## **DECOLONIZING AGRICULTURE:**

# A Case Study of Chakras in the Ecuadorian Amazon

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Master of Sustainable Peacebuilding

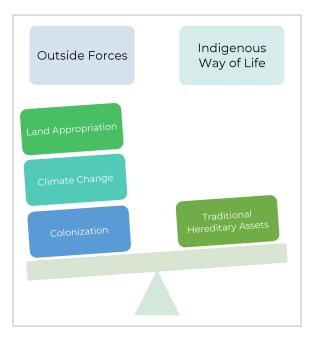
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#### INTRODUCTION



Indigenous people have routinely been dispossessed of their traditional hereditary assets, among these being agricultural practices. With climate change, land scarcity and increased intrusion from the outside world, Indigenous growing methods are suffering. One such example is the decreased use of the chakrai growing method among the Kichwa, one of several Indigenous people residing in the Napo Province of the Ecuadorian Amazon.

Outside forces, such as colonization and the global capitalist system, have negative impacts on the wellbeing of Indigenous people and have rarely worked to their advantage, even when they "own" valuable land and resources. The effects of colonization can be seen from the Arctic to New Zealand and lands in between. Inuit mothers have highly contaminated breast milk as a result of

pollution flowing north from other countries. The Maori have lost about 95% of their land since 1960 and "continue to experience disproportionately high rates of poverty, incarceration, illness, sexual assault, domestic abuse, and suicide." Globally, Indigenous people continue to suffer dispossession, disenfranchisement and often, death.

The 2019 Global Environmental Outlook noted that, "having evolved after years of observation and experience from a holistic relationship between people and nature, traditional knowledge sustains life and landscapes." Not only do Indigenous people recognize a deeper connection to nature, they are disproportionately affected by transgressions against the environment. In her book *Silent Snow*, Marla Cone's words ring true for many of the world's Indigenous people, "With little power to defend themselves, they are at the mercy of others-governments and outsiders who have long ignored their needs-or worse, tried to wipe out their ancient traditions by assimilating them into modern society." 1

#### **CHAKRA USE IN ECUADOR**

Many of the Kichwa are subsistence farmers who traditionally grow crops in agroforestry<sup>ii</sup> plots called chakras. **The Kichwa face many challenges as they try to navigate a new economy and a world with increasing outside pressure on their land and way of life.** 

<sup>&</sup>lt;sup>i</sup> See *Chakra Use in Ecuador* section.

<sup>&</sup>quot;Agroforestry is "the practice of growing trees and crops in interacting combinations."

Chakras are intrinsically linked to the cultural practices, traditions and health of the Kichwa. Kichwa families and communities spend time tending their chakras, growing products which enhance food and nutrition security and promote traditional dietary practices. Fresh foods from chakras often provide a more robust spectrum of nutrients than the modern diet. Chakras also contribute to the biodiversity of the Ecuadorian Amazon. They support the soil bed through a mixture of trees, shrubs and plants and once abandoned, revert to a mature forest-like state quickly. Additionally, they provide buffers around forest reserves and conservation areas and act as corridors of migration for different species.



#### **METHODOLOGY**

This project grew out of a research project in collaboration with Dr. Graham Wise of IKIAM University in Ecuador, focusing on the complexities of bringing guayusa<sup>iii</sup> products to the international market. Over the course of nearly two years, we completed an extensive literature review, gathered original data in Ecuador and interviewed Indigenous people, researchers, policymakers, global and local development organizations, and social enterprise entrepreneurs. We then conducted a systems analysis and created a KUMU<sup>iv</sup> map (https://kumu.io/MSP-Global-Challenge/chakra).

