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Research Article

“Saving the Forest” with a REDD+ Project: Socio-Ecological Repercussions on Indigenous People in Cambodia

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With the ecological threat associated with climate change and biodiversity loss, the push to expand green zones with minimal human presence is gaining momentum, especially in the Global South. In line with this worldwide trend, the Kingdom of Cambodia has embarked on a long-term strategy for carbon neutrality, aiming to achieve zero emissions by 2050, making it the first in ASEAN to submit such a vision. Protecting the forest is the present-day motto. Beyond this mainstream rhetoric, this article delves into the survival realities of the indigenous people involved in Cambodia's conservation projects. The anthropological research intends to reveal the fate of the villages (human rights, access to land and natural resources, sovereignty) living in and around a conservation area. We examine the case of the transnational organisation Wildlife Conservation Society engaged in a Reducing Emissions from Deforestation and Forest Degradation (REDD+) program in a territory traditionally inhabited by the ethnic Bunong people. The findings provide significant insights, frequently neglected, into the challenges associated with the will to “save the forest”, with an extremely limited participation of the local population.

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Acronyms

- ASEAN Association of Southeast Asian Nations
- CPA Community Protected Area
- ELC Economic Land Concession
- FPIC Free, Prior and Informed Consent
- KWS Keo Semia Wildlife Sanctuary
- MoE Ministry of Environment
- NGO Non-Governmental Organisation
- PA Protected Area
- PACT Pathways Alliance for Change and Transformation
- REDD+ Reducing Emissions from Deforestation and Forest Degradation
- WCS Wildlife Conservation Society

Introduction

Despite being one of the least developed countries globally, Cambodia has been prioritizing for more than a decade the reduction of greenhouse gas emissions, mostly through programs aimed at Reducing Emissions from Deforestation and Forest Degradation (REDD+), combined with sustainable forest management, conservation, and enhancement of forest carbon stocks. The implementation of such projects is considered an essential part of global efforts to mitigate climate change. It relies on the scientific fact that forests play a fundamental role in mitigating climate change by removing CO₂ from the atmosphere and storing it in biomass and soils^[1]. This also means that when forests are cut down or degraded, they become a source of greenhouse gas emissions by releasing stored carbon^[2]. In order to avoid this ecological threat, a REDD+ project aims to prevent a forested zone from being cut^[3]. And for maintaining the forest intact, a 'compensation' is theoretically proposed to the people living in the REDD+ area, as is the case with WCS, which is in charge of executing a REDD+ project approved by the Cambodian Ministry of Environment for more than fifteen years.

According to national authorities, the decision to maintain or increase forest cover is deemed economically beneficial, presenting the country with an opportunity to restore its ecological image and capitalize on environmental conservation^[4]. Despite a history of high deforestation rates over the past two decades^{[5][6]}, the government now seeks to portray itself as a champion of forest preservation, aligning its development policy with the principles of the green economy^[7].

Green rhetoric dominates Cambodia's strategy, with an emphasis on forest preservation to achieve carbon neutrality. Major transnational conservation organizations, including the Wildlife Conservation Society, the World Wide Fund for Nature, Conservation International, Fauna & Flora International, the International Union for Conservation of Nature, and the Wildlife Alliance, are expected to play a pivotal role in implementing projects on the ground. The focus on carbon offsetting, seen as a lucrative opportunity, involves selling stored carbon on the international market. ^[8] have already warned that this major approach to emissions mitigation may interrupt a promising trend toward decentralized forest management. The anthropologists ^[9] have shown how such a centralized process, concomitant with increasing bureaucratic violence, is going on in the Kingdom of Cambodia. Moreover, the evident bias, risks, and dangers often depicted in the scientific literature associated with these so-called nature-based solutions are not envisaged in the country as they have been carefully examined elsewhere^{[10][11][12][13]}. Most controversial from an anthropological point of view is apparently the potential of carbon thus to be a universal yardstick for value by commensurating moral spheres of human action like the environment, the economy, development, etc., that some people, like indigenous groups, regard as distinct^[14].

