shift in the Andes? *Third World Quarterly* 34(8): 1427-1442. DOI: <http://dx.doi.org/10.1080/01436597.2013.831594>

Zorrilla, C. 2009. Protegiendo a su Comunidad Contra las Empresas Mineras y Otras Industrias Extractivas (pp. 1-35). Boulder, CO: Global Response.

Zorrilla, C. 2012 (January 23). *We Live in a Weird World*. Retrieved July 2, 2015 from: <http://www.decoin.org/2012/01/we-live-in-a-weird-world/>