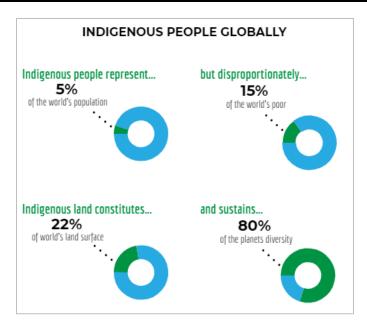
iii Guayusa is a native tree species of the Western Amazon Rainforest and is consumed as a tea by the Kichwa and other Indigenous people of the Amazon Rainforest.

WKumu is an online mapping platform used to create various systems maps. More information can be found on the website, www.kumu.io.

#### **PROBLEMS LANDSCAPE**

Traditional agricultural methods, an integral part of life for many Indigenous people, play an essential role in cultural preservation, health and well-being, climate regulation and environmental stewardship. However, as Indigenous people are oppressed and exploited by outsiders, their traditions and cultural practices end up fractured and fragmented.

Due to migration and pressure on the land by outsiders, the Kichwa have been catapulted into a post-colonial, capitalist system where their livelihood depends on money. This issue is compounded by laws and practices in Ecuador that threaten land ownership, denying the Kichwa their



rightful claim to ancestral lands and without means to continue many cultural practices. Furthermore, chakra use is directly related to the conservation of the Amazon landscape, playing a crucial role in climate regulation, carbon sequestration and many other vital ecosystem goods and services. This demonstrates that the preservation of chakras is not only important for the Kichwa, but important for the world at large.

#### **CONTRIBUTING FACTORS**

Indigenous people and their rights are not respected by many because they do not have what the majority world sees as power or wealth. Rather, Indigenous people are considered easy targets for exploitation and routinely suffer dispossession, discrimination and destabilization. The pursuit of profit (and greed) is a huge motivator and those who have power often bleed those who do not. This may lead to or exacerbate poverty. Governments often side with corporate interests over their own people in a bid to get revenue or sometimes line their own pockets.

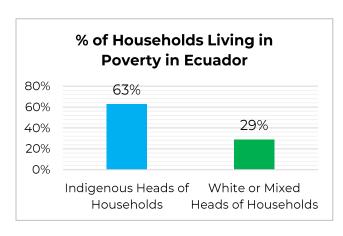
Land appropriated for mining, timber and agriculture also negatively impacts chakra use. The expansion of extraction and agricultural industries in the Ecuadorian Amazon has led to increased migration of colonists from within Ecuador and South America, many of whom receive incentives from the government. Much of the agricultural land used by colonists is centered on livestock and non-chakra style farming, both of which have negative effects on the environment.

Ecosystems goods and services are important for continued life on Earth and slowing the race towards planetary boundary limits. Chakras are rich in ecosystem goods and services that impact the Kichwa and the world. For example, chakras are home to numerous species of native plants, insects and animals which provide food, meat, and medicine for local populations, but also contribute to soil formation and biodiversity. As an agroforestry method, they also preserve trees and bushes which serve a crucial role in carbon sequestration and, in turn, climate regulation.

Migration of colonists has also led to increased urbanization of the Napo province. This affects the role of women who can devote less time tending their chakras <sup>11</sup> and cooking traditional foods due to the need to be involved in income generating activities. A study done in Mondayacu in the Napo region of Ecuador revealed that most women respondents said they were growing fewer varieties of crops in their chakras than their mothers. <sup>11</sup> This decline in food diversity and time spent in chakras negatively impacts food security and the preservation of cultural practices and traditions.

The integration of Indigenous people into the market economy contributes to the declined use of chakras as a result of monocropping. Traditional food products grown in chakras, like guayusa, are being commercialized for the international market. In the Tena area, recently "guayusa has started to move beyond the home gardens and chakras to intensive agriculture with trends towards monoculture... This trend of guayusa towards a cash-crop displays detrimental effects both from an environmental and from a sociocultural perspective." 12

Motivated by economic opportunities, many Kichwa move to cities, ultimately resulting in less participation in cultural practices and traditions. This is due in part to lack of youth involvement and identification with traditional Kichwa culture. Some youth also do not learn, or refuse to use, their mother tongue which increases the likelihood of cultural loss. <sup>12</sup> Even those who strongly identify with Kichwa culture but are forced to leave due to poverty, contribute to declined chakra use as they cannot maintain them from afar.



