

Environmental and Socio-Economic Sustainability of Carbon Financing Projects; A Case Study of the Luangwa Community Forest Project (LCFP) in Mambwe District, Zambia

Lelani Njobvu

Dept. of Agricultural and Environmental Sciences
School of Engineering
Information and Communications University and Zambia
Research and Development Center
Lusaka, Zambia
Njobvulelani18@gmail.com

Dr. Allan Tembo

Dept. of Agricultural and Environmental Sciences
School of Engineering
Information and Communications University and Zambia
Research and Development Center
Lusaka, Zambia
mcalen@mail.ru

Abstract:

Carbon financing has emerged as an important mechanism for promoting climate mitigation, forest conservation, and sustainable development. This study examines the Environmental and Socio-economic Sustainability of Carbon Financing Initiatives in Zambia's Luangwa Valley, focusing on the Luangwa Community Forest Project, a regionally significant REDD+ initiative implemented in a biodiversity-rich area facing increasing ecological pressure. The study evaluates the project's contribution to forest conservation, biodiversity protection, livelihood improvement, and community development, while identifying implementation challenges affecting long-term sustainability. Using a mixed-methods approach, data was collected through household surveys, focus group discussions, and semi-structured interviews with community members, carbon trading companies, conservation organizations, and government officials. Findings indicate that the LCFP contributes to reduced deforestation, habitat restoration, wildlife recovery, employment creation, livelihood diversification, and improved community infrastructure. However, concerns remain regarding governance weaknesses, uneven benefit distribution, land-use conflicts, human-wildlife conflict, and the depth of community participation. The study shows that carbon financing can support both environmental and socio-economic goals when guided by transparent governance, equitable benefit-sharing, and active local involvement. It recommends stronger institutional coordination, inclusive decision-making, and adaptive conservation strategies to enhance sustainable outcomes in the Luangwa Valley

Keywords: Carbon financing, Environmental Sustainability, Socio-economic sustainability, Biodiversity.

1. INTRODUCTION

Carbon financing has become an important mechanism for reducing emissions and supporting conservation through instruments such as carbon credits [47], although its ability to achieve genuine sustainability in developing countries remains contested [31]. This study uses Zambia's Luangwa Community Forest Project (LCFP) to assess environmental and socio-economic sustainability. The project combines biodiversity conservation with participatory forest management and livelihood improvement, yet faces land-use conflicts, limited

community engagement, and uneven benefit distribution [36]. Because carbon projects can support sequestration and biodiversity while also causing habitat degradation or community displacement [3], their long-term viability depends on equitable benefit-sharing [36] and overcoming funding, technical, and stakeholder-participation barriers [3].

Background: Carbon financing generates and trades carbon credits to support greenhouse-gas reduction projects. It developed through frameworks such as the UNFCCC, Kyoto Protocol, Clean Development

Mechanism, and voluntary carbon markets, linking climate mitigation with sustainable development. However, concerns about greenwashing, weak governance, unequal benefits, and limited community participation show that effective projects must balance environmental integrity, social equity, and economic viability. The LCFP reflects this balance through REDD+, participatory forest management, and alternative livelihoods.

Significance: The study evaluates how the LCFP contributes to sustainable forest management, biodiversity conservation, livelihoods, equity, and inclusive rural development. Its findings can inform carbon-financing policy and practice under Zambia's climate commitments, Sustainable Development Goals, and Eighth National Development Plan.

Problem statement: Although carbon financing is expanding, its capacity to deliver environmental integrity and socio-economic equity remains uncertain. Within the LCFP, uneven benefits, governance weaknesses, land-use conflicts, funding gaps, and inadequate stakeholder participation may undermine forest conservation, biodiversity protection, and community trust. This study therefore assesses the project through REDD+, CBNRM, and participatory-governance perspectives to identify conditions for inclusive and lasting sustainability.

General Objective: To assess the environmental and socio-economic sustainability of carbon financing projects, with specific reference to the Luangwa Community Forest Project in Mambwe District, Zambia.

Specific Objectives: To evaluate the environmental impacts of the Luangwa Community Forest Project, with particular attention to forest conservation and biodiversity protection, and to assess the socioeconomic benefits delivered to local communities through income generation, employment creation, and community development initiatives. In addition, the research seeks to examine the extent of community participation in benefit-sharing processes within the LCFP, while also identifying the key challenges and opportunities that influence the long-term sustainability of carbon financing projects in rural Zambia.

Research questions: What are the environmental impacts of the LCFP in terms of forest conservation and biodiversity protection, and what socio-economic benefits has it provided to local communities in relation to income generation, employment creation, and community development initiatives? To what extent is there community participation in benefit-sharing within the LCFP, and what challenges and opportunities influence the long-term sustainability of carbon financing projects in rural Zambia?

