Should Sustainable Development Rely on Financial Incentives? Lessons from the CTE Experiment in the Loire Valley

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Abstract

The Contrat Territorial d'Exploitation (CTE), land use contract, was a significant experiment in France in the early 2000s. Farmers were offered financial incentives in exchange for more organic farming practices, as part of a sustainable development (SD) approach. Using a database of 462 farms in the Maine-et-Loire region, we tried to investigate the true motivation for signing a CTE: was it financial or ecological? In other words, were farmers simply maximising their profits or was there a broader objective? Our results indicate the former to be true. This means that a policy may encourage SD, but farmers cannot be expected to adhere to it without a financial incentive.

Keywords: sustainable development, stakeholders, agricultural sector

1. Introduction

Nowadays, environmental factors are becoming increasingly significant. Several centuries of industrialisation have profoundly altered our planet: the changes introduced (pollution, development, etc.) now require us to modify our objectives. Attitudes of consumers and producers may change, but it is the State above all that can drive economic actors toward more ecological operational methods. The debate changes, but what about behaviour? We can take advantage of past experience to evaluate how behaviour changes in response to public policy. Thus, the *Contrat Territorial d'Exploitation* (hereafter referred to as the CTE), land use contract, experiment from the early 2000s is a rich source of information.

Sustainable development (SD), defined as development that meets the needs of the present without compromising the ability of future generations to satisfy their own needs (Brundtland Report, 1987), is the solution which should allow us to consider the ecological and social dimensions of the decision-making process of all actors. As indicated by Arrow *et al.* (2004), SD involves choosing a sustainable growth method, which means that each stage of growth attained does not penalise future growth. In the business world, sustainable development means the maximisation and evaluation of three types of performance (environmental, social and economic). The term "corporate social responsibility" (hereafter referred to as CSR) is currently used to evaluate the application of these three dimensions. Businesses with a long term commitment to their responsibility as civil society members tend to implement management styles and production methods which permit the coexistence of economic and social progress and respect for the environment.

In order to promote SD, the government has implemented certain policies which aim to integrate this environmental rationale into business strategy. Agricultural producers, stakeholders inextricably linked to the environment, were able to sign a CTE. The CTE was one result of the Agricultural Orientation Law of 9th July 1999 which aimed to promote multifunctional agriculture in response to society's expectations (product quality, healthy soils, landscape conservation, environmental respect, etc.).

Farmers could thus apply for a CTE signed with the State and composed of two sections. The first was a response to employment- and economy-related issues such as produce transfer and product quality improvement. The second referred to environmental and land issues, such as water management (quantity and quality), fertility

and soil erosion problems, or landscape and cultural heritage conservation. In 2002, the CTE was superseded by the *Contratd' Agriculture Durable* (CAD), Sustainable Farming Contract, mainly due to the high costs generated by the numerous beneficiaries of the CTE. Contractual aid had initially been estimated at 23,000 Euros per beneficiary, but in reality reached about 44,500 Euros (Urbano & Vollet, 2003).

If CTEs are now a thing of the past, what is the point in discussing them now? This issue is quite important, since we are measuring the effect of pro-SD public policies by analysing farmers' reactions. This experiment, for which we know we have all the data, allows us to better understand current behaviour. In addition to the economic and environmental results obtained by the CTE, we will use an in-depth CTE survey to evaluate how farmers integrate SD into their practises. Our study will test the truth of the following hypothesis: "financial incentives favour the farmers to take into account sustainable development in their practices". In this regard, we study how the farmers take into consideration the expectations of different stakeholders in the frame of the farming practices. Once we have introduced the stakeholder theory, we will present the database on which we worked and then the analysis of the results obtained.

