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Carbon certification and agriculture: between efficiency, redistribution and GHG reduction

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Résumé. L'article dresse....

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1. Introduction

In the realm of environmental policies, market-based instruments (MBIs) have attracted large institutional and academic attention for the past decades. Historically the development of first Emission Trading schemes under the US Clean Air Act served as base case from which economists carved out the idea that efficiency for environmental policies was higher through market means than command-and-control regulations (Lane, 2012). Such strong dismissal of the potential of top-down environmental regulations (taking in the 1970s the shape of technical norms and taxes) has paved the way for the proliferation of market-based initiatives (Gunningham, 2009) but also for the surge of a number of critical studies that notably emphasized their low environmental outcomes.

Beyond this binary opposition, market-based policies have been the subject of an important area of scholarship that intend to clarify the type of economic mechanisms they are based on (Wunder, 2005; Vatn, 2015; Pirard & Lapeyre, 2014), the role of public regulations in their design and development (Castree, 2008) and correlatively the political power of states that sustains their effective operationalization (Lederer, 2012; Rea, 2019). While the ability of public entities to govern environmental problems through economic means has been a deep questioning of this area of scholarship, it has mainly been conducted in reducing public action to its efficiency. This notion has been shaped differently by scholars, and yet generally points out to the idea of efficient use of means to reach an objective. During the 1970s and 1980s, at the dawn on market-based policies, economists mainly problematized efficiency from the standpoint of firms, and addressed it as the comparison of costs between top-down command-and-control regulations and market-based mechanisms (Lane, 2012). Progressively, an imperative of performance has been tied to the design of market-based policies, designating through the use of performance-based standards or “pay for performance” mechanisms, a repeated imperative promoted for its ability to optimize expenditures or investments (Ghosh 2019), may it be at the expense of environmental achievements (Rozance et al, 2020). In searching efficiency, policies and related studies lost sight of environmental outcomes (Randalls 2011).

This longstanding focus on (economic) efficiency is blurring other qualities of environmental public action. Scholarship on social states is here useful to point out to other ways to frame and analyze the appropriateness of policy, as they shed light on the redistributive rationale that has spanned the advent of mutualization and redistribution mechanisms of social welfare systems (Lindbeck, 1985). One key feature of the redistributive function of states is public spending. It comprises of different ways to organize expenditures and allocate them among households, including transfer payments, social security benefits and subsidization of private services directed toward individuals. Historical accounts of welfare states shed light on the progressive shift over time, from broad support where redistribution was carried out through a class-based vertical differentiation of needs, to progressive liberal reforms that have included horizontal fragmentation and individualization of benefits in motion since the 1980s. Complementary to accounts on the types of mechanisms that bring redistribution

forward, scholars have insisted on the influence of interests groups in advancing public redistribution of welfare. The political process can be viewed as a redistributive battle from which economic channels and policy targets are defined, constructed, and set into motion.

In this paper, I suggest to change the focus from efficiency to redistribution in the analysis of market-based environmental policies. More than consideration about efficient use of public money and resources in advancing environmental policies, my concern is about the ability of market-based environmental policies to reach relevant environmental targets, in other words to ensure distribution of resources toward appropriate objectives. I consider this matter to be all the more needed for MBIs as they are a case of important delegation of policy implementation to market players, and ask: to what extent do market-based environmental policies allow for a distribution of actions toward relevant policy targets? In other words, I wonder to what extent leaving public action to private actors can lead to some capture effects and orientate action toward some goals more than others.

The article draws on the case of French voluntary carbon market to explore such question. They are a type of market mechanism that allows public and private companies to voluntarily offset their GHG emissions by purchasing carbon credits produced on the French territory. More precisely, the paper builds on an analysis of carbon credit production by the agricultural sector. While the mechanism hinges on over-the-counter transactions, facilitated by a diversity of market intermediaries, public regulations intervene in a number of ways to sustain their completion: certification of metrological standards for GHG footprint, subsidization of market intermediaries, funding of carbon balance assessment in farms and validation of credit production by regional administration are among the main activities that support market development in practice. Building on a qualitative investigation of both the design and implementation operations that set carbon credits into circulation, I study the means of action (rules, metrological standards, economic circuits) as well as the policy targets / outcomes (what types of farms are actually involved in the mechanism, for what transformation of farming practices, with what effects on GHG balance).

The article is organized as follows. Section 1 presents the analytical framework of the paper with the help of a discussion of redistributive features of states and markets. Section 2 is the study case: it includes an analysis of market rule design at the national level, and their implementation in dairy farms in the North of France. Section 3 discusses the main results and concludes.

