CARBON OFFSETS: A PRIMER

For the Global Livingston Institute

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EXECUTIVE SUMMARY

In this report, the

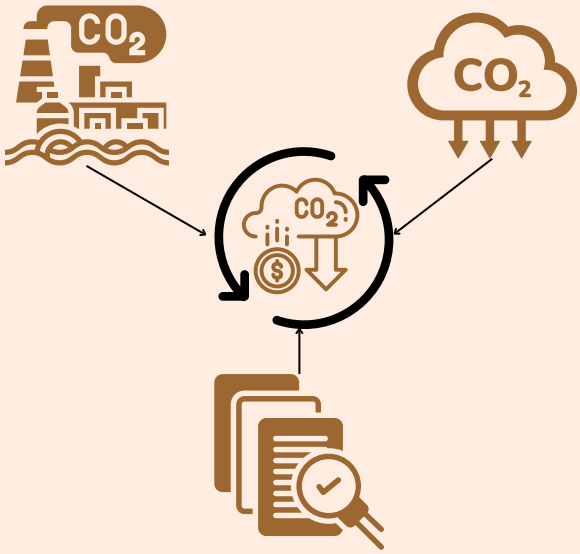
Over the past two decades, the practice of carbon offsetting has been met with both examples of success and failure. Academic literature and media coverage gives a plethora of examples of cautionary tales on these projects, but many of the issues with the practice have more to do with the execution than the concept. While not a permanent solution to carbon emissions, carbon offsetting does represent a way to combat this issue in a more immediate way; therefore, it is worth solving the problems with offsetting in order to use it as a tool for sustainable development. Carbon offsetting provides an opportunity for the Global Livingston Institute to further its mission in Uganda by creating avenues for supporting communities. This report will serve as an initial probe into carbon offsetting for GLI, providing research and recommendations on the ethics and efficacy of the practice. A number of components will be included in this document. First, it is important to explore the existing academic literature on the topic of carbon offsetting to provide a critical foundation for the following research and recommendations. An interview with Mr. Miria Opio, an expert in offsetting from Uganda, is also included. Next, a case study section will highlight examples of offset projects and identify common practices. Finally, recommendations are given to serve as a base on which GLI can inform its decisions on engaging in carbon offsetting in the future. GLI's longitudinal approach to research will allow for the findings of this research to be expanded on; future efforts should focus on ways to apply principles from this report to offsetting projects conducted by GLI. The aim of this report is to contribute to the existing conversation on carbon offsetting by providing a new perspective on how to approach the practice in a way that engages communities and promotes sustainable development in the developing world. In any efforts made on this matter, GLI should aim to be the example in how to implement carbon offsetting effectively.

WHAT IS CARBON OFFSETTING?

Carbon offsetting is the practice of "removing" carbon from the atmosphere produced by a carbon emitter (i.e. an individual, corporation or government entity) via a carbon reduction initiative (generally in a developing/industrializing nation) (Broekhoff et al. 2019). Predominantly, this activity is facilitated through the carbon market, in which carbon credits are purchased by a carbon emitter from a seller that reduces carbon. Carbon credits are permits that are worth one ton of carbon emission. Two types of credits exist: voluntary emissions reduction (VER) credits (a carbon offset exchanged in a voluntary market) and certified emissions reduction (CER) credits (a carbon offset created through the CDM regulatory framework) (Peterdy, 2023). When a credit is sold, it is "retired", meaning that it can no longer be traded in any way. This is reflective of the 'one for one' nature of offsetting: a ton of carbon reduced can only offset a ton of carbon produced.

Carbon reduction is achieved through either removing carbon from the atmosphere or avoiding adding it via an offset project. Carbon offsetting projects span a multitude of sectors utilizing varying types of technology. According to the Allied Offsets directory of voluntary projects, the sector that retired the most VER credits in 2022 was renewable energy with 65,774,172 credits, followed by forestry with 25,361,308 credits, and chemical/industrial projects with 9,346,532 credits (Allied Offsets, 2023). It is worth noting that the average prices of credits vary drastically depending on the sector they are associated with. Forestry projects on average have the highest price of 14.51 USD, followed by agriculture at 12.56 USD and household devices at 11.11 USD (Allied Offsets, 2023). The varying price of carbon credits speaks to the nature of the market; while offsetters obviously want to cover the cost of reducing carbon in the atmosphere, what buyers are willing to pay for a credit also influences their price.