Theoretical/ Conceptual framework:

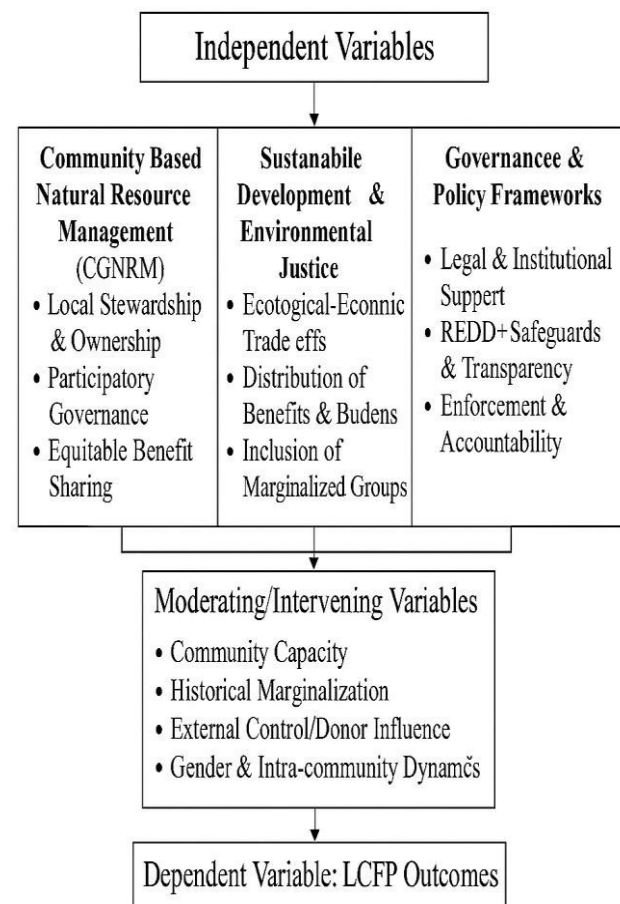


Figure 1: theoretical/ conceptual framework

2. LITERATURE REVIEW

Carbon financing supports climate mitigation in developing countries by linking ecological protection with socio-economic development [6]. Mechanisms such as REDD+, the Clean Development

Mechanism, and voluntary carbon markets monetize emission reductions [30], but their sustainability is constrained by weak governance, limited regulatory oversight [23], and socio-economic inequality. Zambia's LCFP illustrates both the potential and limitations of community-based natural resource management [11];[29]. Although carbon projects can reduce emissions and restore ecosystems [51];[21], concerns about additionality, permanence, and inadequate monitoring persist [26]. Benefits are also uneven because elite capture and the limited scalability of livelihood initiatives can restrict local gains [29];[48]. More broadly, gender inequality, insecure land tenure, limited local agency, and dependence on volatile carbon markets can weaken community empowerment. Ecologically, carbon priorities may overshadow biodiversity protection through monoculture plantations, habitat disruption, and insufficient monitoring. Long-term success therefore depends on transparent governance, equitable benefit-sharing, meaningful community participation, and sustained ecological oversight.

Comparative analysis: African perspectives

REDD+ combines land-use restrictions with incentives for sustainable practices through Payment for Ecosystem Services [16];[13]. However, restricted resource access, socio-economic vulnerability, and land-tenure conflicts can undermine forest-dependent livelihoods [4]. The Cancun Safeguards promote non-carbon benefits, but outcomes depend on strong safeguards and participatory, context-sensitive implementation [12]. Evidence from Brazil, Kenya, and Mozambique further shows that effective REDD+ requires robust institutions, inclusive participation, and sustained investment [32];[25], while elite capture, land-use conflicts, and ecological simplification remain persistent risks [4].

Zambian perspectives: Zambia's REDD+ strategy promotes reduced deforestation and sustainable land use through the National REDD+ Action Plan and National Forest Monitoring System [43]. Community participation is advanced through initiatives such as the Zambia Integrated Forest Landscape Program [40], although local influence remains constrained by slow land-tenure reform [42]. Incomplete carbon accounting and fragmented legal enforcement also weaken implementation [28],

while increasing private-sector involvement raises concerns that market priorities may overshadow community welfare [8].

Overall, carbon financing offers potential for climate mitigation and rural development, but its success depends on transparent governance, equitable benefit-sharing, and context-sensitive implementation. The LCFP reflects these opportunities and limitations, highlighting the need for localized, interdisciplinary research and adaptive approaches.

3. METHODOLOGY

The study used a mixed-methods design, combining qualitative and quantitative approaches for triangulation. It was conducted in the South Luangwa Valley and Lupande Game Management Area, with Mambwe District selected because it hosts REDD+ projects and faces biodiversity, deforestation, and socio-economic pressures. Participants included local communities, government agencies, NGOs, private-sector actors, and researchers involved in carbon trading and forest governance. Nsefu, Mnkhanya, and Jumbe chiefdoms were purposively selected, while stratified sampling ensured household representation across demographic and livelihood groups. Cochran's formula indicated a minimum sample of 96 households; 101 were surveyed. Primary data came from semi-structured questionnaires and focus group discussions, while secondary data included official reports, policies, and databases from FAO, the World Bank, and national agencies. Qualitative data were analysed through content analysis and Braun and Clarke's six-step thematic approach, supported by document review. Quantitative survey data were processed in Microsoft Excel using totals and percentages. Findings were presented in tables, charts, and graphs to identify patterns in demographics, biodiversity, governance, community engagement, and benefit-sharing.