2. Distributional effects of carbon markets: a framework

Moving from efficiency to redistribution considerations requires a renewed analytical standpoint on market-based instruments. Because these comprise of a combination of

public and market action to reach environmental outcomes, two aspects of public policy are relevant here: the way states and public authorities take position in the definition of policy targets and rules, and the way the latter are redefined and operationalized in practice through private action. In what follows I explore the main features of *welfare state* which helps outlining a framework for an environmental welfare state approach.

2.1 Environmental state as welfare state

The *welfare state* literature clearly highlights the national specificities of States in addressing the question welfare redistribution through social protection systems. These specificities are based on four sets of political orientations. These four analytical factors are useful here to think about market-based environmental policies as environmental welfare systems. I explore here each of the four dimensions, seeking to highlight how they are specifically articulated within environmental policies. They provide the basis for the analysis of the French voluntary carbon market and its distributional features.

First, a welfare system is characterized by a specific sharing of responsibilities between state and non-state actors, that Esping-Andersen (1990) has also grasped as a public/private ratio, an analytical criterion that echoes the delegation of environmental actions to market players in the case of MBIs. The role of states within environmental policies has experienced a significant change in the 1970s with the creation of new legal principles within environmental law. More specifically, the polluter-pay principle makes economic actors responsible of their environmental impacts and accountable for their costs. There are several means by which the polluter-pays principle is implemented. Historically, it has taken the form of command-and-control regulations (technical norms and related taxes, ref), and has more recently been enforced through market-like mechanisms. Depending on policy objectives and orientations, the later has been adopted in many national and international contexts and has taken various institutional shapes (Bigger 2018; Boisvert 2015; Vatn 2010), that entails different types of responsibilities for public regulators. The important point here is that welfare provision is not carried out by the latter but by a third-party organization (Barral & Ghosh, 2023) that is often a professional entrepreneur in charge of environmental care activities (biodiversity restoration, carbon sequestration, water quality improvement etc.). Public action is therefore oriented toward 1) the incentivization of both regulated industries and private organizations in charge of welfare provision and 2) validation and/or verification of environmental welfare provision and transactions (Lansing 2012; Milne et Mahanty 2019) through the production of dedicated rules, extended agency missions and bureaucratic means (Barral 2020; Lederer & Höhne 2021; Rea 2017) that constitute the environmental welfare system.

Second, welfare state implies an administrative definition of the populations to be taken in charge through redistributive means. By analogy, taking environmental

problems in charge through market-based mechanisms requires the definition of relevant sectors and actors for the provision of environmental welfare. Formally, implementing the polluter-pays principle through market mechanisms is based on economic transaction between polluters and private organizations whose action leads to environmental recovery actions. Who is legitimate to take part in welfare provision is both a scientific and a political question that conveys many different types of answers. Literature on market-based policies first sheds light on different processes of environmental welfare providers' definition, oriented toward top-down rule setting or participatory approaches. Public regulators can strictly define what are the policy targets and who is allowed to act as a service provider for this specific target. For example, biodiversity offsets in the USA are only implemented on endangered species that have been federally listed after a long bureaucratic process aiming at the examination of their biological states and threats (Schwartz 2008; Wyman 2012). Once a species is listed, it benefits from federal protection and impacts on its habitat ought to be compensated, notably with the help of professional entrepreneurs whose activities are framed by top-down standards of rules such as the performance ratios of environmental restoration and the commensuration equivalence between impacts and welfare provision. In other cases, in which the French voluntary carbon market falls, the definition of policy targets and standards of rules are participatory: to ensure substantial participation in the market, which is a condition for its expansion (or "scaling-up" as carbon market proponents say), the French Ministry of Ecology voluntarily leaves open participation to all industries that show initiative and willingness to get involved in the process. Top-down rules are built on a notion of equity as all policy users and service providers all face a coherent set of conditions, but they also entail an element of bureaucratic discretion in the definition of standards of rules. Reversely, participatory systems are based on the empowerment of potential service providers that propose their own scientific studies and sets of rules for welfare definition, quantification and operationalization.

The rationale behind the definition of contributions and assistance is a third constitutive dimension of welfare systems. Schnaiberg (1983) sets useful distinctions between environmental movements' revendications that highlights different conceptions of redistribution through environmental policies. Building on Lowi (1972), he notably distinguishes between distributive politics (leading to policies that allow for the transformation of productive systems toward more environmental-friendly processes of production through "appropriate technologies") and redistributive politics, meaning here environmental programs that integrate a social equity dimension through economic redistribution to low-income classes. The key point here is that the grounds of environmental policies may range from technology-centered approaches that set social redistribution aside (and for which concentration of actions in the hands of an efficient minority is not a problem, and might even be a requirement to meet goals efficiently) and policies that take equity into considerations and integrate social goals with environmental objectives. While Schnaiberg's paper has been written in a time when market-based policies were still in the making, it is helpful to set the emphasis on the distribution of actions among economic sectors and territories: social equity, when intertwined with environmental welfare, impedes to explore the social

structures of environmental policies, sorting out whether it benefits to a broad audience or a reduced number of actors. It leads to questioning to what extent are the outcomes of market-based policies related to some kind of stratification of the policy targets/populations at stake.