2. CTE Stakeholders

Stakeholder theory originates in the work of Berle and Means (1932). They believed there is social pressure on management to assume responsibility for those for whose "well-being may be affected by the firm's decisions". Berle and Means (1932) predict a type of business management which balances "the interests of different community groups". Bowen (1953), considered the first proponent of corporate social responsibility, emphasises the moral and social obligations incumbent on the firm. The firm must make decisions "coherent with society's values" (Mercier, 2004). According to Freeman (1984), the term "stakeholders" appeared in 1963 at the instigation of Ansoff and Stewart who created a neologism from the English and American terms "shareholders" and "stockholders". The notion of "stakeholders" was actually popularised by Freeman (1984) who defined it as: "any group or individual who can affect or is affected by the achievement of the organisation's objectives". For advocates of stakeholder theory, the organisation's societal responsibility is not limited to the satisfaction of capital providers' interests, as proposed in neo-classical theory (Friedman, 1962; Hayek, 1979, cited by Toublan, 1995), but includes responsibilities in terms of all the stakeholders involved in its development.

From that point onwards, stakeholder theory has focused on the study of relationships maintained by the organisation with its various stakeholders. Depending on the type of relationship being studied, there is a reasonably widespread acceptance of the notion of stakeholder. Some authors limit their study to participants directly involved in the organisation's economic success. Thus, Hill and Jones (1992) only consider constituents who have a legitimate claim on the firm. In the same vein, Clarkson (1995) differentiates voluntary stakeholders, who invest some form of capital (human or financial) in the firm, from involuntary stakeholders who play a passive role. Other authors have a broader view of stakeholders. This leads them to identify a greater number of stakeholders, which results in a more complex network of relationships between the firm and its stakeholders. Given that stakeholders do not all exercise the same level of pressure, many authors have suggested typologies allowing them to be classified. Caroll (1979) distinguishes primary stakeholders with a contractual relationship with the firmfrom secondary stakeholders with an indirect relationship with the firm (Clarkson, 1995; Carroll & Buchholtz, 2000). Pesqueux (2002) revisits this distinction by classifying stakeholders into two groups: contractual stakeholders and diffuse stakeholders. For her part, Isabelle PelleCulpin (1998) proposes a classification of stakeholders in accordance with the three CSR pillars (institutional, economic and ethical). Friedman and Miles (2002), in turn, suggest four groups of stakeholders, introducing the variables "compatible/incompatible with the organisation's interests" and "necessary (internal) or contingent (external)". Using Clarkson's definition (1995), Kochan and Rubinstein (2000); Mitchell et al. (1997) and Frooman (1999) analyse the level of stakeholder influence in terms of their contribution to the organisation's resources and the costs sustained by both parties if the relationship breaks down.

Mitchell *et al.* (1997) identify seven types of stakeholders according to their possession of at least one of the three following attributes: power, legitimacy and the urgency of claims stakeholders may make on the organisation.

Stakeholder theory may offer a standard model for managing relationships with stakeholders (Donaldson & Preston, 1995). Identifying and classifying them allows the organisation to respond appropriately to their expectations.

Clarke (1998) recognises these particular needs in terms of information. Management must communicate to each stakeholder the information of interest to them (Table 1).

Partners	Stakeholder Expectations	Information Supplied by Organisations			
Employees	Remuneration, job security, training	Company reports, employment news, negotiations			
Shareholders	Dividends and increased share price	Annual reports and accounts, information on			
		mergers and takeovers			
Customers	Quality, service, security, value for money	Advertising, documentation, surveys			
Banks	Company liquidity and solvency, value of guarantees,	Coverage ratios, security, cash flow forecast			
	cash flow generation				
Suppliers	Stable and lasting relationship	Prompt payment			
State	Respect for laws, employment, competitiveness and	Reports to official bodies, press releases			
	reliable data				
Public	Operational security, contribution to the community	Security reports, bulletins			
Environment	Substitution of unsustainable resources and	Environmental reports, conformance reports			
	non-polluting activities				

Table 1. Stakeholders' Expectations, Clarke (1998)

Source: T. Clarke (1998).

The approach proposed by Clarke reduces the organisation's social responsibility to an obligation to provide information to stakeholders. Paradoxically, in spite of its reductive nature, it is one of the rare approaches to propose recommendations aimed at satisfying stakeholders. "Stakeholder Theory merely indicates that the organisation must recognise its obligations to Stakeholders; very rarely does it specify the content of those obligations" (Mercier, 2001). The lack of literature on the subject underlines the challenge in defining stakeholder expectations. Cyert and March (1963) show that participants have uncertain preferences which may be fluid and even erratic. It is for this reason that we must emphasise the dynamic nature of the relationship between stakeholders and the organisation (Frooman, 1999; Kochan & Rubenstein, 2000). This dynamic represents a challenge to our analysis. It is therefore necessary to take into account the situation under analysis in order to identify the relevant stakeholders.