4. FINDINGS

This section presents the environmental and socio-economic findings through CBNRM, Environmental Justice Theory, and REDD+ frameworks. It begins

with the demographic profile of the 101 respondents, which provides context for interpreting the results.

4.1 Demographic Characteristics

4.1.1 Gender Distribution

Gender distribution showed a relatively balanced sample, with females representing 52.5% (n = 53) and males 47.5% (n = 48), ensuring that perspectives from both groups were adequately captured in “fig. 2”.

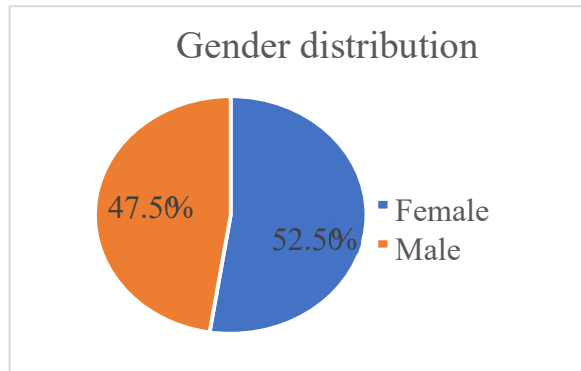


Figure 2: gender distribution

4.1.2 Age Distribution

In terms of age, the largest proportion of participants fell within the 31–45 age bracket (47.5%), reflecting the most economically active and socially engaged segment of the population, followed by those aged 18–30 (27.7%), whose views offered insight into emerging attitudes toward sustainability initiatives as shown in “fig. 3”.

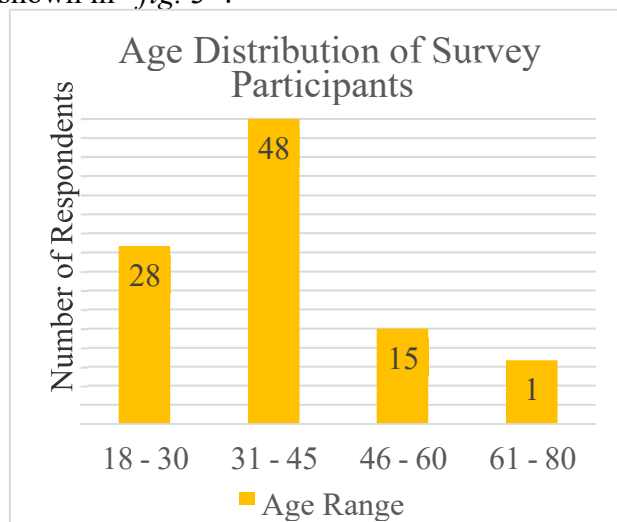


Figure 3: age distribution

Respondents aged 46–60 accounted for 14.8%, while those aged 60 and above constituted 9.9%, contributing valuable long-term experiential perspectives.

4.1.3 Marital Status

Marital status data indicated that 67.3% (n = 68) of respondents were married, 26.7% (n = 27) were single, and 5.9% (n = 6) were widowed or widowers, highlighting household structures that may influence resource access, decision-making, and participation in community-based carbon financing projects as shown in “fig. 4” below.

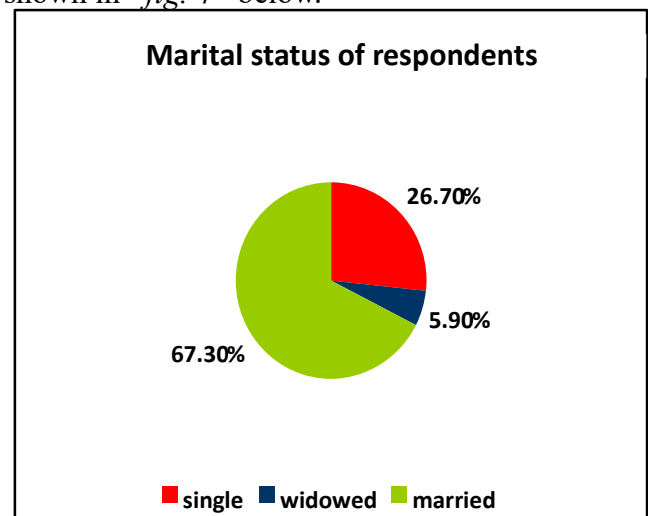


Figure 4: marital status

4.1.4 Educational level

Educational attainment levels showed that most respondents had completed secondary education (60.4%, n = 61), followed by 35.6% (n = 36) with tertiary education, while only 4.0% (n = 4) reported having no formal education as shown in “Table 1”.

Table 1: educational level of respondents

LEVEL	DESCRIPTION	COUNT	(%)
Level 1	Never been to school	4	4%

Level 2	Primary and secondary education (1 to 12)	61	60%
Level 3	Tertiary education	36	36%

This relatively high level of literacy and formal training suggests strong potential for informed engagement, effective participation in project activities, and leadership in environmental governance and sustainable development processes. NOTE: The following results are largely based on community perceptions and reported experiences, rather than direct measurement.

4.2 Environmental impacts of the LCFP

The findings show that an overwhelming majority of participants (98%) had observed notable environmental changes since the project's inception.

