

## **Impacts of Climate Change on Indigenous People and Solutions from an Indigenous Perspective**

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Climate change is one of the most important ecological and social crises that humanity is facing and indigenous people are on the frontlines of the issue. There are indigenous people all over the world and each with their own unique culture and characteristics but one thing that many share is their respect for the Earth and reliance on it for their livelihoods. What happens when the Earth they know no longer responds the same way it had “always”? How does climate change affect indigenous people? The Earth is influenced and shaped by climate and climate is influenced by Earth and all its inhabitants. This means that living organisms (humans, insects, bees, bears, cows, etc.) have some impact on climate and thus the Earth. Humans have significantly contributed to climate change due to their activities that manipulate Earth (agriculture, road development, mining, burning fossil fuels, etc.) in order to meet human needs and wants. Greenhouse gases (GHG) are released in significant quantities due to human activities and contribute to climate change. This research paper begins by introducing the concept of climate change and some factors that contribute to it. I then discuss some ways that climate change impacts the health and well-being of indigenous people. Before concluding, I briefly discuss potential solutions to combat climate change from an indigenous perspective and the importance of collaborating with indigenous communities. Indigenous people have a wealth of traditional ecological knowledge that is unique to them and aids them in their efforts to adapt to changing weather patterns and the associated consequences of climate change.

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### Methods

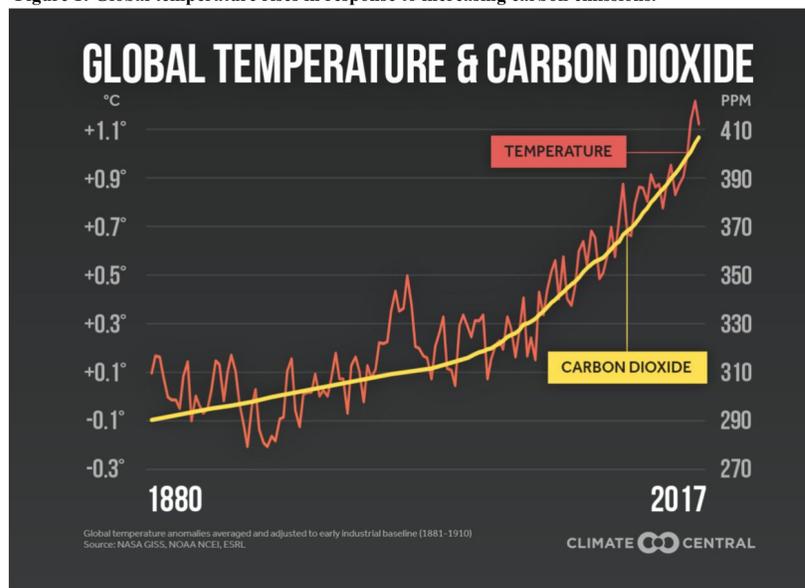
Primary research conducted was mostly done by watching videos and reading news articles. Secondary research included peer reviewed journals and studies acquired through online searches on Google Scholar and library databases for relevant information to the topic of this research paper.

### Climate Change and Contributing Factors

Climate change is described as long-term changes in average weather patterns and it's something that has been happening over the past few decades (NASA). GHGs such as carbon dioxide and methane contribute to climate change by preventing solar radiation from being reflected back out into the atmosphere as it normally does and traps heat in so that global

temperatures rise. Studies show that global temperatures increase in response to rising carbon dioxide emissions (see Figure 1, Climate Central). Human activities that release harmful GHGs include cattle ranching, large-scale mechanized agriculture

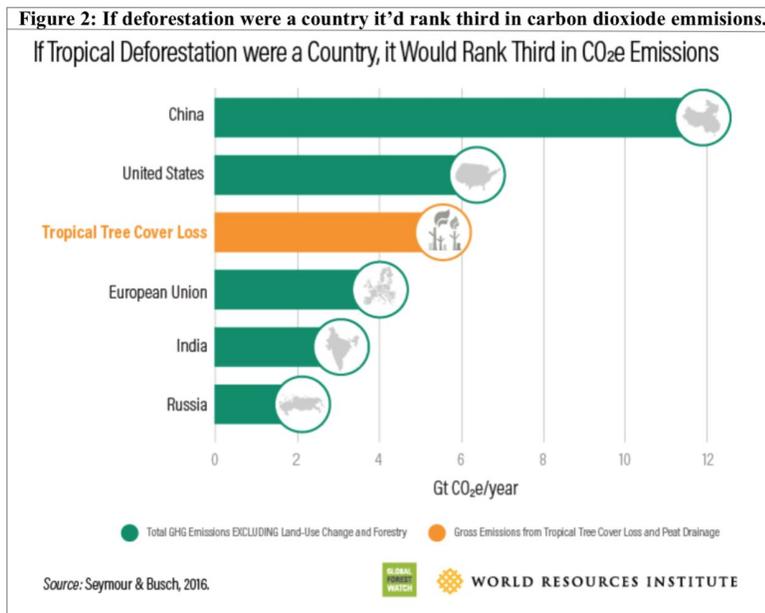
Figure 1: Global temperature rises in response to increasing carbon emissions.