The fourth characteristic of welfare systems is their form of intervention; direct payment and contractualization being common forms of redistribution mechanisms for social welfare policies, highlighting here that this aspect relates to implementation rules and economic circuits that channel funds toward policy targets. These rules are foundational to the social structure of environmental policy, which means that they are the way through which policy targets are reached and policy outcomes exist in practice. Beyond a diversity of institutional arrangements (Pirard & Lapeyre 2014, ref carbone), market-based policies are based on the concretization of economic transactions between private actors. These transactions therefore constitute the basis of the policy's economic structure and are key to address matters of redistribution. Few authors have addressed the distributional effects of carbon markets. Cooper (2015) is an exemption. He highlights the production of metrics as key momentum for rule making and distribution of resources: measurements and commensuration operations accrue from agreements of actors, and they are the basis of the design and function of market-based instruments. Because markets have distributional effects, these operations are highly political and sites of disputes. What misses though in these propositions is a substantial analysis of the effects of implementation, i.e the consequences of redistribution *in practice*, on the production of environmental welfare.

2.2 Voluntary carbon markets as redistributive mechanisms: a framework

From the previous discussion, I suggest the following analytical framework for the study of market-based policies are political tools for environmental welfare distribution. The main objective is to provide conceptual and analytical tools to understand how state and public regulators organize a redistribution of resources toward environmental actions so as to sustain the production of environmental welfare. My argument is that addressing redistribution requires to set the focus of attention on three interrelated dimensions of policy mechanisms.

A first site of investigation is the design of metrics for the production of carbon credits. It hinges on two sets of interrelated questions. The first one is about the responsibility of metric production, with the assumption that private actors are likely to influence its content toward sectorial interest. Maintaining public responsibility in a supervisory role may confer power to private actors as they design complex quantification tools that are "between the two fires of science and policy" (Turnhout, Hisschemöller, et Eijsackers 2007). To fully grasp the depth of their influence on the metrics, the second set of questions regards the content of the metric in itself, and the related rules of exchange, with a focus of attention on the way they may embed sectorial interests, as well as on the way they may favor the participation of some credit producers more than others, or favor some climatic actions more than others.

This last point is related to the second site of investigation, being the structure of the market. I include in this analytical concept a cartography of actors, the study of the functions they fulfil, as well as the position they occupy on the market. The idea is that analysis of distributional features of metrics stems both from its theoretical components and its implementation in practice. The related assumption is that actors with dominant positions on the market are able to influence metric implementation as well as economic transactions. In other words, they play a key role in the concretization of redistribution mechanisms.

The third site of investigation is the “offer side”, that is to say the analysis of the economic sectors, territories and actors involved in credit production, as well as the type of climatic actions that are enforced through their participation. Linking the analysis of the market structure (means of action) and that of carbon credit production (ends of action) is what conceptually brings forward the understanding of redistribution effects of market-based policies.

3. French voluntary carbon market: a matter of integration more than transformation

In 2015, the French Ministry of Ecology has launched the Low Carbon National Strategy, a programmatic document that sets the target objective of reaching carbon neutrality by 2050. Among the several initiatives that derive from this scoping document is the construction of a carbon certification framework called “Label Bas Carbone”. The ambition is to promote scientifically-grounded carbon quantification tools that allow economic actors to measure the carbon footprint of their productive activities, to identify technical and economic levers to reduce it, as well as technical pathways to reach carbon reduction objectives. In what follows, I explore both the overall conception of the Label at the national level, and its implementation in livestock farms in the North of France. It appears as a loosely-controlled initiative whose main aim is to incentivize wide participation of actors while not being very profitable from an economic standpoint.