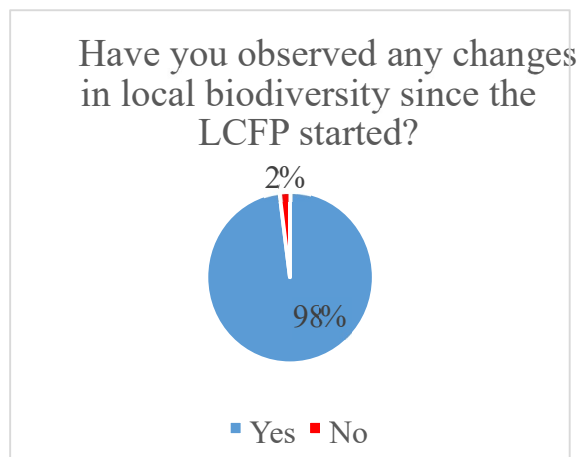


Figure 5: local biodiversity change since LCFP's inception

Respondents identified several positive outcomes, with the most frequently cited being increased forest cover (70%), habitat restoration and protection (70%), and the adoption of sustainable agricultural practices (70%). These improvements were complemented by the reappearance of wildlife (51%) and the resurgence of plant species (46%) in areas previously affected by biodiversity loss. Participants

also highlighted specific environmental benefits, including reduced deforestation (58%), decreased soil erosion (54%), and enhanced land management practices. Despite these gains, the results also revealed unintended negative consequences associated with the project. A total of 61.4% of respondents reported experiencing adverse environmental impacts, primarily increased human–wildlife conflict (62%), crop raiding (24%), and general conflicts (22%) linked to the resurgence of wildlife populations and the restoration of wildlife corridors. These challenges were attributed to animals reoccupying areas near human settlements and agricultural fields, particularly within expanding forested REDD+ zones. Additionally, 16% of respondents noted reduced access to natural resources such as firewood and non-timber forest products due to conservation restrictions. “Table 2” below provides a comprehensive overview of both the positive and negative environmental impacts of the LCFP as perceived by community members during the survey.

Table 2: environmental impacts of the LCFP

Environmental aspect	Frequency	%
Reappearance of wildlife	52	51%
Resurgence of plant species	46	46%
Increase in forest cover	71	70%
Habitat restoration and protection	71	70%
Reduced deforestation	59	58%
Decrease in soil erosion	55	54%
Sustainable agriculture	71	70%
Increase in human wildlife conflict	63	62%
Crop raiding	24	24%
Conflicts	22	22%
Reduced access to resources	16	16%

The survey also revealed strengthened community capacity in natural resource management, with 93.1% of respondents expressing confidence in their ability to manage resources independently, a development attributed to training and awareness initiatives

introduced through the project, while only 6.9% reported lacking such confidence.

4.3 Socio-economic benefits of the LCFP

The study also assessed its socio-economic benefits, which respondents widely acknowledged across multiple dimensions. “Table 3” below presents the community development initiatives identified by respondents as being supported by the Luangwa Community Forest Project (LCFP).

Table 3: community development initiatives supported by the LCFP

Community development initiative	Number of respondents	%
Schools	72	71%
Health clinics	23	23%
Employment	97	96%
Infrastructure development (Houses for scouts, shelters, CRB offices, etc)	22	22%
Livelihood projects (Bee keeping, Goat rearing, Poultry, Cooperatives, savings groups, etc)	75	74%
Boreholes	43	43%

Employment creation emerged as the most frequently cited benefit, reported by 96% of participants, reflecting both direct and indirect job opportunities through roles such as community scouts and positions under Bio-Carbon Partners. Additionally, 74% of respondents noted the introduction of livelihood initiatives, including beekeeping, poultry and goat rearing, cooperative development, and women’s savings groups, although 24.8% indicated that these activities were limited in scope and did not reach the entire community, and only 0.9% reported no income-generating opportunities at all. Infrastructure development was also highlighted, with school construction (71%) and borehole installation (43%) identified as key interventions that improved access to education and clean water, alongside support for health clinics (23%) and the construction of

community facilities such as scout houses, shelters, and CRB offices (22%). Overall, the socio-economic impact of the LCFP was viewed positively, with 75.2% of respondents strongly agreeing and 18.8% somewhat agreeing that the project had enhanced community well-being, while only 1% perceived its impact as negative as shown in “fig.6”.

