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Carbon offsetting and agroecological transition: towards the emergence of a short carbon supply chain

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Introduction

Voluntary carbon offsetting, which consists of companies financing projects that store carbon or reduce greenhouse gas emissions for others, has been developing rapidly since the second millennium. Many companies not subject to regulatory carbon offsetting - based on emissions trading - or simply wishing to make a greater commitment to sustainable development, have thus embarked on financing green projects in countries of the southern hemisphere (reforestation, manufacture and distribution of improved stoves, construction of methanisation units, etc.).

However, many criticisms have been made of these practices. They are still considered complex, nebulous, not necessarily beneficial for the environment and local populations and aimed above all at giving companies a green image (Valiergue, 2021). In particular, these practices are criticised for making the southern hemisphere contribute to the reduction of emissions from the north and, consequently, for allowing rich countries to continue to get richer and pollute (Chartier and Demaze, 2021). Moreover, while agriculture and forestry are two economic sectors that capture CO₂, they have been the subject of few projects compared to others (Bellassen and Leguet, 2008).

In response to these criticisms, so-called local voluntary carbon offsetting (Tronquet et al., 2017) emerged in France in the late 1990s. This consists of companies established in a territory financing carbon storage projects within this territory and with actors in this territory, particularly local authorities, farmers and foresters. The geographical scale is the region. In France, for example, several actors in the Normandy region have initiated voluntary carbon offsetting practices. This involves regional companies, farmers and intermediaries in charge of piloting projects to plant hedges and orchards or to modify the agricultural practices of farms specialising in large-scale crops and livestock.

These practices seem to be in line with international carbon offsetting, i.e. the financing of green projects in exchange for carbon credits. However, the local dimension seems to offset some of the criticisms levelled at international projects, in particular the lack of operational involvement of carbon credit buyers. The latter would thus have visibility on practices and could involve their employees in the framework of Corporate Social Responsibility initiatives (Tronquet et al., 2017). However, it would seem that the organisation of the carbon chain is the same as in other countries, and even that it is run by the same actors, which suggests a risk of reproducing some errors observed in other countries. The lack of research on the subject and the recent nature of these practices suggest that we need to gain a deeper understanding of the local voluntary carbon offsetting process and, in particular, to better understand the motivations of the organizations involved in. Are these practices a break with international

experiences or do they reproduce the limits of international voluntary carbon offsetting at the local level?

The purpose of this article is to present and discuss an ongoing research programme on local carbon offsetting. It is based on a literature review and a few interviews with local voluntary carbon offsetting actors: farmers, communities, farmer services and experts. The paper first outlines how we moved from international to local carbon offsetting. The research methodology is then presented before the first elements of reflection are presented and discussed.

1. Towards a relocation of carbon offsetting

In France, voluntary local carbon offsetting emerged barely ten years ago with the first work around the Label Bas Carbone (Tronquet et al., 2017). But we have to go back at least another ten years to find the origin of this approach, i.e. carbon offsetting on an international scale (Bellassen and Leguet, 2008; Chartier and Demaze, 2021; Ling and Liebrand, 2008; Young, 2003).

1.1. Voluntary carbon offsetting at the international level

In terms of carbon offsetting, an important milestone was the Kyoto Protocol, which began in 1997 and came into force in 2005. This led to the creation of an emissions trading scheme in Europe (Pico and Daniel, 2010). This consisted of creating a market based on supply and demand, according to which the companies with the highest greenhouse gas emissions could offset their emissions by purchasing carbon units on the allowance market.

Voluntary carbon offsetting, which does not consist of buying credits on the allowance markets but of financing decarbonisation projects in exchange for carbon credits, emerged a little later, at the end of the 2000s. It was created to allow companies not subject to regulatory carbon offsetting to compensate for their greenhouse gas emissions. It mainly consisted of Northern Hemisphere companies financing reforestation projects or the manufacture and distribution of improved stoves in Southern Hemisphere countries.