Nevertheless, the development of REDD+ programs is characterized by recurring partial justifications emanating from the government and conservationists. For instance, it is claimed that the main reason to implement REDD+ projects is based on the assertion that they contribute to reducing carbon emissions, preserving the ozone layer, and mitigating global climate change. However, both national grey literature and conservation reports fail to emphasize that REDD+

programs can be seen as rights to pollute that benefit energy-intensive companies. These major multinational enterprises, responsible for a significant portion of CO₂ emissions, can buy carbon credits for continuing their polluting activities, therefore enabling them to carry on their business as usual, under the guise of supporting forest conservation somewhere in the South.

The main purpose of this paper is to question what happens to the people living inside or at the edge of a protected area (Keo Semia Wildlife Sanctuary: KSWS) when a REDD+ project is implemented. How has the project been proposed to them? Do they feel confident? What is going on once accepted? What kind of interaction is prevailing between villagers and the NGO staff at work with the Provincial Department of Environment? And, last but not least, are the rights of the indigenous peoples respected? Under which conditions? These topics, questioning the modalities of access of indigenous peoples to natural protected areas (PAs) where the REDD+ is taking place, deserve to be paid attention to because, and this is our hypothesis, fundamental indicators associated with human rights and indigenous sovereignty are little respected, and even on certain occasions outright flouted, by some international conservation NGOs and the national authorities supervising them.

Methodology

A case study of a long-term established international Non-Governmental Organization (NGO) in the Kingdom is chosen to assess ongoing socio-economic and ecological mechanisms driven by conservation practices. The aim is to examine the subsequent implications of these mechanisms on the quality of life – sovereignty, rights – of an indigenous population in a given territory under the conservation NGO's jurisdiction. We focus on a REDD+ program approved by the government, allowing the Wildlife Conservation Society (WCS) to be in charge of running it for more than a decade in Monduliri province, the northeast part of the country.

Our research intends to look behind the scenes, using field ethnographic surveys carried out between November 2022 and April 2023. We examine the fate of the indigenous people living in and around a conservation area, namely the Bunong people. Updated information has been gathered directly and by distance with key informants from some communities in November and December 2023. Extensive knowledge of the Indigenous Bunong can be found in the writings of the anthropologist ^{[15][16]}.

Nine villages, predominantly inhabited by ethnic Bunong, have been surveyed, out of twenty-two involved in the REDD+ project. A multisite ethnography focusing on a chain of actors (capitalizing on around 100 interviews) ranging from village communities (adolescents, women, men, elders, village chiefs, REDD+ committee members...) to conservation protagonists (field staff, translators, consultants, evaluators, rangers, Ministry of Environment (MoE) employees) reviews the ways an indigenous population residing in REDD+ zones is solicited and responds to a territorial preservation operation. A Cambodian research assistant accompanied us and collected complementary information. Observation and a participative approach were possible by staying in the villages and daily interacting with some families. Informants were selected either randomly or thanks to some privileged contacts previously established before the study. Particular attention was paid to respecting the sociological principle of symmetry by interviewing villagers sympathetic to the REDD+ and some more mitigated towards this project. This leads us to decipher some of the general

conditions under which such a REDD+ program keeps going on, and how people react to it, either collectively or individually.

Confidentiality and anonymity are scrupulously respected. The names of the interviewed persons as well as the locations of the interviews are not mentioned to preserve integrity.

Findings and Discussions

The data, extracted from personal narratives, obtained through informal conversation and semi-guided interviews, and reinforced by a systematic review of the literature (when available, historically and locally), have been clustered, described, structured, and compartmentalized with the following themes that emerged from the practical experiences of the villagers with regards to their perceived situation and ongoing destiny. Results are summarized as follows:

Theme 1: Disreputable legacy of forest protection

- Cambodia's attempts at sustainable forest management in the 1990s were initially considered a failure by donors (Asian Development Bank, World Bank group...). Most forest land was granted as logging concessions to foreign companies, leading to widespread deforestation and corruption^[5];
- Economic Land Concessions (ELCs) granted to large-scale industrial plantations became a tool for land grabbing, posing a significant threat to natural resources and displacing indigenous populations^[17];
- The government's failure to enforce the Land Law ratified in 2001 and the refusal to recognize customary rights have contributed to social and environmental injustices^[18];
- All these past drawbacks, recurrently known in the Kingdom including to many Bunong individuals we interviewed, entertain a certain skepticism towards new national directives that can be manipulated and profitable for some privileged persons and companies, but detrimental to the majority of the peasants depending on the forest.