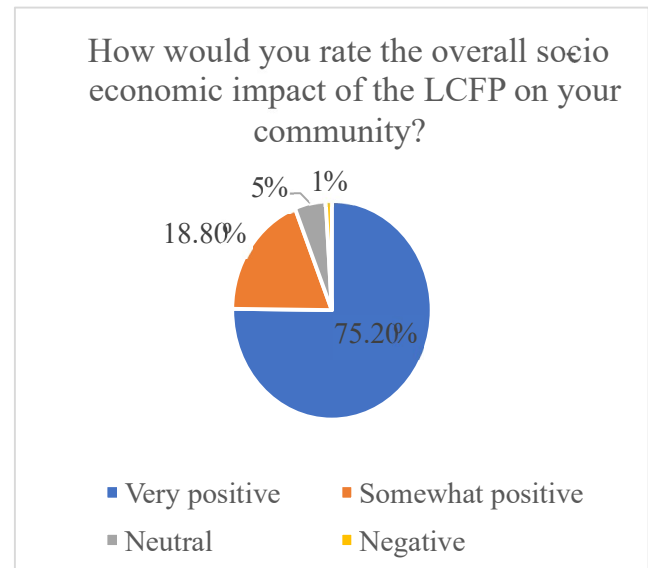


Figure 6: overall socio-economic impact of the LCFP

4.4 Level of community participation in benefit sharing within the LCFP

The study also assessed the level of community participation in benefit-sharing within the LCFP, revealing exceptionally high involvement in project-related decision-making. The figure below shows the level of community involvement in LCFP decision-making.

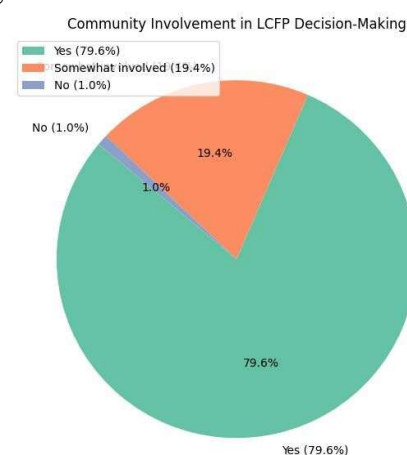


Figure 7: community involvement in the LCFP's decision-making

A total of 99% of respondents reported participating in these processes, with 79.6% indicating full involvement and 19.4% partial engagement, while only 1% had not participated at all. Awareness of project benefits was also strong, as most respondents strongly agreed that they were well informed, primarily through radio programs, Community Resource Board (CRB) meetings, and communication from traditional leaders. Regarding the fairness and transparency of benefit-sharing mechanisms, 68.3% of participants viewed the system as fair and transparent, whereas 14.9% believed it was not, and 16.8% were unsure.

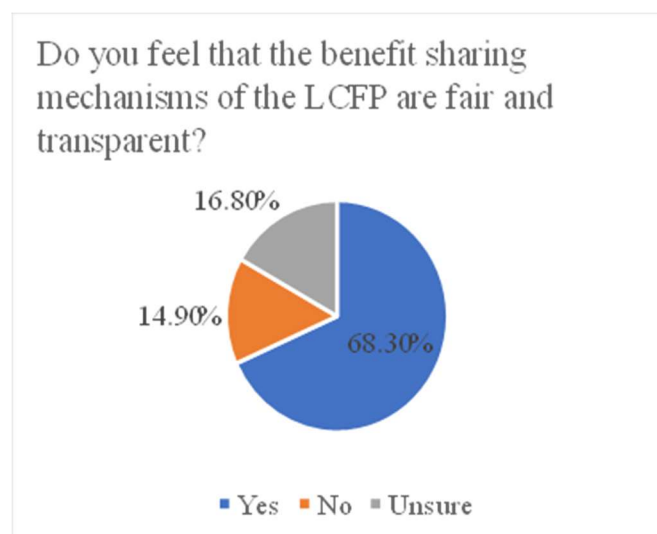


Figure 8: fairness and transparency in the LCFP benefit sharing

Those uncertain cited concerns such as favoritism, limited access to project information, and general

Table 4: challenges and opportunities influencing the LCFP's long-term sustainability

Challenges/Opportunities	No. respondents	%
Governance issues	86	86%
Community engagement challenges	15	15%
Funding inconsistencies	44	44%
Community dependency on forest resources	57	57%
Resistance from traditional leaders	47	47%
Land ownership disputes	43	43%
Traditional land use norms	21	21%

lack of awareness. Despite high participation and awareness levels, several challenges in accessing benefits were identified. The most frequently reported issue was the lengthy and complex procedures required, which many felt were overly bureaucratic and favoured individuals with higher literacy levels. Additional challenges included long distances to benefit-related infrastructure and interpersonal conflicts between villages, particularly where shared resources were involved.

4.5 Challenges and opportunities that affect the long-term sustainability of the LCFP

The study further examined the challenges and opportunities influencing the long-term sustainability of the LCFP. Governance emerged as the most significant challenge, identified by 85% of respondents, followed by funding inconsistencies (44%) and community engagement difficulties (15%). Additional barriers included continued community dependence on forest resources (56%), resistance from traditional leaders (47%), and land ownership disputes among chiefdoms (43%), all of which were compounded by traditional land-use norms (21%) that often conflict with conservation objectives. "Table 4" below provides a comprehensive overview of the perceived challenges and opportunities influencing the sustainability of the LCFP, as reported by community members and stakeholders during the survey.