Constant changes in leadership and legislation, imprecise writing of laws and inconsistency of laws with other provisions on the provisions cause difficulties in enforcing Indigenous and environmental rights in Ecuador. Ecuador's constitution guarantees Indigenous land rights; however, there is a need for a titling procedure for Indigenous lands, a legal framework that involves the participation of Indigenous groups and a model for land management after lands are titled to them. For example, the law states that Indigenous lands are inalienable and "cannot enter into the free market in property" but lands that have already been titled need legal action in order to actually become inalienable. In addition, the process of granting land titles is inconsistent, costly and time consuming which leaves some Indigenous people without necessary documentation. Some families or communities are unable to present a formal land title because they acquired land through informal means. This can prevent their participation in certain government programs aimed at environmental conservation and poverty alleviation.

#### **SOLUTIONS LANDSCAPE**

#### **LOCAL-SCALE INITIATIVES**

Initiatives from Ecuador's government have focused on economic insecurity, decreased availability of land and a lack of value placed on Indigenous knowledge and heritage. The Socio Bosque program is a national conservation agreement that provides direct monetary incentives to communities for voluntary conservation of native forests or native ecosystems. <sup>14</sup> Also, Ecuador's national development plan, *Plan Nacional del Buen Vivir*, is based on Indigenous knowledge. <sup>vi15</sup> The national scale incorporation of this knowledge indicates a shift in national values and mental models surrounding Indigenous people.

In the private sector, social enterprise models have been used to bring chakra products to a global market while maintaining traditional chakra growing practices. Runa, a guayusa drink company, developed criteria such as spacing requirements between guayusa plants to allow room for other plants to be grown. However, an evaluation of Runa's model found an increase in clearing of secondary forests and decrease in plant varieties in chakras to grow more guayusa. Another guayusa company, Waykana, addresses this issue by buying a variety of chakra products from each farmer such as cocoa and fruits. This encourages chakra use and increases economic security by diversifying farmers' incomes.

Leveraging change at the consumer level is a strategy that has seen success in making chakra use economically viable. Fifteen high-end restaurants in Ecuador's capital, Quito, are creating menus that use products bought from family chakras. Organizations, such as *Canopy Bridge*, have helped 350 Amazonian Indigenous farmers establish supply chains to these restaurants. <sup>18</sup> This incentivizes chakra use, as a variety of products are bought from each family, including items that do not sell locally, which provides more financial security. It also provides an opportunity to share Indigenous growing and culinary traditions with those who have little interaction with Indigenous people.

The UN REDD+vii program has seen large success in Ecuador.<sup>19,20</sup> The program enhances chakra growing methods through logistical and financial support to farmers. It also collaborates with the Ecuadorian government to create mechanisms to protect chakras and implement a benefit-sharing system attached to their forest management strategies.<sup>19</sup> Ecuador's REDD+ Action Plan was created with a participatory approach which has contributed to its great success.<sup>20</sup>

vi In 2008, the Ecuadorian constitution incorporated the principle of Sumak Kawsay. The principle is considered a way of living among many indigenous peoples in Ecuador, including the Andean Quechua and Amazonian Achuar, and focuses on harmony with nature and community.