3.1 First steps: incentives to take part in a fragile initiative

Since the early stages of the Label Bas Carbone development, the bureaucrats of the Ministry of Ecology have foreseen the role of their institution as a steering one, fostering the participation of other public but also private actors in the conception of the certification framework. A first study phase was launched in 2015, with the help of a European Feder subsidy for the so-called “VOCAL project”. This project, coordinated by the Institute for Climate Economics (I4CE, a think tank linked to a national investment bank), gathered public actors (Ministry of Ecology, Ministry of Agriculture, the environmental agency ADEME and INRA, a French research institute linked to the Ministry of Agriculture) as well as professional unions from the forestry and livestock farming industries. In this phase, professional unions and I4CE were funded to explore the value of developing such a framework. The later carried out economic surveys and benchmarked other carbon certification endeavors at the international level; they concluded that agriculture was poorly integrated in such efforts because of the technicity of agricultural production and complexity of related measurement systems. Forest carbon stocks and sequestration mechanisms, in comparison, are much easier to

model, which limits the transaction costs for the production and sale of carbon credits. In addition, their benchmarking study revealed an economic gap in regards to production costs of carbon credits that would be potentially produced in France, in comparison with Global South carbon sequestration or emission reduction projects. Yet, with livestock farming being under broad criticism and pointed out by environmental activists for its high GHG emissions, related professional unions launched pilot projects aiming at designing a quantification tool of French dairy farms' carbon emissions, as well as assessing the potential technical levels that would allow to act on the farms' carbon footprint. Despite these economic limitations, forestry actors were also willing to launch technical studies and design their own quantification tool and carbon footprint reduction pathways. Forests are a key site of carbon credits production at the international level, which encouraged French forestry organizations to pursue a similar path. These two economic sectors acted as pioneers in the production of a market-based decarbonization instrument, which, as we'll see below, provided them with a competitive advantage over other sectors that entered the initiative later on.

This first step is useful to highlight the experimentation phase that precedes design and implementation of a market-based instrument. Remindful of Callon (2009) who tackles carbon markets as ongoing experiments, it also shows that first steps of a market-based mechanism can require specific resources and tasks to assess the relevancy of such endeavor before further economic, cognitive and resource investments are pursued. European public funds are also a necessary condition of this study phase. More generally, this step is typical of the division of responsibilities between public actors and professional organizations that spans through the whole development of the Label Bas Carbone. It highlights that beyond the notion of public/private ratio lies a more complex picture: at the national level, public regulators endorse a coordination role, and to some extent watch after sectorial interests (trouver exemple dans entretien Foucherot), while public subsidies are a less visible but equally important function to spur professional initiatives. These funds are all the more necessary as the study phase revealed the poor economic potential of a French carbon market compared to other international instruments, highlighting the need for extended support from public actors. In this context, incentivization of professional actors through public subsidies are all the more needed.

More than wondering why forestry and livestock farming sectors pioneered, the important matter here is rather what were the effects of these early actions on the structuration of the Label Bas Carbone. The following part focuses on the dairy sector, and shows how professional organizations, as pioneer actors of the agricultural sector, gained from such early actions the possibility to orientate the carbon certification framework, and later on the carbon market mechanisms, toward their own sectorial interests. This is particularly evident when analyzing their influence on the metrological orientation of the quantification tool, as well as on the regulation of carbon credit transactions. While this highlights some kind of concentration of actions on one sector, the low economic potential of the Label Bas Carbone also influenced its implementation toward low-risk actions.

3.2 Design of quantification tools and certification frameworks

In the division of tasks for the design of Label Bas Carbone, professional organizations were entrusted to work on the content of the tools while public actors reflected on the procedural rules that would sustain implementation of the tools.

Public actors have entrusted professional organizations with the design of quantification tools and identification of GHG reduction levers, limiting its role to the assessment of their quality. Interviews revealed two types of configurations for the production of these frameworks. The first one is a rather narrow configuration of few sectorial actors, for which discussions and decision-making processes are rather confined¹. The dairy sector experience falls into this category, as only one technical institute (among a diversity of inter-branch representatives), called Institut de l'Élevage (IDELE), took over the design process which allowed their members to influence the technical orientations and final decisions. This resulted in the production of a carbon quantification methodology called "Carbon'Agri", composed of a baseline quantification tool and a list of technical levers that farmers can activate to reduce their farm's carbon footprint. The configuration of actors also involved experts from I4CE, ADEME and the Ministry of Ecology, but as IDELE had previously been involved in the design of a carbon footprint quantification tool for dairy farms called CAP2ER, they were able to emphasize their competence on decarbonation pathways and to become key proposition makers in the working group. One important consequence of IDELE's influence on the decision-making process is the choice of the aggregated indicator to be used to assess dairy farms' decarbonization pathways. While I4CE experts were in favor of an annual indicator (tGHG/year), IDELE exerted pressure on the agents of the Ministry of Ecology to select a productive indicator, in the form of tGHG/milk production. This choice clearly situates climate actions in a broader range of possibilities as a yearly indicator would, as not only actions reducing the absolute value of GHG qualify as relevant orientations, but also actions aiming at increasing milk production per cow. In this case, technical changes aiming at increasing the productivity, while not leading to an absolute reduction of GHG emissions, are eligible as they allow for a decrease in the indicator's value. So far, public researchers and environmental NGOs have denounced this sleight of hand, and push for a change in the quantification method, but none of these requests have been effective in the time of writing.