Theme 2: Current deforestation crisis still going on

- Despite international development efforts and the alleged national commitment to the green economy, large-scale deforestation persists. A careful estimate calculated by the ecological department of Copenhagen University reveals that around 1.5 million acres, or 12%, of the Kingdom's PA forest cover was lost between 2011 and 2018.
- Two Economic Land Concessions (ELCs), granted by the government within the KSWP Protected Area (PA), have led to severe impacts on biological and social diversity, with indigenous Bunong villagers facing threats and dispossession^{[19][20]};
- The lack of management plans and insufficiently demarcated zones within the KSWP has facilitated land grabs and deforestation by migrant populations^[21] from the lowlands who are frequently encouraged by high-ranking Khmer personalities.

Theme 3: Institutional consensus and corporate nature

- Interviews with officials, local authorities, and conservationists highlight an institutional consensus behind REDD+ that extends beyond Cambodia's

borders, with international actors involved. It leads to a corporate nature^[22] elaborating, supervising, monitoring, and evaluating the REDD+ feasibility and its whole process;

- Complicity and sometimes corruption are noted, with the conservation NGO, national/local authorities, and external agencies (audit, consultants, brokers, carbon certifiers...) suspected of exaggeratedly gratifying and flattering the REDD+, therefore prioritizing their agenda over ethical considerations. For example, it suffices to have a look at one of the evaluation reports for WCS, whose field expertise leaves one stunned^[23]. Another illustration is the complacency of the Cambodian carbon creditor Verra, a nonprofit organization that operates standards in environmental and social markets – Verra is also the world's leading carbon crediting program – whose calculations and integrity have been seriously put into question by numerous scientists^{[24][25]}

Theme 4: Resource management as a power struggle

- Resource management is not a technical issue that can be tackled by conventional forestry or land-use planning methodologies, despite the conservation NGO's attempts to regularize it. It must be portrayed as a question of power, relationships, and money, resulting in various forms of social and environmental injustice;
- Power struggles often involve forest-dependent Bunong rural communities pitted against companies colluding with the central government and foreign investors;
- Indigenous communities and activists opposing land grabs and deforestation face intimidation, arrests, and pressure (as has been observed within the Bunong community, some women were, and are still, forced to appear regularly in court because they 'dare' to challenge the authorities; elsewhere, villagers are trying in vain to prevent outsiders from illegally cutting trees in their territories). The conservation NGO keeps silent on that issue, arguing "they cannot interfere in criminal cases";
- Neither investors nor the wealthy owners recognized as land grabbers have ever been put on trial, even when openly denounced by the conservation NGO.

Theme 5: Top-down conservation practices and disregard for vernacular knowledge

- Indigenous peoples have a rich history of managing their environment. They view themselves as an integral part of nature. Their traditional knowledge, which is changing and adapting, is disregarded by the conservation NGO acting under the auspices of "real" science. Such a claim has already been denounced, for instance, by ^[26] in Brazil, where native peoples, by virtue of their low numbers and cultural, social, and political differences – as well as being marginalized by a system that officially considers them 'relatively incapable' – are markedly disadvantaged;
- There is a perceived disdain for cultural awareness and understanding. The recurring theme of the authoritarian biologist and the arrogance of anti-humanism wildlife conservation in the Third World, previously depicted by ^[27], is still ongoing. Except for a very few WCS members more open to people's ontology and cosmology, the NGO prefers to impose the dogma of

Western ecological science^[28]. Staff members are citing convenience and a desire to maintain credibility with donors and national authorities by relying on a “pure” scientific discipline. Moreover, WCS imposes its own ideology and policy, pretending to ‘have no time’ to learn about alternative ways of indigenous people’s world vision and conservation practices;

- Village elders deplore WCS for not recognizing local botanical knowledge and not reviving the vernacular understanding of plants, as has been successfully done elsewhere in the country^[29]. Similarly, the call to record myths, customary rights, and ancestral practices liable to appreciate indigenous cultures is not taken into consideration by conservationists;
- In spite of their claim to work with local people, conservation efforts are more focused on creating a model based on a “conservation fortress.” Not without people, as has been historically done in Africa^[30], but with minimal human involvement;
- Community Protected Areas (CPAs), where villagers are allowed to enter, provide very limited livelihood opportunities due to strict regulations and decisions made at the Ministry of Environment level. Inadequate provincial directives (the forest is no longer considered a convenient place for the people), aggravated by incessant controls by eco-mercenaries, fail to deliver expected socio-economic revenues and sufficient non-timber forest products to local communities.

