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**Performance of services:
a framework to assess farm extension services**

Pierre LABARTHE
Institut National de la Recherche Agronomique
UMR SAD-APT
16, rue Claude Bernard
75005 PARIS
E-mail: pierre.labarthe@inapg.inra.fr



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PERFORMANCE OF SERVICES: A FRAMEWORK TO ASSESS FARM EXTENSION SERVICES

Abstract: There is in Europe a trend for privatisation and commercialisation of technical extension services for agriculture. At the same time, extension is supposed to support the contribution of multifunctional agriculture (MFA) to rural development. This article proposes an analytic framework to test whether performances of commercial extension enable to enhance the effectiveness of intangible investments in MFA context. Empirical investigations were realised about technical extension for cereal production in Ain (France) and Zeeland (Netherlands). It appears that [A] private extension providers hardly invest in R&D relevant to MFA context; [B] some farmers who contribute to MFA may lack technical knowledge when provided by commercial extension.

Keywords: Agricultural extension services, Information and knowledge

JEL classification: D83, Q16

1. Introduction

As knowledge is recognized to play a key role in economic development (Abramowitz and David, 1996), intangible investments, “*the production of knowledge which is incorporated in the long run in objects, people and organisations*” (Epingard, 2001) are a central issue for agricultural economics. Agricultural extension could be defined as “*the exchanges between farmers and advisers, which deal with management of productions, the management of the information necessary to the production, and the management of the activities and allocation of resources*” (Laurent and *al.*, 2002). Technical extension is an immaterial investment within the agricultural knowledge system (AKS) by playing a key role for the production of knowledge. The consequences of the changes in the provision of technical extension should be therefore analysed. Out of the impact of new information and communication technologies on extension (Streeter, 1990, Batchelor and *al.*, 1991, Leeuwis, 1993), the major change about agricultural extension is a decrease of public involvement in financial and scientific support: “*it is more and more the clients who are in charge of the task of extension and development, either individually or, in many cases, through local professional federation, co-operatives, etc.*” (OECD, 2000). The trend of privatization and/or commercialisation within European AKS concerns especially extension as in the Netherlands (Leeuwis, 2000). But, at the same time, rural development could be understood as an acknowledgement of the multiple functions of agriculture by agricultural policies (European Commission, 1996, van der Ploeg and *al.*, 2000). Thus, the diversity of themes for technical extension is increasing: extension is more and more supposed to bring technical support to other functions of agriculture than primary production. Furthermore, it is planned in the next reform of the European Common Agricultural Policy (CAP) that member States should settle a national extension system in order to provide extension related to the implementation of sanitary and environmental standards (European Commission, 2003). These changes settle the question of effectiveness of extension service: would the trend toward greater commercialisation of extension services increase the effectiveness of extension services in a context of acknowledgement of multifunctional agriculture (MFA)? But how to assess farm extension services effectiveness when providers of extension are confronted to such a new situation? The question of the assessment of effectiveness of intangible investment such as extension is a complicated issue (Carter, 1996). To overcome this difficulty, this article proposes a framework which enables to link the internal performance of extension supplier with global effectiveness of extension for policies which acknowledge MFA. This framework has been tested in the case of technical extension for cereal production in two regions: Ain (France) and Zeeland (Netherlands).

2. An alternative approach for the assessment of effectiveness and performance of extension services

At present, there is a stream for privatisation and/or commercialisation of extension services in agricultural sector: “*Major reconstruction of the public sector, and more specifically public sector agricultural extension, began in the 1980s. This was the beginning of market-oriented paradigm shift,*

and in many countries heralded "end of the beginning" for centralized extension. An ideological and institutional paradigm shift took place that called for (a) reduction of public sector services; (b) experimentation with new services delivery structures, including a growing interest in privatization; and (3) decentralization of activities with shared responsibilities between central and local governments and also with private user companies and associations" (Rivera, 2000). Even though the reasons for this global trend toward greater privatization of extension services could vary according to the countries, it often relies on the theoretical hypothesis that private provision of extension could increase its quality : "Extension services provided by the private sector, or even profit-oriented parastatals, can only upgrade the quality of overall extension support available to farmers, both for the crops and activities they directly cover and by the competition they provide government. Similarly, one cannot argue against the principle of cost recovery; at the least, it instils a sense of financial discipline, and is one criterion (out of many) upon which to evaluate the appropriateness of alternative extension strategies and activities" (Baxter, 2000). The purpose of this paper is to develop an analytic framework for the assessment of effectiveness of extension services in order to test this hypothesis.

The specificity of the framework proposed in this article relies in two points. 1) As agriculture plays multiple functions for rural development, this analytic framework includes these functions in the assessment of the effectiveness of extension services. 2) As extension is a service activity, this framework proposes to take into account the specificities of services to assess the performance of extension in a context of privatization.