The second configuration, while not prominent for the article, is useful to highlight contrasting ways to take part into the design of a market-based instrument. It refers to more inclusive and transparent processes. An example of such configuration is the field crop sector. Related organizations, who entered the mechanism three years after that of the dairy sector, set up a working group that gathered as many representatives as possible, together with researchers from public institutions, aiming at reaching a broad agreement on the type of technical information and on the quantification framework that were deemed relevant to incentivize climate action in the field crop sector. This

¹ To some extent, the forestry configuration is close to this one, as two professional unions were involved in the design of three certification frameworks – this is partly due to the fact that the French forestry sector comprises a small number of representative organizations.

resulted in the production of another productive indicator, in tGHG/ha (and not tGHG/year). Unlike the dairy sector's orientation, this indicator compels farmers to commit to extensification measures that have a direct impact on GHG absolute emissions.

As mentioned above, public and semi-public expert agencies (ADEME and I4CE) have been entrusted the design of procedural rules for the operationalization of Label Bas Carbone. Because the Label Bas Carbone is meant to be adaptable to a variety of valuation mechanisms (and not merely the voluntary carbon market), these procedural rules are limited to what happens at the scale of GHG reduction pathways (timeline of the projects, monitoring conditions, public validation of reduction plans), that is to say relate to the transformation of productive practices. What happens beyond the certification of GHG emission reduction or carbon sequestration, such as the economic valorization of carbon projects and the organization of transactions is left open to market operators. This became particularly clear when I interviewed one former I4CE expert that had been involved in the drafting of the ministerial ruling that formally launched the Label Bas Carbone. As I shared with her an interrogation I had about the reduced number of stakeholders that were mentioned in the ruling (project holders, - i.e farmers or farmers' groups in our case -, beneficiaries - i.e credit buyers, and auditing parties), she explained that it was an option that the agents of the Ministry of Ecology had taken without hesitation, since intermediaries such as market operators, technical advisors, and other intermediaries that intervene in the construction and functioning of the voluntary carbon market were private actors whose action didn't need to be regulated by public law ; rather, their coordination relates to private law. A direct consequence of such decision is that, as a middle-range bureaucrat from the Ministry of Ecology in charge of Label Bas Carbone explained, they are entirely invisible to regulators, who are consequently completely unable to reflect on and regulate their influence on the voluntary carbon market.

Sharing of responsibilities in the making of the voluntary carbon market therefore takes two different forms. At the design level of the instrument, public actors actively define and coordinate roles. Sectorial organizations are entrusted a seemingly technical mission, that of gathering substantial information about GHG footprint and identifying potential levers for its reduction. The analysis of this policy making stage unsurprisingly reveals the highly political character of such operations, as they have important consequences on the way GHG reduction pathways are carried out in practice. What is at stake here in the public/private sharing of responsibilities is the extent to which public entities manage to regulate the politicization of technical operations. In a context of low legitimacy of carbon-based economic activities, public actors are dependent on the participation of sectorial organizations, which tends to leave them leeway on micro-decisions (that in the end have macro-consequences). The second form of public/private sharing of responsibilities is more tenuous. It stems from the legal distinction made between public and private in public action and law. By construction, part of the stakeholders is invisible to state regulation, as they are not directly entitled with responsibilities in the market-based instrument. Nonetheless, they

bare some *de facto* responsibilities that ought to be considered to fully understand the way market-based mechanisms allow for redistribution of means and resources.

3.3 The building of IDELE's dominant market position

In the overall process of market construction, IDELE has two comparative advantages. Being at the same time a pioneer and a lone player allowed the organization to gain a dominant market-maker position. This is particularly clear regarding two aspects of voluntary carbon market functioning: carbon credits stacking, as well as price making.