3. Main Stakeholders in the CTE Experiment

Owing to their history and the norms and values which apply to them, farmers constitute a study subject with very particular characteristics. Farmers are governed by a specific regulatory and legislative framework. The industry has its own operational rules which differ from those in other types of businesses, such as commercial organisations. One important characteristic of this legal framework is the societal nature of the activity: food production (law of 9th July 1999 about standards of food safety). Another characteristic is a farmer's moral and legal obligation to carry out an activity which does not negatively impact upon the environment. These principles require the collaboration of partners such as farmers, agricultural bodies, residents and government.

In this specific context, a group of participants may fall into either of the two main theoretical debate categories which form the basis for the existence of a stakeholder: power and legitimacy (Andrioff & Waddock, 2002). The power criterion (Frooman, 1999; Mitchell *et al.*, 1997; Rowley, 1997) defines the interdependent relationships between the organisation and the different groups which make up its environment (Andrioff & Waddock, 2002). In the farmers' case, the power relationships between groups or individuals lie notably in the ad hoc judicial framework, but also in the economic relationships between the participants (producers, supplier-customer and the State). The legitimacy criterion, based on neo-institutionalist theories (DiMaggio & Powell, 1983) as well as on moral philosophy theories (Phillips *et al.*, 2003), is particularly relevant.

In the general CTE context, we have identified two main stakeholders: the government and the citizen consumers.

- *Government*: proposes measures and finance to encourage and oblige farmers to adopt more environmentally friendly production methods. Co-signs the CTE agreement.
- *Citizen consumers*: the main participants concerned with consumption of agricultural products. They have a voice in matters of respect for food product quality and respect for the environment.

Although it seems simple to identify the main CTE stakeholders, the problem now facing the researcher analysing the CTE results is that of the farmers' motivation. In other words, what is the impact of the CTE in terms of government expectations? In order to examine this question, using available CTE-related data, a representative sample of farmers will allow us to find the answer.



Figure 1.

4. Database

4.1 Farms in the Department Maine-et-Loire

With almost 3,000 CTEs in the Pays-de-la-Loire, this region is in fifth position nationally (around 8% of contracts signed). In the department Maine-et-Loire there are 697 farmers who were able to benefit from this opportunity (between 2000 and 2002) from a pool of very diverse production types. Agriculture in Maine-et-Loire is relatively extensive, based on the use of pastures (notably in the Segréen area) and favourable for milk and meat production. This mixed-crop and livestock farming also exists in Brittany but farming there is more intensive with high rotation fodder pastures due to the higher rainfall.

Several activities in our sample require a significant volume of labour. For example, wine production, tree cultivation, market gardening and horticulture. This utilisation issue is also encountered in the Midi-Pyrénées region (regional leader with around 6,200 CTEs), which has similar characteristics.

4.2 Sample Selection

We have a rich database at our disposal from CER FRANCE Maine-et-Loire which undertakes the accounting and financial management of around 50% of the commercial farms in the area. This database has the advantage of being current since the information is updated regularly.

We also sent questionnaires to 257 farms with a signed CTE managed by CER FRANCE. The 231 subjects who responded (a return rate of 90%) were utilised along with a control sample of 231 farms with a profile similar to that of the CTE farmers (geographical location, legal structure, etc). We can thus compare the CTE farmers' motivation with that of other farms.

4.3 Sample Characteristics

Table 2 shows the main activities of the farms who signed a contract.

Activity	CTE	Non CTE
Milking cows	38.8%	38.4%
Cow-calf operations	27.1%	24/1%
Wine Production	5.9%	7.6%
Grain	5.5%	5.4%
Others (< 5%)	22.7%	24.5%

Table 2. Activities of the 231 CTE signatories

Almost two thirds of the farmers are dedicated to mixed-crop and livestock farming, which makes a fairly homogenous group, whereas the remaining third covers very heterogeneous farms (wine production, grain, tree cultivation, market gardening, horticulture, etc.).

