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Local Perception of the Carbon Emission Reduction Program in Oil Palm Plantations

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Abstract

A case of the carbon emission reduction program on oil palm plantations is pursued here with the aim of filling existing gaps in knowledge regarding community involvement and perceived benefits. Quantitative interviews were carried out with selected local stakeholders to get their level of awareness, knowledge and attitude towards the program. The results ranged from informed to ignorant attitudes, some of the participants, grasping what main aim of the program is environmental, others being puzzled or even doubtful. Also, the perceived benefits were mostly expressed in a business economic basis and while responding to the questions and concerns, numerous participants focused on the commercial payoff within the short run rather than the wellbeing of the environment. There were also concerns on the questions of an equity kind where some of the community members felt that they are left out every time the decisions are being made. Including the community members in communication practices, honesty and openness are important factors in determining the effectiveness of the carbon reduction program. Indeed, by centreing its analysis at the community level, the study applies a more local perspective to understanding of how these programs are perceived by the target populations and provides guidance to enhance community participation in these initiatives. The study calls for the improvement of environmental governance mechanisms that respond to socio-economic objectives as well as enhance ecological performance.

INTRODUCTION

The oil palm industry has been well-known to most tropical countries as a major driver of environment depletion, especially deforestation, loss of bio-diversity and high emission of carbon (Murphy et al., 2021). Palm oil is one amongst the largest Capacity global consumed edible oil and used in food, cosmetics and bio diesel markets. However, its growth especially in the South eastern Asia and Africa region has been associated with serious environmental impacts meaning that the industry is one of the leading industries contributing towards enviornmental degradation globally (Palmer et al., 2023). Many carbon emission reduction schemes have been undertaken to try and offset the negative impacts of oil palm plantations on the environment. Such interventions are usually associated with other bigger sustainability interventions and seek to pursue economic development alongside

sustainable agriculture practices in order to curb the unsustainable agricultural practices that are destructive to the environment (Günther et al., 2020).

Carbon emission reduction strategies of oil palm plantations typically concern reduction-resulted emissions involving land management practice like reforestation, no-burn policy, and methane abated from palm oil mill effluent (POME) (Uning et al., 2020). Furthermore, new certification initiatives, as the Roundtable on Sustainable Palm Oil (RSPO), become the primary instruments that provide ways for decreasing the oil palm production environmentally negative impact. Many of these programs seek to avoid emissions not only of carbon but also of other pollutants, and by extension, engage with such significant sustainability factors as social equity and local economic development. However, the effectiveness of such policies to a large extent depends on the level of such perception by the people in or around the oil palm producing regions (Asubonteng et al., 2021).

Over the last couple of decades, the participation of the local communities in matters concerning the environment has received a lot of attention. Perceptions and attitudes of the local community towards sustainability programs are now considered important factors affecting the success of sustainability programmes (Thompson et al., 2020). People or groups who have a feeling that they are not involved or not well informed are likely to resist engaging in any of the programs hence negating the implementation of the programs (Taylor & Asmundson, 2021). On the other hand, conscious communities within organizations developing and implementing sustainability programs are likely to have positive impacts on the programs' outcomes (Wamsler, 2020). For instance, in the context of oil palm plantations, local people are not only mere spectators who watch and receive carbon emission reductions' impacts on their lives and in the context of these carbon emission reductions but also agents who are stakeholders with rights over the land ownership and entitlements to developed livelihoods and social systems.

Understanding the stakeholders' perceptions is therefore very important because they can either support the efforts or oppose them, either for or against reduction of carbon emissions (van et al., 2021). These perceptions may include economic including employment and income implications of the programs and social and cultural elements including land use culture and institutional framework of local governance (Peetz et al., 2021). Market awareness also contributes significantly because people with extensive information about environmental issues of oil palm plantation and importance of carbon emission cut backs are more likely to support this concept (Rustam et al., 2020). Nevertheless, for many communities the short-term economic needs seem to predominate over long-term ecological values, especially in areas where oil palm plantations are an important source of income (Golub et al., 2021).

A significant implementation barrier that needs to be addressed in the carbon emission reduction program for oil palm plantations is that these programs are assumed to be externally induced by the other stakeholders and not considering the local communities (Shah et al., 2021). The absence of local stakeholders in planning and actual programme design and rollout processes may breed doubt and suspicion about the aims and possible returns of such programmes (Roll et al., 2022). The major concern in carbon reduction programmes hence lies in the fact that communities may see such programs as potential threats to their existing or customary practices of utilization of land, sources of income such as farming among others (Sovacool, 2021).