To fully grasp the organizational and economic logics at stake, preliminary information about the voluntary carbon market is required. Its social organization gathers four groups of actors. First, on the demand side are public and private firms that seek to offset part of their GHG emissions by purchasing carbon credits. They are supported by a first level of market intermediaries, that label themselves “start-ups” and who provide legal and financial engineering support to credit buyers (Magnin, Doré, forthcoming). They are typically a type of intermediary that is outside of the scope of the legal ruling. A census of these intermediaries reveal that they are approximately a dozen, mainly graduates from business schools. They have stronger competences in supporting business support and usually lack networks within economic sectors involved in credit production and may experience difficulties in reaching them. In relation to this, a second set of intermediaries take part in the market. These are historical sectorial organizations that have built their legitimacy and professional networks through time before diversifying their activities with decarbonization activities and carbon certification development. Such is the role of IDELE, as well as other agricultural professional unions and technical institutes, who link farmers to credit buyers and their brokers. As they master technical knowledge and territorial networks, in addition to the accountability the Ministry of Ecology has accounted them, they benefit from a structural power position in the market. Considered as legal representative of carbon credit producers, their activities are mentioned in the legal ruling. A third set of actors can be labeled “carbon experts”: in this category I include software producers (organizations that develop tools to facilitate data gathering for footprint calculation, who fall outside of the scope of this paper), as well as “carbon technical advisors” (who work for historical technical organizations from the farming sector and who assist farmers in the calculation of their GHG emissions, in the identification of reduction levers, and in their implementation). These are also outside of the scope of the legal ruling; next part develops their role in the implementation of quantification and decarbonization activities. Fourth are the credit producers, dairy farmers in the case of carbon credits produced through IDELE's quantification tool. Their involvement in the voluntary carbon market is voluntary. Consequently, they are able to pick up the levers and activities they see as relevant for their farms, and carbon technical advisors often state during interviews that it is important to offer them leeway in these choices to ensure their participation in the long run.

IDELE has launched its first “call for proposals” in 2019. As a representative organization, its missions are to advertise the possibility to enter the carbon credit production to dairy farmers, to coordinate the calculation of carbon footprint and

identification of reduction levers within farms, to gather information about the total number of avoided emissions and sequestered carbon after implementation of all projects, and to look for buyers (*i.e.* to interact with start-ups). This first call gathered XXX proposals and allowed them to foresee the production of 70 000 carbon credits over a five-year period of time (the length of dairy carbon projects). Comparatively, in the same year, the CNPF, a public agency for the development of private forested land, launched a similar call and predicted a future production of 25 000 carbon credits over a 30 years period of time. This sheds light on the fact that, at that time, offer was still concentrated in the hands of few organizations, and IDELE had managed to manage almost 75% of the production. Next part explores how IDELE managed to incentivize such broad participation through the mobilization of territorial networks.

IDELE's ability to stack an important number of credits before other market players allowed the organization to enforce some market rules and to strengthen their dominant position, providing services to other projects representation for the selling of their credits. The current reference is implemented in IDELE's projects is a full price of 38€/credit, with the following repartition: 30€ for dairy farmers, 5€ for IDELE and 3€ for the start-up in support of the buyer. During interviews with start-ups, some managers mentioned that they had tried to bypass IDELE's prescriptions, either negotiating directly with farmers, or imposing a different repartition of value through the chain of transactions, but never really succeeded. This only created conflictual relations with them and, for one of them, imposed to look for other economic sectors to buy credits.

3.4 How to incentivize massive participation: when public policy supports market construction

How did IDELE manage to stack such an important amount of credit is another side of the story that helps understanding how and through what processes they gained their dominant market position, and consequently, how these build up specific redistribution mechanisms. As I mentioned to first interviewees that I was eager to study the implementation of Label Bas Carbone, IDELE representative wholeheartedly advised me to do so in Nord-Pas-de-Calais, where approximately 12,5% of the total number of dairy farms involved in carbon credit production are located, the highest regional rate.

This important involvement of dairy farmers in the voluntary carbon market can be all the more surprising that, from an economic standpoint, the sale of carbon credit only represents "icing on the cake", as dairy organizations state. For instance, a dairy farmer that participated in the call for project in 2019 explains that the levers he opted for allow for the avoidance of 665t of carbon in a 5-year time period, amounting a total of 19 950€ or 3 990€/year. These low economic incentives are not what drove the wide adoption of the Label there, but its intertwinement with public subsidies for dairy farm decarbonization already in place in 2019 when the Label Bas Carbon was launched. This public policy undoubtedly plays a key role in the development of carbon credit production as it allows to lower the costs of credit production. In practice, certification of a GHG reduction project through Label Bas Carbon entails a first two-day field visit of a carbon technical advisor to gather data and calculate the GHG footprint, a second meeting with the latter to examine the results and consider the reduction levers to be taken into account, a technical visit in year to assess their implementation and provide

technical advices, and a last technical visit in year 5, including another measurement of GHG footprint and final calculation of the number of carbon credits. A rough estimate of the implementation costs sheds light on the economic constraints that lie on the market mechanisms, that are likely to hinder its development and explain why public subsidies are an important requirement to sustain farmers' and agricultural organizations' participation. In the absence of public subsidization, farmers would have to bear the initial costs to launch a project. As one field visit amounts 2000€ (paid to the advisor's employee), whereas carbon credit payments only happen in year 3 (40%) and 5, this would constitute a strong obstacle to participation.