Evolving environmental policies and reporting standards	5	5%
Volatile carbon offset markets	8	8%
Language barrier	15	15%
Youth involvement	43	43%
Expansion of livelihood projects	31	31%
Recognition of available ecological areas suitable for REDD+ implementation	27	27%
Growth of international carbon markets	22	22%

Training of more lead farmers	29	29%
Leveraging the global and national momentum toward green economy transitions	26	26%
Policy advocacy with government institutions	11	11%

Other concerns included evolving environmental policy requirements (5%), carbon market volatility (8%), and language barriers (15%). Despite these challenges, respondents highlighted several opportunities to strengthen sustainability, including increased youth involvement (43%), expansion of livelihood projects (31%), and the availability of ecological areas suitable for REDD+ activities (27%). Further opportunities included training more lead farmers (29%), growth in international carbon markets (22%), and alignment with national and global green-economy transitions (26%), while 11% pointed to policy advocacy as a means of enhancing institutional support. The findings also indicated moderate perceptions of stakeholder collaboration, with 55.4% affirming effective cooperation among communities, government, NGOs, and private actors, though 42.6% were uncertain and 2% perceived collaboration as weak. Additionally, 54% of respondents reported witnessing conflicts related to the project. Finally, 73.5% believed that a clear strategy exists to ensure long-term sustainability, while 26.5% were unsure, and several policies, particularly the Forestry Act No. 4 of 2015, Wildlife Act No. 14 of 2015, and traditional land rights laws were identified as hindering sustainability, whereas the Environmental Management Act No. 12 of 2011 and emerging green-economy policies were viewed as supportive.

5. DISCUSSION

Respondents perceived the LCFP as delivering substantial environmental and socio-economic benefits. Most (98%) reported improved forest conservation, biodiversity restoration, ecological resilience, wildlife recovery, and the return of threatened plant species. These outcomes were linked to participatory governance and CBNRM principles of local stewardship, decentralization, and

community ownership [17];[39]. This contrasts with evidence that carbon projects may marginalize local communities [37], suggesting that inclusive governance can reduce such risks.

However, 61.4% reported adverse effects, particularly wildlife encroachment and crop raiding, confirming that wildlife recovery can intensify human-wildlife conflict [5];[33]. These impacts threaten food security and community support for conservation, requiring adaptive management, integrated landscape planning, buffer zones, and early-warning systems [35];[41]. Socio-economically, the LCFP improved incomes and access to education, water, and health services, supporting environmental justice principles [42];[38]. Payments, infrastructure, and alternative livelihoods strengthened resilience and reflected successful REDD+ models [46];[34] and non-carbon safeguards [4]. However, 24.8% reported uneven benefits, suggesting elite capture and exclusion [14];[15]. Despite 99% participation consistent with participatory justice [42];[18] and CBNRM [17], community influence sometimes remained procedural rather than substantive [22];[14].

Chiefs, CRB meetings, and radio promoted awareness [24], but vulnerable groups remained less informed [19]. Governance concerns included weak institutions, unclear mandates, and limited accountability [27];[9], while forest dependence, resistance from traditional leaders, and insecure land tenure contributed to conflict and mistrust [7];[20]. Sustainable outcomes therefore require transparent benefit-sharing, meaningful participation, inclusive communication, and stronger institutional accountability. Volatile carbon markets and changing policy standards threaten sustainability, highlighting the need for diversified funding through public-private partnerships, green bonds, and ecosystem-service payments [1]. Although 55.4% viewed stakeholder collaboration positively, uncertainty (42.6%) and scepticism (2%) revealed persistent coordination and trust gaps. Land and resource conflicts require mediation and grievance mechanisms that strengthen participatory governance [35];[17].

Despite these risks, respondents identified youth engagement, ecological expansion, and livelihood

diversification as opportunities consistent with CBNRM and Africa's green-economy transition [50];[2]. Green enterprises could connect conservation with economic empowerment, but fragmented policies and weak institutional capacity remain barriers [10]. Harmonised legal frameworks and integrated climate governance are therefore necessary to connect national priorities with community needs [49];[45].

CONCLUSION

The study concludes that the Luangwa Community Forest Project is a viable model for sustainable carbon financing in rural Zambia when supported by strong governance, equitable benefit-sharing, and strategic partnerships. The project has advanced forest conservation, biodiversity recovery, and local stewardship through CBNRM, while generating income, employment, diversified livelihoods, and improved access to education, water, and health services. The reported 99% participation in decision-making and generally positive views of benefit-sharing further indicate strong community engagement, trust, and legitimacy. These findings are important because they show that well-designed carbon-financing initiatives can jointly support climate mitigation, ecological resilience, poverty reduction, and inclusive rural development, making the LCFP relevant to Zambia's climate goals and international REDD+ priorities.

However, procedural barriers, literacy-based exclusion, spatial inequalities, governance gaps, forest dependency, land-tenure disputes, and fragmented policies threaten long-term sustainability. Strengthening institutional capacity, clarifying mandates, and improving inclusive governance are therefore essential. Nevertheless, youth engagement, ecological expansion, and alignment with green-economy policies provide important opportunities for the LCFP's continued growth and resilience.