Table 3. Surface area of the 472 CTE and non-CTE far	ms
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Surface area (in ha)	CTE (231)	Non-CTE (231)	
Crop surface area (a)	32.72 (32.87)	34.45 (31.51)	
Fodder surface area	58.77 (43.94)	41.03 (31.15)	
Usable area	91.84 (48.72)	75.68 (43.62)	

Discription: The useful area is different from the total crop surface area and fodder surface area. This is uncultivated or non-productive land. (a) Significant at 5%.

The contract beneficiaries farms have a usable agricultural area (UAA) larger than that of the non-beneficiaries and in particular 50% more fodder area. The CTE farms also demonstrate improved performance in terms of the elements in Table 4.

Table 4. Level of performance of contract beneficiaries farms and non-contract - beneficiaries farms

Performance criteria (in k€)	CTE (231)	Non CTE (231)	
EBE / UTAF (a)	39.6 (25.7)	37.2 (34.4)	
Current result / UTAF	18.0 (19.9)	17.5 (24.0)	

Description: EBE: *excédent brut d'exploitation* (Gross Operating Surplus); UTAF: *unité de travail agricole familial* (Family Agricultural Work Unit). (a) significant at 5%.

The product per work unit is lower for CTE beneficiaries and naturally is linked to farming strategy; in this case extensive in terms of the pasture surface area, but also to the reduced profitability resulting from the implementation of the environmental measures contractually agreed on in the CTE.

Even though CTE beneficiaries product is lower (on average over 5 years), the current result per UTAF nonetheless attains the same level. The profitability of these farms is slightly higher with a gross operating surplus to net product ratio of 32.2%, or 3 points higher when compared with conventional farms.

Table 5. Size of subsidies for contract beneficiaries' farms and non-contract - beneficiaries farms

Performance criteria (in k€)	CTE (231)	Non-CTE (231)		
PAC Subsidies	23.4 (21.1)	23.1 (17.9)		
CTE Subsidies	6.0 (6.7)	0 (n/a)		
Total Subsidies (a)	29.4 (21.2)	23.1 (17.9)		

Description: (a) significant at 1%. PAC: Politique Agricole Commune (Common Agricultural Policy or CAP).

Even though contract beneficiaries' farmers receive average CAP subsidies higher than the others, these farms also have higher subsidies per hectare. Also, in the case of CTE grants, total subsidies per hectare are markedly higher than the grants received by conventional farms.

These subsidies are important for the farms and represent a sale price offset. Without these CAP subsidies, many farms would not be viable. Whatever the farming strategy (conventional, organic, sustainable, integrated, etc.), farming revenue is significantly lower on average if the subsidies are not taken into account (includes all subsidies). In fact, the farming revenue of 50.6% of the contract beneficiaries' farms would be negative compared with 44.2% of conventional farms. The objective of the DPU urban protection scheme for 2013 will be an issue in terms of European aid and French agricultural aid in particular.

A database was created using a questionnaire distributed to contract beneficiaries' farmers in the Maine-et-Loire department to determine their reasons for entering into such an agreement. The economic and financial data was used to evaluate the farms' performance and compare them with entities of a similar nature (size, legal structure, location, etc).

5. Results

5.1 Farmer's Motivations When Signing CTE

Using a fifteen minute telephone survey of the 231 respondents, the replies to our 19 questions allowed us to determine the reasons which led the farmers to adopt environmentally friendly practices. The questions were arranged under 5 main headings: type of contract, CTE-related issues, choice of environmental measures,

remuneration for those measures, willingness to follow an SD strategy (re-signing, signing a CAD, etc). This study was undertaken by Planchais (2008).

Since most of the questions were of a closed nature, the types of responses were:

- a positive or negative response, or

- a choice from a selection of predetermined replies (including 'other'), or

- a scale with 5 possible replies (strongly disagree, disagree, not sure, agree, strongly agree)

We were thus able to confirm that farmers were aware of the issues related to their business, since water and soil problems are mentioned as a priority. The water-related questions asked were "Is preserving water quality one of the aims of your CTE" and "Is water consumption management one of the aims of your CTE?"