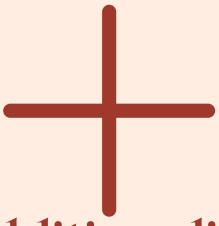
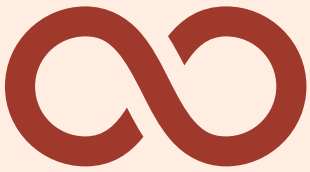
This is true of both types of credits, though they are distinct from one another. The two types of credits represent two different modalities through which carbon offsetting is facilitated. As previously mentioned, CER credits were established through the CDM. This mechanism was created by the Kyoto Protocol that allows for an Annex 1 nation (a nation with dangerous levels of emissions with an emission-reduction commitment) to assist in setting up an emission offset project in a non-Annex 1 country, in order to allow flexibility in meeting emission goals (UNFCCC, n.d.). This process is regulated by the United Nations Framework Convention on Climate Change secretariat. CDM projects have been met with mixed success in terms of offsetting carbon (Sutter & Parreño, 2007), and the program itself experienced a collapse in 2012. In the decade since this incident, the CDM has recovered and stabilized, but is not at the level it used to be. Voluntary markets, on the other hand, are much larger and are currently experiencing growth. As opposed to the CDM, the voluntary market has a different ruleset on how credits are produced and traded. Not tied to specific guidelines like the CDM, voluntary carbon offsetting generally involves a direct relationship between carbon credit buyers and



producers or the sale of carbon credits on an exchange. Brokers of carbon credits also exist to facilitate the buying and selling of carbon credits (Favasuli & Sebastian 2021). A carbon offsetter cannot just sell credits on good will, however; the project must be verified by a standards organization, such as Verra, Gold Standard, Climate Action Reserve, and the American Carbon Registry (Song, Li, and Ott 2022). Once the carbon reduction project is verified, it is subject to monitoring by a third-party organization, to ensure that standards continue to be met. The greater amount of moving components in the voluntary market allow for more flexibility in who can engage in the market and how, but also allow for misuse of the system to occur. This is explored in greater detail in the academic literature on the subject, as well as other more in-depth concepts.

OFFSETTING METRICS

Over the past two decades, a vast literature on carbon offsetting has been developed by an intersection of fields and specialties. From this literature, certain themes can be derived that are relevant to the ethics and efficacy of carbon offsetting. One aspect that is spoken about to a great degree is additionality, which refers to the extent to which carbon offset regimes produce new resources and projects for reducing carbon in the atmosphere. A project can be considered additional if it legitimately offsets carbon more than what would have occurred without the project. Projects that are likely to be additional include industrial gas projects, methane projects, and biomass projects, while energy-related projects, efficient lighting projects, and cook stove projects are less likely to be additional (Cames et al. 2016, p. 10). This is not to say that these modalities can not be additional, and do not have other benefits; this has more to do with the creation and management of a project than the physical mechanisms by which the projects achieve reduction. Permanency is another important aspect when measuring a project's success. Put simply, this is a measure of whether or not a project's effects are long-term, and not undone after the carbon credits associated with reduction are sold (Ruseva et al. 2020). For the most part, this measure pertains to reduction methods that involve sequestration of carbon or prevention of deforestation, but is also relevant to emission avoidance mechanisms. While it is important for carbon sequestration to be effective in the long term, it is important to understand that it is not fully permanent, and that methods such as soil sequestration could be implemented more thoroughly (Ruseva et al. 2020). Regardless, it is important to the legitimacy of carbon offsetting as a practice that the carbon offset is not reversed shortly after, i.e. through deforestation of protected forestry.

 Additionality	 Permanency	 Leakage
Does the project create new reductions in carbon?	Does the project have lasting impacts that are not reversed?	Does the project cause carbon emissions to shift elsewhere?

ISSUES IN OFFSETTING

There are a number of issues with carbon offsets identified within the literature; some are larger problems outside of the scope of what an individual organization is capable of influencing, but all must be taken into consideration. A major issue is non-additionality. As previously mentioned, additionality is an important metric of success for carbon offset projects; therefore, non-additionality represents a failure in which the project does not contribute carbon reduction that would not have already occurred. A prime example of this can be seen in India, where through the CDM, 52% of solar projects that received subsidies would have been funded regardless (Calel et al., 2021). Non-additionality is an issue because it allows for carbon emitting countries to exceed limitations set forth by the Kyoto Protocol and for corporations to claim that they are reducing emissions without actually creating an offset.