These barriers to entry haven't influenced the implementation of Label Bas Carbone in Nord-Pas-de-Calais as prior to its operationalization there, the Regional Council had also launched a policy that aimed at incentivizing dairy farm's decarbonization, the so-called "Fermes Bas Carbone" ("Low Carbon Farms"). Intensively lobbied by a local dairy farmer organization called AOPENDairy, the Agricultural Department of the Council has opted for a contractualization with historical technical advisory organizations, and has funded 1900€ out of 2000€ for two field visits, the 100€ remaining being at the expense of farmers since 2018. When IDELE launched its first call for projects in 2019, AOpenDairy in accordance with the Regional Council offered to compound both mechanisms, which allowed to mobilize regional funds for the production of carbon credits. In a nutshell, the voluntary carbon market, seemingly referring to auto-organization of private actors for environmental credit production, appears more clearly as a heavily subsidized policy where private funding (through sale of credits) constitutes a minor share of the economic equilibrium. The presence of a previous regional public policy played a part in the construction of IDELE's dominant position as a market-maker as it allowed to rebalance the economic difficulties of the voluntary market, difficulties that has been identified from the initial steps of its construction.

3.5 Climate actions: optimization more than transformation

Even though public subsidies lower the entry barriers, economic gains still appear rather limited for farmers. The combination of limited gains and voluntary participation of farmers influences the type of technical levers that are preferably implemented on farms. As IDELE's national coordinator puts it:

"Clearly, carbon credits are not incentivizing enough. As I always say, from an economic standpoint, it is the icing on the cake; but it does not allow important risk taking or large investments. When I say large investments, I mean for instance planting hedgerows. Carbon credit gains don't allow to pay for this". (IDELE Label Bas Carbone coordinator, 2022)

Consequently, most dairy farmers (approximately 80% according to the program coordinator) have opted for technical levers that lead to the optimization of their productive system, and therefore of the productive footprint indicator (in tGHG/L of milk). They consist of increasing milk production per cow, mainly through the reduction of first age calving and changes in the fodder diet. In this case, decrease of carbon footprint goes hand in hand with an increase of productivity, that does not require

major investments or technical improvements. As carbon credit production is achieved with a reduction of costs per productive unit, barely no economic risks are undertaken; most of emission reduction stems from optimization of GHG emissions/L milk, with little carbon sequestration in biomass (through hedgerows) or soils (through intercropping for instance), meaning that carbon credits can be produced without a decrease in absolute value of GHG emissions.

A minor share (20%) of dairy farmers has opted for more transformative technical levers, that have a greater climatic impact as are based on carbon sequestration. The most explicit example is the conversion of field crops into temporary pasture land², that extensifies agricultural production in two ways: it limits the use of phytosanitary products and GHG emissions from tractors, and it increases the food autonomy of the herd. What interviews reveal, both with farmers and technical advisors, is that farmers opting for such decarbonization pathways were already involved in some kind of structural transformation of their farms and ecologization of their farming practices before Label Bas Carbone was launched. The program therefore represents an opportunity to boost an already existing trajectory, more than a driver for change in itself.

4. Conclusion

In this paper, I build on the case of the French voluntary carbon market, and more precisely on the analysis of its design at the national level and its implementation in dairy farms in the north of France, to explore the redistributive mechanisms of market-based environmental policies. To what extent and how does the delegation of action to market actors lead to specific redistribution of resources for environmental welfare? Three discussion points are made here, about the distributional features of market-based policies *per se*, about the reliance on accountability in environmental policies, and about the consequences in terms of climate action.

4.1 What does it mean to say a market-based policy is redistributive?

Rather than focusing on the efficiency of environmental policies, that relate to the reasonable use of public money for environmental actions, I suggest paying attention to their redistributive features, as a mean to assess their ability to provide environmental welfare to societies.

If social welfare is defined as the levy of economic resources from individuals or economic organizations and their redistribution toward low-class and needy people, the notion of redistribution does involve extensively reaching out all people that fall in the category, as well as providing them with sufficient resources to be able to make a living. Regarding environmental welfare, definitional issues are slightly different: redistribution includes not only a social dimension (reaching out extensively to individuals) but also an environmental one (having climatic effects). Unlike for welfare policies, these two factors are not necessarily convergent: it may be more relevant to concentrate action on a few policy targets that are more effective than others in terms

² Farmers who develop such practices usually rotate their pasture land every five years, which allows them to remain eligible for European CAP subsidies.

of climate action, than distributing resources to a broad number of targets whose climatic actions are fluctuating. Studying the redistributive features of market-based environmental policies then means both sorting out their potential in reaching out various types of actors and their implications in terms of environmental benefits. Lastly, it is important to consider how these two dimensions relate to each other.