However, in the search for contract beneficiaries' farmers motivation, we have concluded that this is more economic (61.5% of respondents) than environmental. Indeed, 199 contract beneficiaries' farmers (86.1%) believe the CTE to be a validation of existing farming practices (particularly so in terms of limiting chemicals, extensive pasture management and hedgerow maintenance). In other words, signing a contract does not lead to actual strategy changes in the business: rather these are opportunistic behaviours.

Nonetheless the contract beneficiaries (78.3%) are satisfied with their agreement (63.9% mostly satisfied and 14.4% completely satisfied). In June 2006, 19 contract beneficiaries' farmers (8.2%) had already signed the current *contratd' agriculture durable* (sustainable agricultural contract) or CAD since their CTE had expired (mainly CTEs signed in 2000).

Overall the CAD has not been as successful. In fact, only 54.3% of the respondents would have signed a CAD if the CTE had not existed. The level of financial assistance, even when capped at 27,000 per contract, is the principal reason for signing. On the contrary, more restrictive environmental measures do not encourage some farmers to adopt an SD-oriented strategy.

5.2 CTE Effects on Agricultural Practices

Thanks to the data, we have obtained information related to the use of chemicals on farms. By this we mean chemical fertilisers and plant-care products (pesticides, herbicides, insecticides and fungicides) which affect the ecological environment.

With varying signing dates we have used contract beneficiaries' farmers whose contracts expired in 2005 (the first CTEs from 2000). We thus have a continuous sample of contract beneficiaries' farmers (85) and non-contract beneficiaries' farmers (150) during and after the CTE.



Figure 2. Evolution of the cost of fertilisers and plant-care products between 2002 and 2008

Note: Cost per hectare (ha).

We note that the cost of \notin 1/ha for fertilisers appears as an abnormal point in this chronological series. 2005 was the year during which the CTE ended, but on different dates for different farms. It seems that from the end of the CTE, farmers used a very high level of fertilisers. In other words, they replenished their stocks, which explains why 2005 was an exceptional year and we will remove it from the analysis. We will compare the years immediately before and just after 2005: 2003 and 2004 on the one hand, and 2006 and 2007 on the other. We thus obtain the average costs in Figure 3.



Figure 3. Evolution of average chemical costs in 2003-2004 and 2006-2007

During the contract period, the cost of fertilisers and plant-care products for contract beneficiaries' farmers was lower than that for non- contract beneficiaries' farmers. However, at the end of the contract, we note that this cost starts to increase and align with the average. We observe a farm catch-up strategy. We also note that with rising grain sale prices, producers tend to use more chemicals to maximise their yields.

5.3 A Sustainable Success?

For the purposes of this analysis we will use a homogenous sample, since the 462 farms are in different sectors and have greatly differing chemical usage: in market gardening, for example, small areas generate much higher costs per hectare. We will only refer to livestock farms for which we have all data for the years 2003 to 2007. Of 231 contract beneficiaries' farmers or non-contract beneficiaries' farmers, our statistical analyses allow us to better determine the farmers' ecological or non-ecological behaviour.

E	During CTE		A	After CTE		
Ferunser Purchases	Average Effect	Factor Contribution	Average Effect	Factor Contribution		
Beta (constant)	-229.8743	265.1325	-1618.1887 *	1220.2652		
	(0.5596)	(-0.6728)	(02.8645)	(1.5689)		
CTE (yes/no)	-786.9055 ***	363.0407 *	-764.3055 ***	-182.0496		
	(-4.7473)	(-2,8524)	(03.8437)	(-0.7063)		
UTAF (Family Agricultural Work Unit)	-5.0503	3.5741	-14.6729	3.0299		
	(-0.6181)	(0.4180)	(01.6313)	(0.3348)		
SAU (Useable Agricultural Area)	42.7896 ***	-22.2206 ***	48.3585 ***	-20.5335 ***		
	(8.2234)	(-6,2110)	(7.0882)	(-4.1807)		
Debt	-7.0038	5,4768	-0.0310	18.1022		
	(-1.3450)	(0.8715)	(-0.0034)	(1.1471)		
Overheads	0.0179 ***	-0.0027	0.0325 ***	-0.0057		
	(4.1795)	(-0.7795)	(5,6184)	(-0.9120)		
Seed purchases	0.2556 ***	0.0027	0.2388 *	-0.3491 ***		
	(4.6183)	(0.0668)	(3.0907)	(-5.8264)		

Table 6. Use of fertilisers during and after CTE

Note: * p< 0.06, *** p< 0.001.