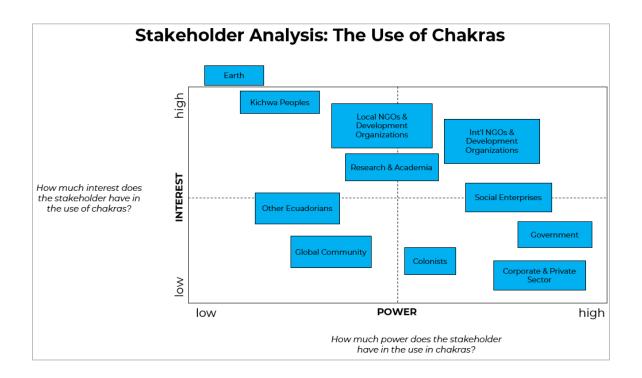
vii United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation

#### **GLOBAL-SCALE INITIATIVES**

Indigenous organizations have made progress in promoting Indigenous agricultural practices, gaining and protecting land rights and bringing the Indigenous voice to global settings. One example is UNOSJO<sup>viii</sup>, a group of 12 Indigenous Zapotec communities in Oaxaca, Mexico. They have become well-known in Mexico and internationally for exposing the contamination of local corn varieties by genetically-modified crops, taking legal action to block future occurrences of contamination and encouraging farmers to grow traditional varieties of maize through the creation of local seed banks. <sup>21</sup>

The nonprofit sector provides resources and support to protect and encourage Indigenous growing methods, like chakras, and other small-scale diversified farms. *First Peoples Worldwide* is an Indigenous-led nonprofit that funds local development projects in Indigenous communities around the world. It has awarded 319 grants to 237 Indigenous organizations, representing 579 Indigenous groups in 62 countries. <sup>22</sup> The organization facilitates the use of Indigenous knowledge to address some of the world's most wicked problems relating to climate change, food security, medicine, governance and sustainable development. <sup>22</sup>

Increased attention to Indigenous knowledge and agricultural methods in research has also proven effective. This shift in focus and values has led to the creation of programs such as the *Indigenous Food and Agriculture Initiative*, at the University of Arkansas School of Law, that works to "promote Tribal sovereignty through food and agriculture." <sup>23</sup> They provide strategic planning and technical assistance to support Indigenous agriculture and sustainable use of natural resources with the goal of improving economic security. <sup>23</sup>



viii La Unión de las Organizaciones de la Sierra Juárez de Oaxaca

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#### **GAPS AND LEVERS OF CHANGE**



**GAP: CHALLENGES OF LAND OWNERSHIP** 

LEVER: PROPER LAND TITLING AND RECOGNITION OF INDIGENOUS RIGHTS

Land is an important commodity in every country and particularly to Indigenous people. For farmers and hunters, land is the basis on which their livelihoods rest. Issues of land use and land ownership are complex among the Kichwa, including the titling of property, the use of property and the inheritance of property. Clear and transparent laws and policies, observance of land rights of the Kichwa and just and accessible means of resolving land disputes are needed. Even Kichwa in remote communities must be protected from those who try to dispossess them of their land.

#### Some action steps include:

- The government must invest infrastructure and administration into a land titling program.
- The private sector must respect land ownership.



**GAP: BOTTOM-UP APPROACHES** 

LEVER: ADOPT A PARTICIPATORY APPROACH IN POLICYMAKING AND PROGRAMMING

Indigenous people around the world are frequently in the position of having their lives and futures decided by others. Programs are rarely successful if they are planned and implemented with little or no input from the people most affected. The Kichwa are often marginalized when it comes to policymaking and programming. The government at all levels, non-governmental organizations, the business community, etc., need to include the Kichwa from the start to the end of their deliberations and in leadership positions. This cannot be a token inclusion; the participation must be real and meaningful.

#### Some action steps include:

- The private sector must seek strategies and outcomes that benefit all parties.
- Funders need to fund projects based on criteria generated by Indigenous people.