Source: Climate Central. *Change in the Growing Season* | Climate Central.  
<http://www.climatecentral.org/gallery/maps/change-in-the-growing-season>. Accessed 10 Nov. 2018.

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(LSMA), road development, mining, logging, and many others such as driving a car or flying on a plane. Factors that contribute to climate change that are occurring in Bolivia are cattle ranching and LSMA, in particular soybean crops. Cattle ranching and LSMA often result in the displacement of indigenous people in order to clear land which also contributes to deforestation. Deforestation is a major issue affecting indigenous people that also contributes to climate change. Forests are carbon sinks, they remove carbon dioxide from the atmosphere and sequester it. Forests also recycle water, stabilize the ground, provide a habitat for a wide range of species, provide natural resources used for traditional medicines and support indigenous traditional ways of living. Between 2000-2010, about 430,000 hectares of forest were lost in Bolivia which equates to about one hundred million tons of CO<sub>2</sub> emitted annually or about 80% of the country's



CO<sub>2</sub> emissions (Andersen et al.).

An annual average of 350,053 hectares of land has been deforested in Bolivia since 2011 and each year it increases (Tabuchi et al.). In fact, if tropical deforestation were a country it'd be the third largest country emitting carbon dioxide (see Figure 2,

Source: Fritts, Rachel. "Tropical Deforestation Now Emits More CO<sub>2</sub> than the EU." *Mongabay*, 2018, <https://news.mongabay.com/2018/10/tropical-deforestation-now-emits-more-co2-than-the-eu/>.

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Fritts). LSMA also emits significant amounts of GHGs when considering all the activities that go into this type of farming. It often requires the use of machinery that use fossil fuels which release GHGs. Fertilizers are also used in large amounts to increase crop yields and pesticides to protect crops. The production and use of fertilizers, pesticides, and even of the fuels for machinery all emit GHGs and contribute to climate change. If we factor in the GHG emissions that result from the exporting of crops from LSMA then we add even more to the total GHG emitted.

### **Impact of Climate Change on Indigenous People**

Climate change impacts the health of indigenous populations in several ways, including access to quality food and water sources. Indigenous people rely on the land and the natural resources found within it for their livelihoods. However, climate change influences the availability and distribution of these natural resources. For example, in the Amazon, increased temperatures combined with decreased precipitation can increase drought frequency which influences vegetation growth in the region that may lead to relevantly fire resistant vegetation being replaced by other species that are highly flammable (Vasquez). This places families at risk to experiencing forest fires and contributes to water stress and food insecurity. In some cases, communities are left with no other choice but to migrate and/or turn to less healthy solutions to meet basic needs. Indigenous communities in Northern Alberta, for example, have experienced negative health impacts due to climate change mediated by food sources. Executive director for Indigenous Climate Action Eriel Tchekwie Deranger explained that food sources have become

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“contaminated and/or disappearing because of climate change, this affects the health and livelihoods. As our diets change we have limited access to healthy food sources and choices.... We are seeing increases of diabetes, autoimmune diseases, obesity, and cancers caused by contamination ... Both climate change and the drivers of climate are impacting the health and survival, cultural survival of communities in Northern Alberta,” (American Public Health Association). Deranger advocates for collaboration between scientific and indigenous communities to work alongside each other to find solutions. In addition to respectful collaboration, she advocates to work with indigenous communities in creating awareness of indigenous scholar systems and their traditional ways of being as valuable and using it when looking at how to move forward on issues related to climate change.

Climate change also affects the availability and quality of water sources. A study that explored the impact of climate change on indigenous health in the Bolivian Chaco ecosystem found that water stress and warming global temperatures have negative impacts to watersheds, ecosystems and health (Aparicio-Effen et al.). One climate change impact on indigenous health in this region is the increased risk and exposure to water borne diseases. Increased warming and reduced rainfall were found to be correlated with diarrheal vulnerability and the number of diarrheal cases in rural and indigenous communities (Aparicio-Effen et al.). Meaning that, indigenous populations were at increased risk of developing diarrhea and acquiring it as a result of warming temperatures and reduced precipitation. In Bolivia, 80% of glaciers are retreating

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due to climate change, which contributes to water stress by reducing water availability (Aparicio-Effen et al.).