Leakage is another concern with carbon offsetting projects. This is the phenomenon in which the effects of a project are effectively undone due to a failure in the project's design or implementation (Murray et. al, 2004). As opposed to permanency issues in which the offset created by the project itself is undone, leakage is the additional production of carbon created outside of the project's purview. A large-scale example of this can be observed with the CDM, in which reduction of demand for fossil fuels from countries with energy related emission reduction projects leads to the price of fossil fuels going down, increasing consumption elsewhere (Rosendahl & Strand 2011). While not the fault of emission reduction schemes, this is an unfortunate externality which highlights how carbon offsetting is not effective by itself.

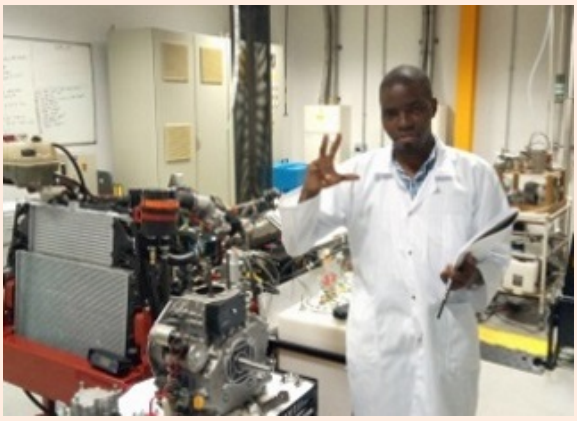
Other issues deal with unforeseen consequences created by carbon offset projects. Considering that these projects are often carried out in developing nations, there is a high propensity for foreign interventions to exacerbate pre existing socio-economic issues. In Guatemala, the AES-CARE Agroforestry project, while having a history of success, shifted away from helping economically disadvantaged farmers to larger farms, leaving poorer farmers without aid; in Sri Lanka, a solar power regime meant to aid plantation workers ended up shifting the burden of the cost onto said workers, furthering social divides (Wittman & Caron, 2009). Externalities like these must be taken into consideration when implementing carbon offsetting.

FORESTRY OFFSETTING IN UNGANDA

A number of carbon offsetting projects have already been implemented in Uganda, primarily in the form of large reforestation projects (Blum, 2020; Cavanagh & Benjaminsen, 2014; Edstedt & Carton, 2018; Fisher et al., 2018; Lyons & Westoby, 2014). Some of these projects were shut down relatively soon after their implementation, and many have had unintended consequences, doing more harm than good. A prime example of this can be seen with the efforts of the Norwegian forestry company Green Resources, which operates one of the largest privatized plantation forestry regimes in all of Africa (Lyons & Westoby, 2014; Edstedt & Carton, 2018). There have been a number of problematic externalities with this project. The Ugandan National Forest Authority gave Green Resource the license to reforest the Bukaleba and Kachung Reserves; however, the area they were licensed to was owned by local farmers, resulting in their displacement (Lyons & Westoby, 2014). Another example of this can be seen with Trees for Global Benefit, a reforestation project run by Ecotrust. This project involved contracting farmers to plant trees on part of their land as opposed to crops. These contracts were for twenty-five years and had specific quotas tied to farmers getting paid for their land usage (Carton 2020) However, many farmers have not been able to meet these quotas and are unable to change their land utilization, leading to issues of food insecurity.

EXPERT INTERVIEW: MIRIA OPIO

In addition to the following case study, an interview was conducted with an expert on carbon offsetting, Mr. Miria Opio. Mr. Opio is a co-founder of Carbon Green ltd., a PhD Candidate at the University of Leeds, a researcher at the Center for Research in Energy and Energy Conservation (CREEC) of Makerere University, and a business development manager for MyCarbon. His acumen is indicative of his involvement and knowledge on a variety of aspects of carbon offsetting, including voluntary markets, implementation of projects, and the practice within Uganda. The following is a summary of the interview and the interview questions are listed at the end of the report.



Mr. Miria Innocent Opio

The first question in this interview pertained to Mr. Opio's experience with offsetting. In addition to his aforementioned credentials, he discussed an offset project planned by Carbon Green. The project will involve engaging ten local schools in reforestation by having each plant an acre of trees on the school grounds. The purpose of this is not just to utilize land for reforestation, but also to engage students in ecological education, while providing the schools with a source of revenue.