## GAP: VALUING OF ECOSYSTEM GOODS AND SERVICES LEVER: APPROPRIATE VALUATION OF ECOSYSTEM GOODS AND SERVICES

Many ecosystem goods and services are free and available to all. Because of this, they are often misused and/or wasted. In addition, many decisions are made ignoring or not paying attention to the environmental consequences of proposed actions. Deforestation, monocropping, mining, construction of roads into the interior, conversion of land into pasture, petroleum exploration, etc., all have negative consequences which affect the Kichwa profoundly. A system of appropriately valuing ecosystem goods and services would greatly help to ensure that such decisions would be taken with more care, thought and foresight. Laws, policies, business models and various programs should recognize the significance of ecosystems good and services and adopt practices and accountability structures that take them into account.

#### Some action steps include:

- The government needs to create and enforce policies that value and protect ecosystem goods and services.
- The private sector must prioritize ecosystem goods and services in their business execution.



#### **GAP: ACCOUNTABILITY OF PRIVATE SECTOR**

LEVER: CREATE ACCOUNTABILITY STRUCTURES AND STRUCTURES THAT DISINCENTIVIZE ECOLOGICALLY PREDATION

Money is a great motivator, and many atrocities and wrongs have been committed in the name of profit. The lack of accountability for environmental misdeeds allows or even encourages the private sector to keep exploiting the Indigenous. The poisoning of water, the destruction of forests, the indiscriminate killing of animals, the polluting of air, etc., all happen with impunity. Individuals, corporations and even governments should be held accountable for their misdeeds. Strong deterrents should be put in place and stiff penalties should be meted out to offenders.

#### Some action steps include:

- The private sector must acknowledge, obey laws and take ownership of damages.
- Existing laws must be enforced swiftly and strengthened. Deterrents, financial and otherwise, must be stiff and compelling. Corruption must not be tolerated.

#### LESSONS LEARNED AND REFLECTION

Our research and the stories of those we interviewed parallel our lived experiences and identities as Nigerian, Hmong and Native American, and we came to recognize how present, pervasive and persistent colonization is. Nigeria, like Ecuador, experiences the resource curse, including significant environmental damage done by the oil industry and vast swathes of primary forests destroyed by logging. The Hmong and other ethnic minority groups in Southeast Asia have been driven off their land and made to adapt to a post-colonial way of life. Native Americans have also been robbed of their land, and for generations have suffered severely from both physical and cultural violence as a result.

Our lens shifted from looking at poverty as foundational in the system to looking at profit and power as the primary drivers or the deep structure<sup>ix</sup>. The pursuit of profit not only disproportionately affects Indigenous populations, it is **prioritized** over the culture, knowledge and lives of Indigenous people. We learned that while social enterprises have good intentions, it is challenging to exist in a capitalist system and also work against it. We recognized that improving livelihoods and addressing economic insecurity often perpetuates colonialism by encouraging Indigenous people to enter into an economic system that excludes their voice, culture and traditions. Solutions could include many of our levers of change but will fail due to the relentless pursuit of economic gain, corruption and insufficient political will to change. **In short, colonization is about economics and power, and decolonization is about valuing people more than money.** 

The lives of Indigenous people are complex. While we feel we have a good grasp of the role of chakras in Kichwa life, we acknowledge that our understanding is partial, incomplete and at times flawed. It is not our intention to speak for the Kichwa people as we believe they have the right of self-determination as all peoples do. Rather, we come alongside them, joining their voices in declaring that their right to their ancestral lands and way of life be respected.

We learned that colonization is not just a thing of the past. **Structures of colonialism, capitalism and imperialism are deeply ingrained in development practice.** We saw this in how poverty is defined\*, how development and success is measured\*i, and how issues of equity are approached\*ii. Even the Sustainable Development Goals have been criticized for not fully acknowledging Indigenous experiences.<sup>27</sup> **The severing of cultural identity from food, agriculture and the environment has led to a lack of factoring in externalities in the global system and the devaluation of Indigenous people, their knowledge and their voice.** Therefore, the potential for large-scale change lies in not only changing how the system is viewed, but also **changing how we value the system**.