Large American and European companies have taken part in the movement. This is particularly the case for companies in the transport (road and air), luxury goods, cosmetics and tourism sectors (Chartier and Demaze, 2021). The United States has instead chosen to invest in projects on its territory and, secondarily, in South American countries. Although the US territory is large, it is in some ways the pioneer of local carbon offsetting. European firms have rather financed projects in Africa or Asia.

The beneficiary countries, i.e. those in which the projects were carried out, are mainly Asian. Since 2007, 33% of the projects have been located in Asia, against 30% in North America and 18% in Latin America. In Asia, two countries are the focus of foreign investment: India and China. Between 2008 and 2018, India was the subject of 442 projects against 426 for China.

Next come the United States (351 projects), Turkey (124 projects) and Brazil (97 projects) (Chartier and Demaze, 2021). In terms of the number of carbon credits, however, China is in the lead: approximately four times more credits have been issued in this territory than in India (Valiergue, 2021). The reason is linked to the nature of the projects. As Valiergue (2021) shows, projects enabling the reduction of fluorinated gases are few in number (less than 2% of projects), but they represent almost half of the carbon credits issued worldwide in 2018.

Voluntary carbon offsetting has continued to develop over the years, but with a downward trend in activity since 2012. This seems to be correlated with the criticism levelled at it.

1.2. The limits of voluntary international carbon offsetting

A carbon credit does not have the same monetary value depending on the type of project carried out, the territory of application and the environmental and social benefits provided (Valiergue, 2021). This explains, among other things, why certain countries and certain projects are favoured over others. This brings us to the limit of voluntary carbon offsetting: it is a market in its own right, driven by financial interests that place climate, environmental and social issues, i.e. those for which carbon offsetting was invented, in second place (Valiergue, 2021). Several studies mention the abuses of this market: the "carbon cowboys" affair in the 2000s, dubious methods for calculating tons of CO₂ equivalents stored, questionable additionality of projects, land grabbing, absurd plantation choices, exploited producers, etc. (Bellacem and Leguet, 2008; Valiergue, 2021; Chartier and Demaze, 2021; Lal, 2007).

Beyond the businessization of this market, it is the legitimacy of carbon offsetting that is targeted. In the end, it amounts to compensating for the lack of effort by companies to reduce greenhouse gas emissions and to making third countries bear the burden of this reduction. Carbon offsetting is tantamount to absolving oneself of environmental responsibility through the purchase of pollution rights. Several companies have thus been accused of greenwashing by trying to communicate their environmental good works (Valiergue, 2021). Recently, however, a consensus has been reached by the actors and stakeholders in this market: the company's priority must be to reduce its GHG emissions, with offsetting only as a second option, in the presence of so-called residual emissions. Another development is the extension of carbon storage programmes to health and social programmes (e.g. the provision of improved stoves to not only reduce deforestation but also improve the quality of life and health of populations).

Another criticism, which is less perceptible in the literature, is the "above ground" nature of carbon offsetting. If carbon offsetting is a market, i.e. a space where agents buy products or services from sellers in exchange for a monetary value, the product or service (tonnes of CO₂ equivalent stored) cannot be seen. This raises the question of the visibility of the product or service rendered and, above all, the veracity of the CO₂ storage. In addition, it is difficult to contextualise projects, i.e. to point out their usefulness in protecting the planet. Carbon offsetting is understandable for market operators but difficult for neophytes to understand. The complexity of the carbon value chain (numerous intermediaries whose functions remain vague and sometimes redundant), the lack of transparency on projects (except with regard to the client who buys carbon credits) and the geographical distance between clients and the places where projects are implemented also contribute to the opacity of practices. All of this

contributes to a lack of awareness of carbon offsetting and to ongoing suspicion of it. According to Valiergue (2021), the lack of communication by operators and the distrust of observers such as journalists or researchers contribute to this suspicion. The lack of vulgarization by operators towards civil society is certainly another factor of misunderstanding.

1.3. The emergence of local carbon offsetting

Local carbon offsetting responds in part to the criticisms made. It consists of carrying out decarbonation projects in a territory, with the support of local actors (Chartier and Demaze, 2021; Tronquet et al., 2017; Valiergue, 2021). This development is applied by the choice of certain countries to relocate carbon offsetting in order to benefit farmers and foresters on their soil. Indeed, society is asking them to make efforts to decarbonise and, above all, to use their assets to store carbon. Why not encourage companies to invest on their own territory?