Question two focused on specific practices of successful carbon offsetting projects as well as where they fail. What Mr. Opio said in regard to this issue primarily dealt with how stakeholders in offsetting projects are managed. He talked about the importance of awareness, i.e. making issues of carbon emissions salient to carbon emitters as well as the communities affected by offset projects, in order to create interest and support for projects. Engagement of stakeholders is also important, in this case meaning continuously engaging with groups involved with the project to ensure its success.

For example, a project which pays farmers to plant trees on their land would need to provide support and guidance to farmers so that their reforestation efforts are maintained. Collaboration was also discussed; facilitating communication between stakeholders and being transparent on goals and impacts is vital to project success. In addition to these facets of stakeholder management, he mentioned how in Uganda, local officials will often want to be involved in projects pertaining to the environment and offsetting.

Question three pertained to what technologies produced better offset projects. This question was asked with the intention of determining what modality is the best for reducing carbon. However, this was ultimately not the right approach to the issue, as a number of variables affect what method of offsetting is best in any given case, such as geographic and community concerns. However, Mr. Opio provided some insights into other aspects of technological concerns. MyCarbon has developed software for tracking emissions and emission reductions, which is important for analysis. Regarding hardware, technologies that improve offset projects, such as better planting technologies, should also be considered.

Questions four and five were mostly answered in question three, however some additional considerations came to light. Offset projects provide economic opportunities for their stakeholders. This is achieved not only through the money coming in from selling carbon credits, but from the technologies used in offsetting itself.

For example, solar panels reduce carbon emissions through avoidance, but they also provide consistent power for anything from farming to internet access. Additionally, Mr. Opio discussed how livelihood concerns of communities need to be taken into consideration, i.e. how an offset project may change the way in which people live and work. Project should not disrupt livelihoods, such as was the case with Green Resources and Trees for Global Benefit. Rather, they should bolster livelihoods, either through providing resources or new economic opportunities.

Some interesting concepts emerged in this interview. First, the success of an offset project is in part dependent on its ability to engage stakeholders effectively. Managing the relationship between offset projects and their stakeholders is crucial to ensuring it is serving a community, not producing harm, and is implemented effectively. Next, modalities of offsetting all have use cases. While some technologies offset more carbon, such as carbon sequestration methods, the specific context in which they are implemented needs to be taken into consideration. Community need should come first; understanding what type of project would benefit a certain community should be the first step in designing a project. Finally, offset projects have impacts beyond carbon reduction; they can have positive or negative impacts on community livelihoods, ranging from economic empowerment via new resources or job loss via technological changes. These impacts must be taken into consideration for offset projects moving forward.

CASE STUDY

Given that carbon offsetting has already been around for approximately two decades, a plethora of cases of both successes and failures with the practice already exist. A case study provides a qualitative analysis of a number of cases over a series of time, based on common themes (Denzin & Lincoln, 2011). Therefore, it is useful to utilize this method to better understand common themes of successful carbon offset projects. Projects were selected for the case study based on their relevance to GLI, i.e. geographic similarities to Uganda, similarities in organizational capacity, and their level of success. Information for the case study came from reports on carbon offset projects, collated from third-party sources as well as from the organizations carrying out the projects themselves. Projects were analyzed based on scope, community engagement aspects, and additional effects.

Project	Scope	Community Engagement	Additional Effects
Green Resources	Large scale	None of significance	Displacement of farmers
Trees for Global Benefit	Large scale	Contracted local farmers to plant trees	Farmers locked into contracts, faced with food insecurity
Mikoko Pamoja	Small scale	Engages local communities and schools in the Gazi Bay	Supplies water to nearby communities, assisting with education, women's leadership
SunCulture	Medium Scale	Tailors services to and addresses a specific need of a community, however does not engage them in decision making	Improved crop yields, reliable source of power to rural communities
Carbon Tanzania Yaeda Valley REDD Project	Medium Scale	Engages indigenous population as well as farmers in its efforts	Biodiversity protection, indigenous land rights

CASE 1: MIKOKO PAMOJA

Mikoko Pamoja is a mangrove reforestation project located in the Gazi Bay of Kenya.