First, to what extent does the construction of Label Bas Carbone allows to reach various types of economic sectors and actors? The study case reveals that beyond the openness of the program to the participation of any sectorial actors, there are a number of conditions that explains the success of some initiatives more than others. Consequently, *in practice*, the possibility to benefit from economic resources to engage in climate actions is not equally spread out within economic sectors. In a context where the funding of the policy partly lies on the sale of credits, and thus on private funds, involvement in the program may become less attractive as time goes by. As the case reveals, pioneering actors are better-positioned to accumulate experience and knowledge, to determine rules (such as prices), to build networks but also to stack credits and valorize them early in the process. Dominant positions on these market-types of instruments impart a positional rent that influence the production of rules of exchange. Recent interviews with Label Bas Carbone actors revealed that sale of carbon credits was slower than their production, which reinforces the idea that first comers are favored. This raises important political questions about equity of treatment for policy users. More than opening up a program where all economic actors are free to participate on an equal basis, further examination reveals that horizontal fragmentation and individualization of benefits implies social inequality in terms of access to resources.

Second, the case reveals further inequalities in terms of environmental welfare provision by participants. This notion is close to that of “environmental effort” (Deldrève, Candau, et Noûs 2021), the latter designating the intensity of effort that is being required from policy users, while with environmental welfare I suggest the effort for the provision of an environmental benefice. The case of Label Bas Carbone highlights here that within rules and metrics is entangled a conception of action that favors the lowest bidders. One of the reasons why these preferential mechanisms occur is the polysemy of “pay-for-performance” at stake: as a voluntary program, Label Bas Carbon requires low barriers to entry for participants, and leaves open the way farmers engage into decarbonization pathways. In the end of the day, they all benefit for the same income per carbon credits, but the production costs, changes in the organization of labor as well as economic risks vary from one option to another. In “pay-for-performance”, if “pay” is equally calculated, “performance” entails different meanings and practical operations. Regarding the dairy sector’s case, environmental performance is intertwined within the historical and productivist conception of farms, in relation with their participation in the national food security. What the Ministry of Ecology justifies, is that rather than reducing effectively the French carbon footprint, they take part in the overall optimization of productive systems, maintain the total production with a better GHG footprint ratio.

These two analytical levels point out to a double reductionism carved out in market-based instruments. Public regulators leaving open the definition of policy targets through voluntary participation, some economic sectors' representants more than others are likely to exert power on the construction of the instrument, with consequences not only on the inequal repartition of resources but also on the environmental welfare. Their control of rule-making processes, especially of metric definition, can lead to spin-off effects and low environmental outcomes.

4.2 Accountability, profitability and climate action

This double reductionism takes root in the broader movement of private accountability in environmental policies. Since the 1970s and the formalization of the polluter-pay principle, economic actors are entitled responsibility of their environmental impacts, and thus that of taking charge of them. Progressively, this has also led to another liberal of environmental actions where environmental gains ought to be rewarded up to the level of welfare they initiate. Dismissal of regulatory obligations and stronger top-down rules to incentivize action has gone along with the rise of incentive mechanisms for environmental welfare provision. Driven by empowerment of private actors, the case of Label Bas Carbon reveals that this empowerment not only entails that of direct welfare provisioners (farmers) but also of a number of intermediary organizations whose participation is key in the process. Yet all these actors bear specific interests – sectorial, professional, economic interests notably – that interfere in the implementation of the program. In other words, greater reliability on private actors to reach public goals entails complex implementation mechanisms and curbs state power. Accountability relations should rather be conceptualized as a chain of responsibility, highlighting the way state control is diluted within a complex configuration made of fuzzily-defined objectives.

What comes quite clearly out of the study case is also the reference to costs and profitability in the implementation of the Label Bas Carbone. Relying on a market mechanism whose economic balance has been questioned since its first steps has led to economic risk minimization strategies from economic actors. Even though this default has been regularly balanced by large injections of public money, the economic fragility of the voluntary carbon market, that accrues both from the low price of carbon credits on the international market, and from the low involvement of French firms in carbon offset strategies, intensifies reductionism. Low economic gains favor superficial technical changes, but leaves the impression of a fruitful program with many stakeholders and thousands of avoided carbon tons in relative value.

Relying on market mechanisms and private funds to bring structural changes for the ecologization of economic systems is misleading in two ways. It favors the concentration of resources on pioneer organizations, and it can sustain low hanging fruit results while giving the impression of robust actions. Complementary to scholars highlighting the politization role of markets, a focus on redistribution highlights the production of economic hierarchies and environmental cheap chots.

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