Farmers who chose the CTE purchased fewer chemicals before, during and after the contract. The factor contribution shows the data to be homogeneous (after CTE). Other factors also justify the purchase of fertilisers. Overheads for example: the higher these costs, the higher the fertiliser cost, namely ≤ 17.90 per ≤ 1000 of overheads.

With plant-care products, the result is the same. Farmers who signed a CTE use significantly fewer pesticides, herbicides and insecticides, etc.

As with fertilisers, the surface area is an important variable: with larger farms, CTE beneficiaries use fewer chemicals per hectare. In fact, with in excess of 20 hectares more of fodder area, farmers committed to SD have a significantly lower per hectare cost.

Plant-care Product Purchases	During CTE		After CTE	
	Average Effect	Factor Contribution	Average Effect	Factor Contribution
Beta (constant)	-1971.8637 ***	-93.9710	-2766.9682 ***	1303.0251 ***
	(-7.311)	(-0.3558)	(-8.1552)	(3.7359)
CTE (yes/no)	-866.5813 ***	-303,4553 ***	-855.8198 ***	-308.4142
	(-7.4234)	(-3,3668)	(-5.8220)	(-2.5610)
UTAF (Family Agricultural Work Unit)	-1.3895	5.5053	-4.3972	3.6636
	(-0.2413)	(0.7258)	(0.5902)	(0.4676)
SAU (Useful Agricultural Area)	17.1009 ***	0.2392	25.9907 ***	-16.2868 ***
	(4.5643)	(0.1279)	(7.2606)	(-5.8758)
Debt	-7.0804	-11,0356*	24.4180 ***	-32.8493 ***
	(-1.8069)	(-3,1104)	(3.7542)	(5.0779)
Overheads	0.0308 ***	-0.0082 ***	0.0303 ***	-0.0054
	(11.8799)	(-5.9489)	(9.8865)	(-2.2592)
Seed purchases	0.4285***	-0.1528 ***	0.2767 ***	-0.0779 *
	(11,3103)	(-5,7907)	(8.4045)	(-2.3816)

Table 7. Use of	plant-care	products	during	and	after	CTE

Note: * p< 0.06, *** p< 0.001.

6. Conclusion

The study carried among 462 farms of Maine-et-Loire benefiting from a land use contract (CTE), showed that the grant of financial incentives favours the adoption of farming practices that are more respectful of the environment. Nevertheless, we showed that the farmers are more motivated by alogic of profit maximization aroused by financial help brought by the State than by a true adherence to the principles of sustainable development (SD).

Using a survey of 231 farmers who signed the CTE in the department Maine-et-Loire, Planchais (2008) identified four groups of producers with a factor analysis of the various respondents: the sensitive, the opportunists, the convinced and the strategic. On the whole, economic reasons still apply to these four types since financial assistance will always be necessary (sensitive, opportunists, strategic) or the CTE does not modify the production facility (convinced) and will also provide assistance.

In basing our study on managerial theories, we have not been able to demonstrate an authentic commitment to ecology even if the CTE may have served as a learning experience for the beneficiaries (revised practices in chemical use for example). Therefore, the issue of agricultural aid would appear not to be favourable to SD since it is the subsidies themselves which attract signers and, at the same time, jeopardise pro-SD practices. The necessary condition of a financial incentive for an SD policy has been demonstrated for farmers, but this result is bound to be transferrable to other types of businesses.

To avoid policies which benefit only opportunists and do not produce significant ecological results, it is first necessary to study the behaviour of the participants. It is up to governments to set businesses on the path to SD, bearing in mind that a financial incentive is a necessary condition if good practice is to be adopted.

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