Mangrove reforestation sequesters more carbon than conventional reforestation

Mikoko Pamoja acts a nexus for community action and engagement in the Gazi Bay

The project was featured by Wylie et al. (2016) among other cases regarding successful factors in blue carbon sequestration. The project is relatively small, reporting an average annual revenue from carbon credits of $24,000 USD (Mikoko Pamoja 2023). However, the effects of this project should not be minimized. Blue carbon projects are more efficient at carbon sequestration than terrestrial forestry projects, meaning that they require less resources to produce similar effects (Wylie et al. 2016). The additional effects on the community should also be highlighted. The organization has been able to utilize profits from selling credits for other social goods, such as supporting education (Huff & Tonui 2017). Local women have also been key to the management of the project, improving their social status in a patriarchal society (Wylie et al. 2016). The project has also begun to supply water to nearby villages, providing a service that did not exist before (Mikoko Pamoja 2023). These are just a few of the benefits from giving a local community agency over their own natural resource. Opportunities for wetland conservation projects in Uganda could be explored, as there are numerous wetland systems in the country.

CASE 2: SUN CULTURE

SunCulture is an agricultural company operating throughout Kenya that provides solar power solutions to small farmers, including solar panels and solar powered water pumps (SunCulture 2022).

Solar technologies give new opportunities and energy autonomy

SunCulture's success can be attributed to its innovative service mechanisms

Utilization of their technologies is attributed to increased crop yields for small scale farmers and helps mitigate the effects of drought by tapping into groundwater sources (Fairley 2021). SunCulture's products are sold to farmers, meaning that their relationship with the communities they sell to is one of a business and a client, which could bring their motivations into question. However, they provide innovative service delivery through flexible payment plans, installation and training, warranties and after sale support, making solar power accessible where it was not previously (Jong'a 2021). Recently, SunCulture entered the carbon credit market, with the aim of providing price reductions for their solar products (Ozkan 2023). This could be seen as non-additional crediting, since the solar technologies are generating revenue already via fees for service.. However, SunCulture is meeting the needs of a specific community, and is making their products more accessible by implementing carbon crediting. Improvements could be made to ensure the carbon crediting aspect of SunCulture's business is equitable. While they are a for-profit company, more could be done to invite community stakeholders into decision making processes.

CASE 3: CARBON TANZANIA

Forestry protection is just as much about the rights of local people as it is about environmental concerns

This case saw success by properly managing stakeholders with community wellbeing in mind

Carbon Tanzania is a social enterprise that predominantly works to protect forestry within Tanzania and sells carbon credits (Carbon Tanzania 2021). Their project in Yaeda Valley is a REDD (Reducing Emissions from Deforestation and forest Degradation) project, with the goal of protecting the forest in the region from slash and burn agricultural techniques utilized by farmers (Tapping 2020). While this is similar to the cases of Green Resources and Trees for Global Benefit, an important distinction must be made. The area that Carbon Tanzania aims to protect is legally owned by the Hadzabe indigenous peoples, who do not engage in slash and burn techniques. Carbon Tanzania works with local people to patrol and report on deforestation, as well as assisting farmers in sustainable farming techniques (Tapping 2020). In this case, stakeholder engagement and community needs are front and center of Carbon Tanzania's efforts. Additionally, indigenous land rights are being protected, along with biodiversity found in these forests.

ANALYSIS

Based on the literature and the cases presented in this research, a number of key takeaways can be derived. First, it seems that smaller projects tend to be less subject to issues such as non-additionality. This could have to do with the fact that they are focused on the subject of the project itself, i.e. conservation of forestry, as opposed to the generation of revenues via selling carbon credits. Second, these projects have a broad base of support from the communities that they affect. As opposed to being run by foreign NGOs or enterprises, these projects are community run. This could make them more ethical, as they take into consideration local interests. Finally, the projects have additional positive impacts beyond the offsetting of carbon, which is indicative of their success as projects for improving developing communities.

Theme 1	Theme 2	Theme 3
Smaller project focused on a specific community goal are more successful	Successful projects engage community stakeholders and work for their support	Carbon offsetting can have positive impacts on communities beyond offsetting carbon

RECOMMENDATIONS

Based on the existing literature and cases of offset projects, three key concepts should be applied when perusing carbon offsetting.

Analyze Conditions	• Offsetting has the potential to connect people around the world to offset carbon, but it also has many difficulties • When setting up a project, determine if it can be done successfully with benefits • If a goal can be achieved through different means, explore those
Develop Good Practices	• Engage in self-monitoring and give proper support to ensure accountability • Modality must be appropriate for the circumstances • Focus on depth over width; small projects appear to be more successful
Put Communities First	• Include community inputs into project formulation • Engage and support community members throughout the project • Community empowerment should be placed before offsetting goals