In addition, most carbon emission reductions have economic incentives including the payment for ecosystem services (PES) to encourage community participation Shi et al. (2022). Despite their purpose to offer remuneration for potential economic

losses from decreased land use, these motivations are regarded as ineffective or socially unequal (Blanchard et al., 2020). This can lead to increased exclusions and prejudice about the programs; this results from correlation of the project with fraud especially in regions with previous land and natural resource conflict (Gong et al., 2020). The perception that there is a lack of fairness in how the benefits are administered becomes a sore point in terms of getting buy-in from the communities, to participate in these projects (Starke et al., 2022).

Because of these factors, it is significant to know the local people's attitude toward carbon emission reduction programs in oil palm plantations. The objective of this research is thus to establish an understanding of such programmes particularly how perceptions are influenced by the economic, social and environmental endowment. Based on this understanding, the community attitudes and perceptions of this study aim at documenting and analyzing the factors that hibernate the enhancement of carbon emission reduction activities among oil palm plantations. Knowledge of these local dynamics is vital for sustainability interventions to be impactful, sustainable in the oil palm sector and for transformative change to be made towards improved and progressive environmental stewardship.

METHODS

To sample the opinions of the people locally about the carbon emission reduction programme in oil palm plantations, this study relied on a qualitative research method. Qualitative method was used because it can provide rich understanding of participants' experience, perception and attitude towards issues pertaining to socio-environmental phenomena such as sustainable projects. To do this the emphasis was placed on obtaining qualitative data so as to get more detailed understanding of the different communities' perceptions regarding the attempts made locally to undertake carbon emission reductions initiatives.

It is for this sort of research context that a case study design was used to examine the context of the oil palm plantations and these communities within which the research was sited. Qualitative research design, case study design, oil palm plantations, context. Qualitative research methods were appropriate as it was possible to use the case study method for examining local perceptions in a natural environment with respect to carbon emission reduction programmes. It enabled the exploration of factors that may affect perception of the locals, economic, social, and environment for instance.

To select the participants in this research study, purposive sampling technique was used so as to include people with experiences and knowledge in the subject matter. The study aimed at the members of the local communities in the vicinity of the oil palm plantation involved in the carbon emission reduction schemes. Respondents were purposively selected across different strata to include farmers, plantation workers, community leaders and local government officials. In total, 25 participants were interviewed, with the inclusion criteria excluding only those that were personally implementing the carbon reduction initiatives.

Semi-structured interviews were used when obtaining data from the participants during which the participants were given the opportunity to voice their opinion as the "interrogator" ensured they cover the major areas of discussion. The interviews were conducted in the participants' particular language to ensure comprehension and six interviews out of sixty needed an interpreter. The interviews took approximately 45 minutes to an hour each, and the participants allowed me to record them. Several topics were discussed during the interviews: First, awareness about the carbon emission reduction programs, second, the environmental, economic views of the participants, third, the degree of participation in the programs.

Further, it was appropriate to conduct observations of the communities and plantations where the carbon emission reduction programs occurred with a view of getting more understanding of the context of implementation. Observations made in the course of the study were recorded in the field to include communication with the people, group meetings and any other activities that pertained the plantations. These observations aided in the interpretation of the interview data apart from giving more information regarding the integration of the programs into the community.

Data Analysis

Data collected in the study were analyzed using thematic analysis. The interviews conducted were audio-recorded and these were transcribed manually verbatim; the transcripts were subsequently read several times to and fro for the data familiarization process. This was followed by open coding in the search for emerging themes and patterns concerning local sentiments to the carbon emission reduction programme. During the later stages of analysis, these codes were clustered into themes which presented the major study findings.

In the course of the study, special emphasis was placed on the presence of intersubjective patterns and the polarity of views expressed. The approach selected for analysis was thematic analysis as they made it possible to find out both the manifest and latent features in the view of the participants on environmental, economical and social impacts of the program.