ix Deep structure is a systems thinking term, also known as root cause, which refers to the underlying or core reason for a problem. It "is that portion of a system that, at the fundamental level, explains why the system's natural behavior produces the problem symptoms rather than some other behavior."<sup>28</sup>

<sup>\*</sup>The current definition of poverty is based on participation and success in the current economic system and does not factor in trade-based livelihoods nor alternative forms of wealth outside of income and the monetary value placed on assets like land. <sup>24</sup>

xi While there has been a shift in development methods and strategies globally, the long-standing model has encouraged dependency of developing nations on developed nations and further indoctrinates these nations into a political and economic system where their power and lower is disproportionally low.<sup>25</sup>

xii Even those with the intention of dismantling structures of inequality, perpetuate these same structures and power imbalances. For example, the concept of "giving voice" to marginalized populations which insinuates that said populations do not already have a voice and that there is a group or individual that has the power to decide to give voice.<sup>26</sup>

#### **WORKS CITED**

- 1. Cone, M. (2005). *Silent snow: the slow poisoning of the Arctic.* New York City, NY: Grove Press.
- 2. Lawrence, N. (2010). Working towards Maori equality. *Cultural Survival*. Retrieved from https://www.culturalsurvival.org/publications/cultural-survival-quarterly/working-towards-maori-equality
- 3. United Nations [UN]. (2018). Lands, natural resources represent life for Indigenous people, not mere commodities, speakers stress as permanent forum begins session. [Press release]. Retrieved from https://www.un.org/press/en/2018/hr5387.doc.htm
- 4. Lu, F. (2007). Integration into the market among indigenous people: a cross-cultural perspective from the Ecuadorian Amazon. *Current Anthropology* 48(4), 593-602. doi: 10.1086/519806
- 5. Sunderland, T., Powell, B., Ickowitz, A., Foli, S., Pinedo-Vasquez, M., Nasi, R., & Padoch, C. (2013). *Food security and nutrition: The role of forests.* Bogar Barat, Indonesia: Center for International Forestry Research. Retrieved from http://www.cifor.org/publications/pdf\_files/WPapers/DPSunderland1301.pdf
- 6. Vera-Velez, R., Cota-Sánchez, J. H. & Grijalva, J. E. (2017). Biodiversity, dynamics, and impact of chakras on the Ecuadorian Amazon. *Journal of Plant Ecology*, *12*(1), 34-44. https://doi.org/10.1093/jpe/rtx060
- 7. Torres, B., Jadán Maza, O., Aguirre, P., Hinojosa, L., & Günter, S. (2014). Contribution of traditional agroforestry to climate change adaptation in the Ecuadorian Amazon: the chakra system. In *Handbook of Climate Change Adaptation* (pp. 1-19). Heidelberg, Germany: Springer.
- 8. Weinstock, Marisa. (2109). Ecuador's San Clemente: A Reflection of Shifted Indigenous Economies. Food First: Institute for Food and Development Policy. Retrieved from https://foodfirst.org/ecuadors-san-clemente-a-reflection-of-shifted-indigenous-economies/
- Schaller, D. T. (n.d.). Indigenous ecotourism and sustainable development: The case of Rio Blanco, Ecuador.
   Retrieved from UNESCO website:
   http://www.unesco.org/education/tlsf/mods/theme\_c/interact/www.eduweb.com/schaller/Section1RioBlancol.html
- 10. Coq-Huelva, D., Higuchi, A., Alfalla-Luque, R., Burgos-Morán, R., & Arias-Gutiérrez, R. (2017). Co-evolution and bio-social construction: The Kichwa agroforestry systems (chakras) in the Ecuadorian Amazonia. *Sustainability*, 9(10), 1-19. doi: 10.3390/su9101920
- 11. Perreault, T. (2005). Why chacras (swidden gardens) persist: Agrobiodiversity, food security, and cultural identity in the Ecuadorian Amazon. *Human Organization*, 64(4), 327-339. https://doi.org/10.17730/humo.64.4.e6tymmka388rmybt
- 12. Sidali, K. L., Morocho, P. Y., & Garrido-Pérez, E. I. (2016). Food tourism in indigenous settings as a strategy of sustainable development: The case of ilex guayusa loes in the Ecuadorian Amazon. *Sustainability*, 8(967), 1-17. doi: 10.3390/su8100967
- 13. Whittemore, M. E. (2011). The problem of enforcing nature's rights under Ecuador's constitution: Why the 2008 environmental amendments have no bite. *Pacific Rim Law & Policy Journal Association, 20*(3), 659-691. Retrieved from https://digital.lib.washington.edu/dspace-law/bitstream/handle/1773.1/1032/20PacRimLPoly[659.pdf?sequence=1&isAllowed=y