Local carbon offsetting emerged in the mid-twenties, but it is only since 2019 that it has made progress in the field. In France, the Low Carbon Label launched in 2019 has provided a framework for the players in this emerging sector, both in terms of the methodology for diagnosing carbon storage and the process for selling carbon credits. It has also made it possible to define the levers for decarbonisation, whether in terms of livestock farming, field crops or plantations (orchards and hedges).

The emergence of local carbon offsetting is reminiscent of the emergence of local food circuits. In this respect, we can use the term of "short carbon supply chain". In fact, we argue that the local carbon offsetting chain is based on the same foundations as those of local food circuits:

- Relocation of economic activities (creation of value between actors of the same territory, investment of the community for its territory...);
- Agroecological transition of food systems (less pesticides, less greenhouse gas emissions, water protection, etc.);
- Diversification of farmers' income (carbon credits, channel premiums, financing of carbon capture projects, etc.);
- Response to the excesses of long circuits (visibility and transparency of projects, corporate social responsibility, etc.);
- Reconnecting citizens with their agriculture (better visibility by citizens of the actions undertaken by farmers, foresters and companies...);
- Simplification of the value chain (fewer intermediaries).

The emergence of local carbon offsetting responds to the same criticisms as those directed at long food circuits: complexity, opacity, inconsistency of goods flows, health scandals, dispersion of the value created, agronomic choices guided by profit, etc. Local food circuits have been on the rise for the past twenty years. Will local carbon offsetting be as successful? To answer this question, it is necessary to understand what motivates the actors, whether farmers, local authorities or companies.

2. Methodology

This research is based on formal and informal interviews with voluntary carbon offsetting stakeholders, in particular farmers, in the context of the organisation of a Business Convention on Farm Decarbonisation that the author of this article co-organised. The round tables organised during this convention also provided food for thought. These initial reflections and exchanges were followed up with more formal interviews with regional carbon offset players. In total, just under ten people were met. In parallel with these discussions, several websites of associations involved in voluntary local offsetting were consulted in order to understand how this approach works. A literature review on the subject was also conducted in parallel with this initial exploration of the field. Empirical research is currently ongoing.

3. Results

The first results show that the subject of voluntary local carbon offsetting is not easy to grasp. While we are indeed in a supply and demand market, the carbon credit remains a dematerialised unit, attesting to the absorption of a gas that is by definition invisible (carbon dioxide) and the storage of an element (carbon) that only experts are able to measure. Moreover, the carbon offset value chain is not simple either. If it works with a client who buys credits and a supplier who stores carbon, many players are involved in the chain. Intermediaries responsible for canvassing companies that buy carbon credits, finding farmers with a decarbonisation project, and managing and implementing projects with them are at the heart of the system, rather like international carbon offsetting. Companies in charge of certifying carbon storage are also involved, as well as organisations offering methodologies for evaluating the quantities of carbon stored. Finally, it is necessary to mobilise plant suppliers and possibly work with associations that will help project leaders to plant the plants. Although the players in the sector communicate about their actions, local carbon offsetting remains difficult to understand. This is what makes the difference with local food circuits which, firstly, consist of the exchange of tangible goods and, secondly, are organised around a small number of operators, often only the seller and the buyer.

All this makes the local carbon offsetting market rather complex, which compromises its development, as the players have difficulty in understanding it; hence the steps taken to raise awareness of the subject and to propose a regular inventory (Info Compensation Carbone, 2022).

The financial flows are themselves complex to grasp because of the number of operators, their role in the value chain and the lack of uniformity between offset projects. Questions arise in particular about the methods used to calculate the costs of projects, which obviously vary greatly depending on the situation. Some operators, particularly farmers, probably also have an interest in not saying too much so as not to encourage too many of their colleagues to take up this new market, despite the need for a collective approach to facilitate transactions (Ling and Liebrand, 2008). It would seem that voluntary offsetting does not offer great financial opportunities to farmers. It would allow partial financing of projects (such as hedge planting).