### **Solutions from an Indigenous Perspective**

Indigenous people have an intimate relationship with the environment that they've developed an extensive and valuable ecological knowledge base and the wisdom that places them in a unique position to observe and ascribe meaning to changes in weather intensity and patterns that occur (Boillat and Berkes). This ability to interpret phenomena and their interpretations of changes is key to their adaptive capacity. Adaptive capacity refers to the ability "...to cope with, prepare for, and/or adapt to disturbance and uncertain social-ecological conditions" (Boillat and Berkes). Climate change results in weather patterns that are irregular and vary in intensity. Indigenous people have garnered a wealth of knowledge about their environment by making observations about the environment and the interactions it has with plant and wildlife. These observations help identify indicators that when combined with their generations of traditional ecological knowledge allows them to adapt appropriately to the impacts of climate change. For example, in order to decide the best choice of crops and the location to plant them, Andean indigenous farmers in Peru and Bolivia observe the Pleiades in midwinter (Boillat and Berkes). The Pleiades serve as an indicator that allows them to predict rain patterns and type of harvest, good or bad. There will be abundant rains and a good harvest if the star cluster is big and bright and if its dim and small they interpret this as an indicator for

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poor rains (Boillat and Berkes). This interpretation combined with their traditional ecological knowledge informs their choice of crop and where to plant. Factors that foster adaptive capacity include: “learning to live with change and uncertainty, nurturing diversity for reorganization and renewal, combining different types of knowledge for learning, and creating opportunity for self-organization toward social-ecological sustainability” (Boillat and Berkes). An example of adaptive capacity can be seen when indigenous populations in the Peruvian Amazon started growing *pandisho* “breadfruit”, a highly nutritional wild-fruit, when other food sources became unavailable due to climate change (Boillat and Berkes).

Indigenous knowledge is influenced in part by “Buen Vivir” or “Living Well” which is an indigenous way of thinking and doing. Fabricant views ‘Buen Vivir’ as part of the solution to climate crisis, “...the universalizing of Buen Vivir as a broad-based indigenous construct for living differently, re-embedding the economic, social, and cultural into a system which lives in harmony with Mother Earth” (Fabricant). An example of “Buen Vivir”, living harmoniously or in balance with the Earth and each other is manifested in the policy of a local women’s farming syndicate, Bartolina Sisa Confederation of Campesino, Indigenous and Native Women in Bolivia. Member, Trinidad Cossío, was given a cow by the syndicate and said that, “If it delivers a calf, I have to donate it to another Bartolina, so everyone will benefit” (Derk). This is a good example of ‘Buen Vivir’ in that only what is needed is taken and any manifested benefits are distributed in an equitable manner so that everyone can benefit. Overconsumption is another

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contributing factor to climate change. Changing our consumption patterns in part by reducing our individual consumption and also by way of communal support based off concepts emanating from an indigenous lens, 'Buen Vivir', we can help reduce the amount of greenhouse gas emissions produced by anthropogenic, human produced, activities. The idea is to only take what you need and to support each other in our communities by sharing resources. Social networks were identified as improving adaptive capacity in a study done on indigenous populations in the Peruvian Amazon on community vulnerability to health effects of climate change (Boillat and Berkes). The less we consume the less demand for resources and less GHG emitted or altering of the environment. When we share our resources with our community members instead of stockpiling it for ourselves, we reduce demand for resources and we help foster a sense of community and collective fate. We are all living on the same Earth and what happens in one part of the world will impact the entire world. Having a sense of community can also aid in compliance towards any climate change solutions.

### **Conclusion**

Based on my research, I advocate for the adoption of solutions based on indigenous knowledge and perspectives in addition to respectful collaboration with indigenous people when addressing climate change and associated issues. Indigenous people have been using the environment in sustainable ways for many decades and have valuable knowledge that comes from generations of indigenous people. Reduced access to land, food, and water as a result of

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climate change and associated factors have negative impacts on indigenous health. These negative impacts include increased exposure to water-borne diseases, reduced access to healthy food choices, exposure to pesticides used in LSMA which is a significant contributing factor to climate change, obesity, cancers, diabetes, and more. Indigenous people are not completely vulnerable but have a wealth of traditional ecological knowledge that help them adapt and address the negative impacts of climate change. Further research on climate change and indigenous people could be done to further understand “Buen Vivir” and how it is applied in everyday life and in indigenous communities. This research could be used to create a pathway to how it may be applied globally. What would manifest as a result of implementing policies or solutions based off the indigenous construct of living and being, “Buen Vivir” look like? What would universalizing “Buen Vivir” as a way of living look like in a globalized world? How would it affect ways of doing business? How would this affect our social relation to Earth and each other? The global community can learn a lot from indigenous people about the environment, climate change and how to address the associated issues that arise.

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