To enhance validity of the research the following measures were taken; First, there was member checking, where participants were allowed to go through the interviews and give feedback whether their opinions were correctly recorded. This process also assisted in the clarification of our participants' perceptions as depicted by the data collected. Second, triangulation was employed by comparing the interview findings with the observations made and the field notes. This it assisted in reconfirming information that had been collected, hence boost the credibility of the results attained. Finally, to reduce the possibility of self-generated researcher bias, the researcher kept a research journal where they documented biases, assumptions, and reflexive remarks during the study process.

RESULTS AND DISCUSSION

The purpose of this study was therefore to investigate the ways in which carbon emission reduction programs are understood and received in the oil palm plantations through the experiences and beliefs of people living in the plantations communities. More specifically, analysing economic, environmental and social perspectives of the study, it aimed at revealing nuanced factors which determine either acceptance or rejection of such measures by the communities. The findings of the study highlighted broad qualitative understanding of the different viewpoints involved which were useful in explaining the prospects and difficulties in the enhancement of the carbon emission reduction efforts in these areas. The findings offer insight into how local people understand such programs in relation to their existence and differences in appreciation of the impacts that such livelihoods breeding programs have on the environment and sustainability measures within their communities.

Community Awareness and Understanding of the Program

The study showed that the level of community awareness and comprehension of the carbon emission reduction program differs among participant. Some of the members of the local communities have fairly good understanding of the program, what it seeks to achieve and its environmental benefits, on the other hand, there are some members, who had little or wrong impression of the program. These included; education level, access to information, or direct involvement with plantations as they sampled the differences in awareness between the two.

The findings for those who were more knowledgeable of the program, there was recognition of the environmental impact by having to minimize greenhouse gases emission and the part played in combating climate change. Such participants were mostly likely to have a positive perception towards the program indicating that society needed to put measures in place that factor a reduction in carbon footprints in agricultural practices. One participant, a local community leader, expressed optimism, stating:

> *"We know that the carbon emission reduction program is important not just for our plantations but for the world. It helps reduce the harmful gases that cause climate change."*

This understanding was more prevalent among individuals who had attended informational sessions or had direct interactions with the program's implementers.

However, the study also uncovered a considerable portion of the community who lacked a comprehensive understanding of the program. Many participants reported that while they were aware of its existence, they did not fully grasp the program's objectives or how it affected their daily lives. Some believed the program was solely an external initiative with little relevance to their immediate concerns, such as economic livelihood. For instance, a plantation worker remarked:

> *"I have heard about it, but I don't really understand what it means for us. They say it's about the environment, but I am more concerned with my income."*

This quote highlights the disconnection between the program's broader environmental goals and the community's immediate priorities, such as job security and income generation.

The lack of clear communication from program implementers also contributed to this limited understanding. Several participants expressed frustration that there had not been enough effort to educate or involve the community in discussions about the program's purpose and benefits. Some community members felt that information was often presented in technical terms, making it difficult for them to comprehend fully. One farmer explained:

> *"They talk about carbon and emissions, but many of us don't understand these words. We need them to explain it in simpler ways that make sense to us."*

This sentiment underscores the need for better communication strategies that are tailored to the local context, using language and examples that resonate with the community. Moreover, the study revealed that there was a general perception among some participants that the carbon emission reduction program was primarily designed to benefit external stakeholders, such as the government and plantation companies, rather than the local communities themselves. This perception was particularly strong among individuals who felt excluded from decision-making processes. A farmer commented:

> *"It seems like this program is for the government and the companies. They are the ones who make the decisions, and we just follow what they say."*

This lack of perceived ownership and involvement in the program further contributed to the limited understanding and, in some cases, skepticism about its effectiveness and relevance.

Despite these challenges, there were indications that when properly informed and engaged, community members were more likely to support and participate in the program. Participants who had attended community meetings or had regular contact with plantation management expressed a greater sense of responsibility toward

reducing carbon emissions. They saw the program as a collaborative effort that required their involvement. One community leader emphasized:

> *"We have to work together to make this program work. It's not just for the plantation but for our future, too."*

The awareness and understanding of the carbon emission reduction program within local communities were shaped by several factors, including access to information, the relevance of the program to their daily lives, and the level of community engagement. The findings suggest that improving communication and involving the community more actively in decision-making processes could enhance their understanding and support for the program.