Theme 6: Protected Area opening the door to REDD+ implementation

- The proliferation of PAs reaches about 40% of the Cambodian territory. In Monduliri province, previously dominantly inhabited by indigenous populations, those living in and around the REDD+ are concerned about the possible use and the unclear rights they may have within this huge protected area (290,000 hectares). Discussions and observations on what happens on the ground show that political commitments and coherent visions are lacking. Corruption and competing interests prevail, from the provincial level to the commune and village levels, with the intrusion of private players;
- A part of the protected area, formerly characterized as a ‘paper’ park and under the jurisdiction of WCS, was granted by the government a decade ago to some Vietnamese companies. The absence of any reaction from WCS against this “official” land grabbing reveals, at least for the affected villagers, a patent contradiction between the ideology and practice of the conservation NGO;
- The delimitation and categorization of PAs lack clarity. A legal system exists with unequal treatment. Laws are strict for small forest peasants (“damn on them” if they are caught doing “illicit” practices) but may be softened for corporate elites with social capital and political allegiance;
- Sub-decrees signed by the Prime Minister, in total absence of people’s consultation, facilitate the privatization of state-owned land within conservation areas, always benefiting politically connected companies and investors;
- Government officials and their associates take advantage of deregulated atmospheres, characterized by multifaceted decrees, to manipulate laws for personal gain. A sub-decree of November 30, 2022, allowing some PAs to be returned to the people, is cited as an example by indigenous leaders because it can allow well-placed individuals to have the monopoly of access to a declassified part of the KSWP Protected Area.

Theme 7: From authoritative to paternalistic attitudes

- Conservationists are having paternalistic attitudes toward indigenous peoples, and they consider their knowledge as outdated, if not irrelevant. They need to be “re-educated”;
- Forest dwellers are not perceived as partners worthy of being listened to. Their life conditions and cultural patterns are generally ignored by the WCS. This leads to a lack of conciliation, exchange, and debate;
- The free, prior, and informed consent (FPIC) is a prerequisite for implementing REDD+ in an affected territorial village. In reality, it is often distorted, neither truly prior nor free. Pre-agreements between carbon buyers and sellers are already in progress before the compulsory village consultations. The so-called consultation with villagers is rather a straightforward attempt to convince;
- Due to important political and economic challenges associated with REDD+, the FPIC process leaves no room for negotiation. Some initially reluctant villages have faced pressure from local authorities and MoE agents, discouraging them from refusing the REDD+ proposal;
- While other NGOs in Cambodia face initial difficulties in getting their REDD+ projects accepted due to distrustful villagers, therefore adopting coercive tactics that include threats of government aid withdrawal, project halting, and increased penalties for forest activities, WCS adopts a more meritorious approach. It emphasizes the *evasive* role of communities as “forest guardians” and highlights global attention on their actions: “the world is waiting for your contribution”. Furthermore, “Avoiding climate change,” “saving the planet,” and “the emergency of subscribing to REDD+ for the benefit of the world community” are used as persuasive arguments.

Theme 8: A compensation rather than a right, associated with narrow development activities

- Financial compensations are promised to offset additional subsistence costs resulting from conservation restrictions. Noticeably, they are offered as a “reward,” not as a right;
- The recommendation of the United Nations report^[31], written by experts who evaluated more than 300 worldwide studies in the past 20 years, concluding that deforestation rates are significantly lower in areas where indigenous peoples live and bear responsibility for their forests, is not taken into account. If it were, safeguarding and strengthening the rights of indigenous peoples rather than elusive ‘compensations’ would therefore be vital to preserving forests and biodiversity and fighting climate change;
- Villages have limited autonomy in proposing development activities; they must justify acceptable activities to WCS;
- Development activities include the construction of public buildings, road maintenance, solar infrastructure, water supply systems, education, healthcare services, and vocational training for minor occupations (moto repair, hair salon...);
- The promised economic benefits are critiqued for being modest compared to the funds captured by relevant ministries (the MoE receives 20% for each carbon sale) and the conservation agency;
- Bunong men and women confess a reluctance to propose forms of improvement associated with their own ontology and cosmology, fearing

NGOs' dismissal of their practices and beliefs that can be considered as 'primitive' and 'superstitious'^[28];

- The NGO retains the right to allocate funds based on village performance, assessed annually in line with REDD+ objectives (maintenance of forest cover...)