RECOMMENDATIONS

Recommendation 1: Analyze conditions

As has been exemplified throughout this report, carbon offsetting has potential as a tool for improving environments and aiding development through connecting communities and stakeholders around the world. However, the many pitfalls and past blunders of offsetting make it challenging to do well. Ultimately, GLI should not pursue carbon offsetting unless there is a justifiable benefit for doing so and if the organization can implement and support a project effectively. This will require an honest assessment of organizational capacity and community needs, the latter of which should come before anything else. Offset projects should be used first and foremost to aid communities. If another avenue for generating funding to provide aid to communities exists, then that should be explored before establishing an offset project and selling carbon credits. The premise of additionality in offsetting is that revenue created from carbon markets should allow for projects to exist and operate that would not otherwise. However, this is not to say that offset projects cannot utilize funding for getting off the ground, or that there are no benefits from funding projects with carbon credits. Engaging with the carbon market allows for communities to engage with the global economy that may not have had a previous avenue for doing so. Risks, benefits and capabilities should all be weighed before a project is designed.

Recommendation 2: Develop good practices

While carbon offsetting has existed for decades at this point, it is in many ways still uncharted territory. Failure in offsetting predominantly stems from organizational and implementation issues created by a lack of foresight and support for projects. Good practices exist and should be implemented, however this should be seen as an iterative process. To that end, conducting self-monitoring will be important if GLI moves forward with any carbon offset projects. While the independent vetting organizations are important for ensuring the credibility of carbon credits and the voluntary market,

RECOMMNEDATIONS

self-monitoring is important for self-improvement. This should include aspects such as measuring project efficiency, inspecting for issues like leakage, and reporting on local community impacts. Another concern is project type. While some modalities are more effective and more profitable, design of a project should be based on community needs and resource considerations. Finally, a focus on depth over width seems to produce more effective projects. GLI should focus on smaller projects and how to make them efficient while also producing positive externalities.

Recommendation 3: Put communities first

Finally, the primary goal of all offsetting projects should be to empower communities via the carbon market. This has been a theme throughout the report, but deserves specific attention. Ultimately, offset projects should be created for community stakeholders to have ownership of and have a focus on decolonization. The first step is engagement, which begins with including community members in project formulation, tailoring its design to their needs. Offsetting projects should also seek to create infrastructure and economic opportunities that did not previously exist. Achieving these new developments will require continued support on the behalf of GLI. Establishing a project should involve assessing community capacities and assisting in improvements. For example, in order for a solar panel project to be successful in the long run, maintenance and repairs will have to be performed, which necessitates the training of technicians. While this increases the responsibility of the organization to provide for the project, considerations like this example show how projects can have additional economic impacts. Therefore, in formulation and implementation, projects should consider community needs, engage community stakeholders, and ultimately be owned by the communities they serve.

CONCLUSION

Carbon offsetting is not the solution to anthropogenic climate change. However, it has the potential to be a useful tool in combating it, while also engendering sustainable development in the global south. Unfortunately, this potential has not been fully realized by the majority of previous carbon offsetting efforts. Applying GLI's Listen, Think, Act principle and considering its commitment to advancing best practices in international development, there is an opportunity for GLI to be a leader in reforming the practice of carbon offsetting, especially as the voluntary carbon market grows. In order to achieve this, certain considerations need to be taken regarding the ethics and efficacy of the practice. Projects should be additional, permanent and not have leakages. Additionally, effectively offsetting the carbon that a carbon credit pays for must be achieved by any project to have legitimacy. However, maximizing profit and carbon reduction should not be the focus of offset projects, nor does it improve their effectiveness. Rather, focus should be placed on the product of the project and its effects on the communities that it impacts. This starts with the beginning of project formulation, where resources and stakeholder needs must be analyzed and community groups and members are present at the table. Based on these considerations, starting a carbon offset project may not always be feasible at the moment. However, implementation of these projects should be treated as a learning process, guided by community inputs. Projects need support in order to find success, through engaging the people they help. The modality of a project should also be based on community needs as opposed to what is most profitable. If the people where a project is implemented are not impacted by the project in a meaningful way, there is little reason for them to stay engaged with it. Ultimately, offsetting and selling carbon credits should be primarily utilized as a method for engendering sustainable, community-driven development.

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Interview Questions

1. What is your personal experience with carbon offset projects or the carbon credit market?
2. What are some practices that you have observed in successful offset projects, and what are some practices that cause offset projects to fail?
3. Are there certain technologies that make carbon offset projects more successful, impactful, or sustainable?
4. What additional benefits are created by offset projects besides their carbon reductions, and have you seen any negative impacts?
5. In what ways have you seen offset projects engage local communities?

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