Perceived Benefits

The research found out that there was fairly-divided opinion on the advantages of the carbon emission reduction programme among the local people. To some of the participants, the rationale was evident because the program sought to minimise Greenhouse Gas emissions and sustainable management of oil palm. Also, the respondents who had knowledge of the company's contribution to environmental concerns stated that they had a positive outlook about these efforts because they are relevant to achieving the stability of the environment in future. These individuals linked the program to the phenomenon of fight against climate change, thus stressing the need not only for their locality but for the whole world. Some of the participants said that it was fulfilling to be working on a program that can deal with a major environmental problem in the world. A local community leader commented:

> *"We understand that reducing carbon emissions is a way to help fight climate change. If our plantations can help in some way, that's something we can be proud of."*

This sentiment reflected a growing awareness among certain segments of the community that their involvement in the program could have a broader impact beyond their immediate environment. The perception of participating in a larger global cause enhanced their sense of responsibility and pride. However, many participants viewed the benefits of the program primarily in terms of its potential to improve local economic conditions. For plantation workers and smallholder farmers, the perceived benefits were closely tied to their livelihoods. Some believed that the program could lead to better agricultural practices, increased yields, or even financial incentives linked to environmental compliance. One farmer remarked:

> *"If this program helps us to farm better or gives us incentives for reducing emissions, that would be a good thing for our families. We want to see direct benefits, not just talk about the environment."*

This quote illustrates the practical expectations that many had regarding the program's capacity to directly impact their income and farming outcomes. The potential for job creation and economic stability was another perceived benefit that was frequently mentioned by participants. Some individuals saw the carbon emission reduction program as a way to create new employment opportunities in their region. They believed that by adopting environmentally friendly practices, there could be a demand for more skilled labor or additional roles related to program management and monitoring. As one plantation worker noted:

> *"If this program means more jobs or better work conditions, then it's something we would support. We need more jobs, especially for young people."*

This highlights how the program was seen as a potential solution to broader socio-economic challenges, particularly in areas where unemployment rates were high. On the other hand, not all participants were optimistic about the economic benefits of

the program. A number of individuals expressed skepticism, believing that the financial gains from the program would primarily benefit the plantation companies and government agencies rather than the local communities. One participant stated:

> "*We hear about the benefits, but it seems like the companies and the government are the ones making money from this. We don't see much coming our way.*"

This perspective points to concerns about equitable distribution of benefits, where community members feared being left out of the financial or material advantages that might arise from the program.

In terms of environmental benefits, the study found that while some participants acknowledged the potential for positive ecological outcomes, others were unsure of how the carbon emission reduction program would directly affect their local environment. For instance, several individuals expressed uncertainty about whether reducing emissions would lead to tangible improvements in air or soil quality in their region. One community member commented:

> *"I'm not sure how reducing carbon will change things for us here. We have other issues, like flooding and soil erosion, that seem more immediate."*

This uncertainty underscored a gap in understanding how global environmental initiatives connect to local environmental concerns, and it highlighted the need for clearer communication regarding the specific benefits the program could offer to the local ecosystem. In contrast, participants who had seen or heard of specific environmental improvements attributed to the program, such as reforestation efforts or the introduction of sustainable farming practices, were more likely to view the program positively. A local environmental advocate stated:

> *"Since the program started, we've noticed some changes in how the plantations are managed. There's more attention to protecting the forest areas, and that's a good thing."*

This perspective showed that when tangible environmental benefits were observed, participants were more inclined to support the program and its goals.

This work provides useful informations to the local appreciation of the carbon emission reduction program in oil palm plantations, thereby filling the existing research deficits. Unfortunately, the concentration on the technological and policy element has left the native communities out of the models of carbon emission reduction unrepresented (Weldegiorgis et al., 2021). Specifically, by primarily considering a community's perceptions of such initiatives, this study contributes to the literature by providing insights into grassroots experiences with environmental programmes, thus addressing an existing research limitation.

Among the conclusions derived from this research, this paper will feature the high level of variance in regards to the knowledge that many communities possess with regard to the carbon emission reduction program. This result is in stark contrast to previous research where the authors postulated and calculated equal levels of understanding and involvement of local communities (Winkler et al., 2021). These studies disclosed a wide range of participants' knowledge and, on one extreme, a few participants with a deep understanding of the program's environmental purposes, at the other, participants with limited relevant information or even misinformation. This variation clearly shows that the issue of segmentation and use of different communication strategies for different segments of the population have not been well emphasized in the literature. Much research has been done on the effects of education on environmental awareness (Ardoin et al., 2020), nevertheless, little appears to has been done to document how such awareness impacts on the reception

of carbon reduction programs within particular sectors such as the oil palm plantations. This study fills this gap by examining the part played by specific message communication in enhancing the community's interaction with such schemes.