ACKNOWLEDGEMENTS

Firstly, I would love to thank Jehovah God for everything he has done in my life. This thesis has been successful due to the support I got from many people to whom I am highly indebted. My gratitude

and sincere appreciations to my parents, siblings and some of my relatives, for their support and encouragements throughout the length of my studies. I am grateful to my supervisor, Dr. Allan Tembo, whose unprecedented guidance and unwavering support enabled me to learn and accomplish this work. His calm but unrelenting advice was what I needed at each stage of this work. I am also highly indebted to Mr. Mwenya Silombe, my co-supervisor for his encouragement, guidance and support in making this thesis a success. My gratitude also goes to Mr. Sinkonde for his invaluable guidance on data analysis. Many appreciations to the Information and Communications University for giving me an opportunity to study at the institution and in particular the staff at the School of Engineering department of Agriculture and Environmental Sciences for being so helpful. Finally, my studies could not have been possible without the courtesy of the Zambia Development Centre for giving me this privilege to study at the university, I am so grateful.

REFERENCES

1. African Development Bank (2024) *Youth and Climate Action in Africa: Mobilizing the Next Generation*. Abidjan: AfDB.
2. Africa Carbon Markets Initiative (ACMI) (2024) *Unlocking Africa's Carbon Market Potential*. Available at: <https://www.africacarbonmarketsinitiative.org> (Accessed: 3 October 2025).
3. Baker, J., D. M. M. & M. A. (2018). Challenges in the Implementation of Carbon Financing Mechanisms: A Review of the Literature. *Environmental Science & Policy*, 89, 1-10.
4. Bayrak, M.M. and Marafa, L.M., 2016. Ten years of REDD+: A critical review of the impact of REDD+ on forest-dependent communities. *Sustainability*, 8(7), p.620.
5. Blom, B., Sunderland, T. and Murdiyarso, D. (2010) 'Getting REDD to work locally: Lessons learned from integrated conservation and development projects', *Environmental Science & Policy*, 13(2), pp. 164–172.
6. Brundtland Commission (World Commission on Environment and Development) (1987).

- Our Common Future*. Oxford University Press, Oxford.
7. Carbon Market Watch (2024) *Ensuring Integrity in Voluntary Carbon Markets: A Civil Society Perspective*. Brussels: Carbon Market Watch.
 8. CCB Standards. (2020). Core Carbon Principles. Available at: <https://www.climatecommunity.org/> (Accessed 24 May 2025)
 9. Chhatre, A. and Agrawal, A. (2009) 'Tradeoffs and synergies between carbon storage and livelihood benefits from forest commons', *Proceedings of the National Academy of Sciences*, 106(42), pp. 17667–17670.
 10. Chileshe, A. (2022) *Customary Land Governance in Zambia: Challenges and Opportunities for Reform*. Lusaka: Zambia Land Alliance
 - Chianca, L. (2023). The Luangwa Community Forests Project, Zambia. Available at: <https://reddmonitor.substack.com/p/theluangwa-community-forests-project>. (Accessed: 26 May 2025)
 11. Chomba, S.W., et al. (2016). 'The role of REDD+ in forest conservation in Zambia: A case study of the Luangwa Valley', *Forest Policy and Economics*, 68, pp. 1-10.
 12. Conservation International, 2014. Social and environmental benefits of REDD+ projects: Cancun and non-carbon benefits. Available at: <https://www.conservation.org> (Accessed: 12 April 2025).
 13. Corbera, E., 2012. Problematizing REDD+ as an experiment in payments for ecosystem services. *Current Opinion in Environmental Sustainability*, 4(6), pp.612–619.
 14. Costenbader, J., 2009. Benefit sharing. In: J. Costenbader, ed. *Legal frameworks for REDD – design and implementation at the national level*. Gland: International Union for Conservation of Nature, pp.57–80.
 15. Diallo, M. and Kumar, R. (2024) *Equity and Inclusion in Carbon Financing: Lessons from Sub-Saharan Africa*. Nairobi: UNDP Africa.
 16. Duchelle, A.E., Simonet, G., Sunderlin, W.D. & Wunder, S. (2017). What is REDD+ achieving on the ground? Current state of REDD+ implementation. *Forest Carbon Partnership Facility Technical Report*, World Bank.
 17. Fabricius, C., Koch, E., Magome, H. and Turner, S. (2004) *Rights, Resources and Rural Development: Community-Based Natural Resource Management in Southern Africa*. London: Earthscan.
 18. Figueroa, R.M., 2003. Bivalent environmental justice and the culture of poverty. In: J. Agyeman, R.D. Bullard and B. Evans, eds. *Just sustainabilities: Development in an unequal world*. Cambridge, MA: MIT Press, pp.211–224.
 19. FSD Africa (2024) *Climate Finance in Africa: Trends, Gaps and Opportunities*. Nairobi: FSD Africa.
 20. Geneva Policy Outlook (2024) *PeacePositive Climate Action: Integrating Conflict Sensitivity into Carbon Projects*. Geneva: Geneva Centre for Security Policy.
 21. Griscom, B.W., et al. (2017). 'Natural Climate solutions', proceedings of the National Academy of Sciences, 114(44), pp. 11645–11650.
 22. Griffiths, T., 2008. Seeing 'REDD'? Forests, climate change mitigation and the rights of Indigenous Peoples and local communities. Moreton-in-Marsh: Forest Peoples Programme.
 23. Hamilton, K., Sjardin, M., Marcello, T. & Xu, G. (2010). Building a Market for Carbon: The Role of the Voluntary Carbon Market. Ecosystem Marketplace.
 24. Integrity Council for the Voluntary Carbon Market (ICVCM) (2024) *Core Carbon Principles and Assessment Framework*. Available at: <https://icvcm.org> (Accessed: 2 October 2025).
 25. Karanja, F., et al. (2017). 'The Kasigau Corridor REDD+ Project: A Case Study of Community Engagement', *Environmental Science & Policy*, 77, pp. 1-10.
 26. Kindermann, G., Obersteiner, M., Sohngen,