It is thus an additional motivating factor for farmers committed to decarbonisation. The work thus confirms the results of research showing that, at best, the sale of carbon credits generates additional income for farmers. It also shows that the local carbon industry is not immune to the abuses observed at the international level: attention must be paid to the certification of operations and to the achievement of carbon storage and greenhouse gas reduction objectives. This control of potential abuses entails a risk of bureaucratisation that could dissuade players from committing to the process.

The financial interest of decarbonisation approaches thus seems to be sought elsewhere than in voluntary carbon offsetting. Companies such as Danone or Nestlé offer advantages to producers who implement decarbonisation measures (Sroufe and Watts, 2022). These 'carbon in-setting' practices led by an industrialist or a cooperative (Tipper et al., 2009) seem easier to manage from an administrative point of view. Nevertheless, at first sight, there is nothing to prevent a farmer from doing carbon in-setting and carbon off-setting.

In the end, voluntary local carbon offsetting is growing. This can be explained by the need to relocate flows within territories, such as in local food circuits. It is also a way of accelerating the agro-ecological transition by getting companies to contribute. They have an interest in showing that they are offsetting their residual greenhouse gas emissions by financing local projects that are useful to the region and to society and are visible. They can also involve their employees in the projects, as part of CSR and/or team building initiatives.

4. Discussion

Our work shows that local voluntary carbon offsetting is a topic of interest. It is new for researchers, farmers and companies seeking to offset their emissions. It is a subject naturally linked to entrepreneurship in agriculture insofar as it is a question of seeking opportunities and transition of agricultural models. It is part of the debate on the decarbonisation of agriculture (agro-ecological transition approaches in general) and in those on Corporate Social Responsibility. Voluntary local carbon offsetting is also part of a field of reflection on localism, which is already present in research on short circuits and in research on the production of biogas on farms.

This subject must be investigated by researchers because it raises many questions, particularly concerning the financing of the agro-ecological transition. This mechanism suggests that, potentially, the transition may no longer rely solely on public aid but also on private funding and collaboration between farmers and civil society, particularly other businesses. There are also issues of institutional decompartmentalisation in the background. This decompartmentalisation is all the more important as companies are not only looking for carbon compensation. They want to be able to involve their employees in a social and environmental responsibility process, which implies at least opening the doors of the farms to other companies. These companies would also have an appetite for projects that not only store carbon but also generate environmental co-benefits (Greenflex, 2021; Tronquet et al., 2017). In some cases, these environmental co-benefits are of interest to local authorities (Kebe et al., 2011). We can thus see that voluntary local carbon offsetting requires multi-actor work

(farmers-companies-communities), which has already been observed by researchers interested in territorial food systems and methanisation.

This research also shows that the business model for local voluntary carbon offsetting or more generally for decarbonisation is not yet well established. If carbon trading allows for the financing of projects, how can the farmer be remunerated in exchange for his permanent carbon storage service? Financing seems to be *ad hoc* in some cases (project financing) whereas, as some practices involve storing carbon over several years, farmers should be remunerated in the form of annual rents. Many business models are based on this annuity model. The legitimacy of a business model based on project financing should be questioned and the feasibility of an annuity model should be considered.

5. Implications and limitations

This research invites other researchers to take an interest in the subject, whether they be researchers in management sciences, economics, geography or others. The research needs to shed light on the actors of voluntary local carbon offsetting, whether they are farmers storing carbon, companies seeking to offset greenhouse gas emissions or local authorities. We have already seen the interest of the subject for farmers. But it is also of great interest to companies, which are increasingly involved in decarbonisation initiatives and are looking for innovative and open-air initiatives to mobilise their employees in CSR initiatives. It is also of interest to cities, departments, regions or communities of communes that have to report to their constituents in terms of ecology and are also looking for private funding.

Voluntary local carbon offsetting has some of the characteristics of a virtuous circle insofar as all actors can benefit, but it is not immune to the drifts already observed in North-South approaches.

This work is currently being pursued through interviews with farmers, companies, local authorities and local clearing intermediaries. It is clear that the results presented in this paper are provisional and subject to discussion.

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