Second, this study also brings out the perceived benefits of the program worth highlighting as part of another consideration. Though the environmental implications of carbon emission reduction have been topical in global environmental literature (Köppl & Schratzenstaller, 2021), the effects of these reductions in the locality of the concerned community have not be subject to similar analysis. The results show that while some participants understood the general long-term benefits of the program to the environment, many saw more economic benefits in it. This is inline with the findings by Brown et al. (2021), who argued that rural actors commonly give preference to shorter term material returns over long term environmental effects. However, our study fills this gap by providing evidence that, with the appropriate knowledge, some individuals in the community also understood that the program had the capacity to improve local ecological circumstances like reforestation, and sustainable agricultural practices.

The investigation also provides insight into an important knowledge deficiency of the distribution of economic gains arising from operating carbon emission reduction programs. Similar studies have indicated that reforms of this nature mainly end up enriching big firms and organizations of government, while local communities are sidelined (Liu et al., 2021). Our research provides some evidence to support this statement, whereby several participants complained that the financial advantages were inclined towards the external entities. Nevertheless, contrary to the majority of works studying policy effects on local communities, where such communities are often regarded primarily as policy consumers (Eriksen et al., 2021), the present Investigation shows what active roles the communities can play in campaigning for fairer Post policy outcomes in the first place. Some of the respondents urged further enhancement in the participation mechanisms thus supporting the scholars who advocate for increased participation of stakeholder in environmental management (Lee et al., 2021). According to this study, the solution lies in the need for local communities to have their say in areas that are affected or are to benefit from such programs, so that, the benefits can be fairly distributed.

Secondly, the study brings out a lamentable lack of transparency talking to implementation of carbon emission reduction programs. Some of the participants questioned the likelihood of the program's promises coming to life in their local contexts especially with regard to employment generation and income generation. This concurs with the findings in the present study for Pye-Smith & Borrini (2021), who pointed out that several communities tend to be skeptical about environmental management when no specific and visible results are associated with those initiatives. This discussion is extended in our study to raise that while specifying about the program, if authorities continue to reveal and give details about its objectives, activities, and its positive effects, it can strengthen the community's trust and its participations. This is perhaps especially the case where environmental programs come into conflict with well-established economic activities such as is the case with oil palm plantations.

In the policy implications, therefore, this research recommends increased focus on community involvement and better communication infrastructure for carbon emission reduction activities in the oil palm plantations. The findings are therefore consistent with other prior suggestions advocating for better engagement of the public in planning, implementation of environmental management programs (Cologna et al., 2021). Thus, concerning the problems and outstanding issues of local communities, program implementers can enhance the degree of ownership and

consequent accountability – a critical factor for the continuation and improvement of initiatives.

Furthermore, this study has policy and managerial significance for policymakers and plantation management. Thus, proving that local stakeholders are interested in economic returns just as much as environmental performances stress the point that the policies should be synergistic, which combine environmental protection and enhancement of people's living standards. This conclusion aligns with Lamb et al. (2020) who opine that carbon reduction programs targeting the agricultural sectors of a country has to take into account the social – economic factors in order to gain the support of the rural folk and therefore be effective. This is further built upon in our study by identifying particular fields through which programme implementers can close the gap between environment objectives and business profitability; skills development as well as direct pecuniary rewards for carbon reduction conformity.

CONCLUSION

The study has given a comprehensive analysis of the viewpoints of people living in the regions that established carbon emission reduction programmes in oil palm plantations hence outlining some areas of awareness, perceived advantages and fair division of the results of the programmes. Homing in on practice-level participation, this study aims to fill the literature void that tends to discard the views and cases of local communities in favor of more policy or technical approaches. The conclusions underline how crucial all manner of issues relating to communication, equal sharing of the benefits accrued from the programs, and enhanced perspectives in the implementation of the programs that enable increased community engagement. With initiatives in reducing carbon extremity intensifying in the future, it is paramount to adopt the facet in such a way that complementary to the socio-economic fabric of communities.

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