Theme 9: Limited participation

- Once launched, the REDD+ project proceeds with minimal cooperation with the majority of villagers, now ordered not to cut any trees for whatever purposes, even for domestic use;
- WCS establishes REDD+ committees in each village. They are supposed to act as intermediaries between the organization and the community. Organizing forest patrols is their main duty. The majority of the population faces skepticism about their efficacy. Concerns about potential conflicts of interest within the REDD+ committees prevail. It is suspected that committee members and their families are the main beneficiaries of the REDD+ project;
- Questionable committee practices have been portrayed by common villagers. For instance, some committee leaders are suspected of prioritizing their personal interests, such as securing money from the REDD+ disbursement they received. For instance, by appointing relatives of co-opted persons in the remunerated work (patrol, meeting attendance, per diem allowances...). The perpetuation of these committees is therefore associated with inter- and intra-village rivalries.

Theme 10: REDD+, human rights, and cultural sovereignty

- Villagers, frequently deprived of land turned into PAs, can no longer engage in traditional livelihoods like farming, hunting, and fishing. Only collecting (resin from trees, plants...) is allowed under certain conditions and when it is still possible, as is the case for the resin trees^[21];
- Conservationists are reproached by villagers for restricting subsistence practices through rangers' disciplinary controls and the Ministry of the Environment's inspections;
- REDD+ projects discourage villagers from engaging with the forest biotope. Human beings are expected to be separated from nature;
- Villagers, especially indigenous peoples, experience a two-tiered regime. They are prohibited from cutting down even a tree for basic needs, while they are aware that connected investors and private bodies engage in vast deforestation ventures with impunity;
- A case of human rights violation was presented to us when a young man was arrested, abused, and imprisoned for four months for alleged attempts to cut grass on land close to the core PA. The case illustrates, for the Bunong, a disproportionate response accentuated by a denial of justice (see: ^[32]);
- This story intensifies the fears of other villagers who worry about similar arbitrary arrests without clear justifications. Therefore, some families keep a low profile, suspending agricultural work due to fear and uncertainty;
- Villagers encounter legal challenges, threats, and difficulties in seeking justice, with authorities dismissing attempts to intervene;
- Environmental officers use threats and verbal abuse against villagers and their associates (lawyers, journalists, human rights defenders) attempting to inquire about litigation cases (information provided on condition of anonymity by an indigenous jurist and a reporter);

- Unpredictability generates legal challenges and environmental injustice. Unexpected events are prone to occur whenever a top-down decision is made without concertation.

Based on these findings briefly exposed, one may wonder whether it is an “opportunity” for the indigenous population to be part of the REDD+ program. Initially, when they were requested to accept the REDD+ program, many of them welcomed the idea, believing the conservation NGO would help them prevent the incessant immigration of the lowland Khmer into their territory. But it did not happen. Newcomers continued arriving, and the original inhabitants had to face new deprivations when the REDD+ was implemented. A deprivation that took the form of dispossession because their living territory started to shrink and the size of their land for cultivating had to be reduced or could not be extended as before. Moreover, most of the activities associated with the forest are discouraged by WCS. Such an artificial separation reinforces the Cartesian “great divide” between nature and society^[33], contrary to the indigenous vision seeking unity with nature.

In turn, each Bunong village can access, but on certain conditions strictly evaluated by the conservation NGO, development activities whose main purpose is nonetheless to keep men and women away from the forest. Development packages linked with education and public health are not contested by anybody, provided they last forever. Other “tolerable” activities are criticized by some residents, questioning, for instance, the utility of constructing an expensive committee house for REDD+ meetings. Others wonder whether their quality of life will improve with concrete buildings replacing the timber previously available for all families. Besides, vocational training does not attract many adolescents who do not feel the need, nor the willingness, to learn something they already know (motorcycle repair, cooking, tailoring, etc.).