- B., Sathaye, J., Andrasko, K., Rametsteiner, E., Schlamadinger, B., Wunder, S. & Beach, R., 2008. Global cost estimates of reducing carbon emissions through avoided deforestation. *Proceedings of the National Academy of Sciences*, 105(30), pp. 10302-10307.
27. Larson, A.M. and Petkova, E. (2011) 'An introduction to forest governance, people and REDD+ in Latin America: Obstacles and opportunities', *Forest Policy and Economics*, 18(1), pp. 2–6.
28. Mwape, K., Tembo, G., & Chileshe, J., 2018. Community forestry and carbon financing in Zambia: Opportunities and challenges. *Journal of Sustainable Forestry*, 37(5), pp. 456-472.
29. Mbewe, S., et al. (2019). 'Socio-economic impacts of carbon financing in Zambia', *Zambian Journal of Forestry*, 34(2), pp. 4560.
30. Michaelowa, A. & Purohit, P., 2007. Additionality determination of Indian CDM projects: Can Indian CDM project developers outwit the CDM Executive Board? *Climate Policy*, 7(5), pp. 444-460.
31. Murray, B. C., Sohngen, B. & Ross, A. (2014). Bioenergy and Land Use Change: A Review of the Literature. *Environmental Research Letters*, 9(11), 1-10.
32. Nepstad, D.C., et al. (2014). 'Slowing Amazon deforestation through public policy and interventions', *Proceedings of the National Academy of Sciences*, 111(24), pp. 8836-8841.
33. Nyirenda, V.R., Chansa, W. & Myburgh, W. (2021). Human-wildlife conflict patterns and mitigation in protected areas of Zambia. *Journal of Environmental Management*, 287, 112–123.
34. Okonjo, C. and Mensah, J. (2023) *Carbon Credit Projects and Community Benefits in East Africa*. Nairobi: African Centre for Climate Policy.
35. Ostrom, E. (2009) *Understanding Institutional Diversity*. Princeton: Princeton University Press.
36. Peters, C. M., Baker, J. & M. A. (2016). Equity and Carbon Financing: The Role of Local Communities in Climate Change Mitigation. *Climate Policy*, 16(3), 1-15.
37. Phelps, J., Webb, E. L., & Agrawal, A. (2010). Reducing emissions from deforestation and forest degradation (REDD): Lessons from the global South. *Global Environmental Change*, 20(1), 283– 292.
38. Rawls, J. (1971). *A Theory of Justice*. Harvard University Press, Cambridge, MA.
39. Ribot, J.C., Agrawal, A. & Larson, A.M. (2006). Recentralizing while decentralizing: how national governments reappropriate forest resources. *World Development*, 34(11), 1864–1886.
40. Roe, D., Walpole, M., & Nelson, F. (2020). The business case for community-based conservation: A critical review. *Environmental Conservation*, 47(2), 133–140. Available at: <https://doi.org/10.1017/S037689291900057X> (Accessed 17 July 2025)
41. Sayer, J., Sunderland, T., Ghazoul, J., et al. (2013) 'Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses', *Proceedings of the National Academy of Sciences*, 110(21), pp. 8349–8356.
42. Schlosberg, D. (2007). *Defining Environmental Justice: Theories, Movements, and Nature*. New York: Oxford University Press.
43. UNFCCC (2021) *Zambia's National REDD+ Strategy and Implementation Framework*. Bonn: UNFCCC.
44. United Nations Framework Convention on Climate Change (UNFCCC) (1992). United Nations Framework Convention on Climate Change. Available at: <https://unfccc.int/resource/docs/convkp/conveng.pdf> (Accessed 4 October 2025)
45. UN-REDD Programme (2021) *CommunityBased REDD+ (CBR+) Implementation Guide*. Geneva: UN-REDD.

46. Wildlife Works (2024) *Kasigau Corridor REDD+ Project: Impact Report*. Voi: Wildlife Works Carbon.
47. World Bank (2016). *State and Trends of Carbon Pricing 2016*. Washington, DC: World Bank.
48. World Bank. (2020). *Carbon Finance: A New Opportunity for Sustainable Development*. World Bank Publications.
49. ZambiaLII (2015) *The Forests Act No. 4 of 2015*. Available at: <https://zambialii.org> (Accessed: 1 October 2025).
50. ZeroCircle (2024) *Hongera Carbon Project: Community Impact and Ecological Assessment*. Nairobi: DGB Group.
51. Zhang, Y., et al. (2020). 'The impact of green finance on carbon emissions: Evidence from China', *journal of cleaner production*, 258, 120123.