- 14. de Koning, F., Aguinaga, A., Bravo, M., Chui, M., Lascano, M., Lozda, T., & Suarez, L. (2011). Bridging the gap between forest conservation and poverty alleviation: the Ecuadorian Socio Bosque program. *Environmental Science & Policy*, 14(5), 531-542. https://doi.org/10.1016/j.envsci.2011.04.007
- 15. República Del Ecuador Consejo Nacional De Planificación (CNP). (n.d.). *Plan Nacional de Desarrollo 2017-2021*. Quito, Ecuador: Secretaría Nacional de Planificación y Desarrollo Senplades 2017.
- 16. Krause, T., & Ness, B. (2017). Energizing agroforestry: llex guayusa as an additional commodity to diversify Amazonian agroforestry systems. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 13(1), 191-203. doi: 10.1080/21513732.2017.1303646
- 17. Santander, D. (2017, October). Waykana guayusa and chakra growing methods. (K. Riebe, A. Sedar, & L. Xiong, Interviewers).
- 18. Altenhenne, M. (Director). (2018). *Ecuador: Feast à la Amazon* [Video file]. Retrieved from https://www.youtube.com/watch?v=HuMTXsWgg7A
- 19. United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries [UN-REDD]. (2015). *Ecuador: Successfully positioned to implement national REDD+ Action Plan.* Retrieved from https://redd.unfccc.int/uploads/2234\_27\_ecuador-casos-existosos-en.pdf
- 20. Yves Guedez, P., & Guay, B. (2018). Ecuador's Pioneering Leadership on REDD+; A Look Back at UN-REDD Support Over the Last 10 Years. UN REDD Programme.
- 21. Grassroots International. (2019). Union of organizations of the Sierra Juarez of Oaxaca (UNOSJO). Retrieved from https://grassrootsonline.org/who-we-are/partner/union-of-organizations-of-the-sierra-juarez-of-oaxaca-unosjo/
- 22. First Peoples Worldwide. (2019). Our impact. Retrieved from http://www.firstpeoples.org/impact.htm
- 23. University of Arkansas. (2019). *Indigenous Food and Agriculture Initiative. University of Arkansas.* Retrieved from https://law.uark.edu/service-outreach/ifai/
- 24. The World Bank. (2019). *Understanding Poverty*. Retrieved from The World Bank: https://www.worldbank.org/en/topic/poverty/overview
- 25. Kothari, U. (Ed.). (2016). *A radical history of development studies: individuals, institutions and ideologies*. Zed Books Ltd.
- 26. Villanueva, E. (2018). Decolonizing wealth: Indigenous wisdom to heal divides and restore balance.
- 27. DeLuca, D. (2017). What do the Sustainable Development Goals mean for indigenous peoples? *Cultural Survival Quarterly Magazine*. Cultural Survival. Retrieved from https://www.culturalsurvival.org/publications/cultural-survival-quarterly/what-do-sustainable-development-goals-mean-indigenous
- 28. Finding and Resolving the Root Causes of the Sustainability Problem. (2014). Root Cause. *thwink.org*. Retrieved from http://thwink.org/sustain/glossary/RootCause.htm