Various features highlight the condescending attitude of a conservation NGO. In line with the government, WCS contributes to assimilating indigenous Bunong and pushing them into a market-oriented society. Their participation has not taken the form of sincere collaboration. Up to now, as it has been synthesized elsewhere^[34], conservation - or more precisely neoliberal conservation - associated with community-based management is a myth. The potential contribution of indigenous knowledge in forest preservation is largely undermined. Nothing is expected from them besides preventing wood logging in their village circumscription. And to remain unobtrusive and uncritical.

In sum, contrary to the mainstream propaganda, the overall situation that has been scrutinized here points toward a bleak future for indigenous populations under REDD+, with legal challenges, restricted freedom, increased administrative responsibilities, human rights violations, denial of sovereignty, and non-existent environmental justice.

Such a statement does not intend to be generalized. It remains valid only while considering the proposed case study. Quite a few other research studies using different methods have tried to assess the impact of the REDD+ projects on peoples' lives. They have been conducted in other parts of the world with various interpretations, sometimes positive^{[35][36]}, sometimes mitigated^{[37][38]}.

In the meantime, *the Pathways Alliance for Change and Transformation (PACT)*, a coalition of Indigenous, community, and non-profit organizations, published a paper in September 2023 calling for a moratorium on the forest carbon trade out of concern for the rights of Indigenous peoples and local communities^[39]. PACT says a pause in

selling carbon credits is needed until protections for the land rights of these communities are laid out “explicitly, proactively, and comprehensively.”

Conclusion

National estimations, covered by the unquestioning media, are disingenuously unanimous: REDD+ projects are a success; other contracts need to be prepared, populations have to be mobilized, and carbon buyers need to be found. Put simply, everything is fine.

But of all these self-proclaimed successes of ‘voluntary carbon market operations’ (see: ^[40]), which are above all juicy strategies initiated by the authorities in complicity with conservation NGOs to capture external funding, nothing is said about these carbon markets, gangrenous on all sides^{[41][42]}, and whose failure to prevent climate change has been demonstrated elsewhere^{[40][43]}. Such an orchestrated operation like REDD+ is all for the benefit of the extractive industries and other polluting companies, legally allowed to continue their poisoning activities by “saving a forest” in the South, thus diluting effective climate action. ^[44] have clearly demonstrated that carbon offsets allow companies and governments to outsource emission reductions to third parties. In that respect, they may have played a prominent role in many climate mitigation policies to date. But in order to support temperature stabilization under the Paris Agreement, nearly everything about them must change^[44].

Moreover, carbon credits, for which various scrupulous reporters/investigators collaborating with scientists have expressed serious reservations with regards to the probity of these certifications¹, are certified in exchange for a forest that has to be preserved from any human intervention. Consequently, governments’ efforts are aimed at diverting local populations from exploiting natural resources, without questioning whether or not their traditional management methods can contribute to the maintenance of the forests. The ways of indigenous people have to be eliminated.

Apart from receiving significant economic gains, the Cambodian MoE policy is now willing to encourage more conservation projects whose missions will be to reduce access to ancestral lands and forests for indigenous people who once upon a time had the usufruct. This is the open door to the perpetuation, if not a reinforcement, of green colonialism.

Footnotes

¹ A joint investigation by the Guardian newspaper, the German weekly Die Zeit, and SourceMaterial revealed in January 2024 that the vast majority of rainforest offset credits from the leading certifier (Verra), which are sold to companies that then use them to make claims about their overall emissions, do not offer the environmental benefit that they claim^[45].

Ethics Statement

Informed consent, but not written, insofar as most interviewees could not read, for participation was obtained from all participants involved in this study. Participants were orally informed about the study’s purpose, procedures, potential risks and benefits, confidentiality measures, and their right to withdraw at any time without penalty. Given the sensitive nature of the research

and the vulnerability of the study population, particular care was taken to ensure comprehension and voluntariness during the consent process. Anonymity and confidentiality of participants have been maintained throughout the research process and in this publication.

Data Availability Statement

The datasets generated and analyzed during the current study primarily consist of qualitative interview transcripts and field notes. Due to the sensitive nature of the information shared by participants and the ethical commitments made to ensure their anonymity and confidentiality, the raw data are not publicly available. Anonymized excerpts relevant to the findings are included within the article. Further inquiries regarding the data can be directed to the corresponding author, subject to ethical considerations and participant privacy.

Author Contributions

Frédéric Bourdier conceptualized the study, conducted the fieldwork and data collection, analyzed the data, and wrote the manuscript.

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