2.1 Assessing effectiveness of extension services for agricultural policies

Research works focusing on effectiveness of extension services in agriculture rely on a set of three concepts - effectiveness, efficiency and accountability - defined as follow: "Effectiveness refers to the ability to meet goals, objectives or needs - here these are the goals, needs and objectives of the rural population. Efficiency refers to the way in which goals are met - it implies that is done at as low a cost as possible without having a negative impact. Accountability is institutionalised responsiveness to those who are affected by one's action". Thus accountability contributes to effectiveness and only institutions which are effective can be classified as truly efficient. In a sense, then, efficiency subsumes the other goals" (Carney, 1998). In such a conceptual framework, effectiveness is often conceived at the level of the individual client, and, even though problems of externalities (such as inequalities of access to information and asymmetries of information) and accountability linked to this externalities are stressed by different studies (Hanson and Just, 2001), the focus is put on the assessment of efficiency of extension services (Carney, 1995), in terms of costs and benefits. Nevertheless, the evolution of agricultural policies is characterised since the 1990s by the acknowledgment of the different functions: primary production, food safety, maintenance of environment, social cohesion, services in rural areas and political functions such as food security (European Commission, 1999). If agricultural sector is to meet and fulfil these different functions, then the evaluation of the effectiveness of agricultural extension should take into account multiple goals related to these different functions. In a context of acknowledgement of multifunctional agriculture (MFA), I propose to distinguish two levels in the evaluation of the evolution of the quality of extension: the global effectiveness of extension related to goals of agricultural policies on the one hand, and on the other hand, the level of the internal performance of extension supplier. The question is then whether the change induced in criteria of internal performance for extension supplier by the decrease of public investment will enhance or not the global effectiveness of extension services.

Therefore, it is necessary to build a framework for the assessment of internal performance of extension service at the level of suppliers, in order to understand the consequences of privatisation and/or commercialisation of the services on this internal performance.

2.2 Assessing the internal performance of extension services at the level of the supplier

Extension can be modelised as an activity of transfer of information to farmers. In that case, information can be considered as goods (Umali and Schwartz, 1994). The analysis of the performance

of extension is then often translated in terms of efficiency of the transfer of information, and could be analysed thanks to tools of standards economics such as maximisation of utility functions of demand and supply for extension supply, where these functions could be independent (Dinar, 1996). Nevertheless, such a conceptual framework could only be applied in the case where agricultural extension has the properties of a private good such as rivalry and excludability (Umali and Schwartz, 1994). If some works try to take into account the diversity of the nature and source of information used by farmers (Just and al., 2002, Allaire and Wolf, 1999), it could also be considered that there are hardly cases in which agricultural extension fulfils the conditions of validity of standard economics (Hanson and Just, 2001). Indeed, not only demand and supply for extension are dependant from each other (Frisvold et al., 2001), but it could even be considered that extension allows a co-production of specific knowledge through service relation between farmers and advisers. The concept of co-production of service relation has been defined by Gadrey (1994) as: “*operational interactions through joint and coordinated actions about the really object of the service relation*”.

Therefore, in order to deal with the difficulty of assessing the internal performance of firms which provide extension, I propose to consider extension as a service activity rather than an activity of transfer of information. Service activity has been defined as “*a change in the condition of a person, or a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit*” (Hill, 1977). Service activities imply to settle service relations which can be defined as “*the modalities of connexion between clients and supplier about the problem which the client asks for the service*” (Gadrey, 1994). The activity of agricultural extension could then be described with two kinds of tasks. Back-office tasks, which consist in accumulation of technical references created from scientific knowledge through experiments and data basis management, and front-office tasks which consist in the service relation itself. Defined as such, services are still subject of major difficulties about the measurement of their productivity. Gadrey (1996) stresses the fact that the main difficulty of assessing services is to define the product of services, and that this difficulty is all the more important for immaterial services such as extension. Nevertheless, some recent works in the field of service economy tackle this difficulty by proposing a framework for the assessment of a plural performance of services, measuring performance in different dimensions of the product of services. Performance measures an increase in the quality and the quantity of the different dimension of the service. Following Gallouj (1999, Gallouj and al., 1999) and adapting his framework to the case of suppliers of agricultural technical extension, I propose to consider five dimensions of product and performance of extension service: financial dimension, technical dimension, relational dimension, innovative dimension, and civic dimension. Each of these dimensions could be described both in quantitative and qualitative terms (table 1).

	Quantitative performance	Qualitative performance
Technical dimension	- Number of clients - Number of clients / adviser	- Reduction of “error ratio” = number of contact without change in the production system of the farmer
Financial dimension	Net value of the extension activity (gross income – cost of services)	- Adaptation of services to the diversity of target clientele
Relational dimension	- Turn-over of clients	- Personalisation of the services
Innovative dimension	- Accumulation of technical references (results of field experiments, collection of data and management of data basis, etc.)	- Ability to develop new extension services or tools or to incorporate new technical references in services
Civic dimension	- Actual clientele / target clientele	- Equity of services provided to the diverse clients

Table 1. The five dimensions of performance of technical extension characterised as a service activity.

The **financial** dimension stands for indicator of the net income of the extension activity of the supplier. The **technical** dimension describes the yield of the service activity: the quantitative performance is measured through the number of clients per adviser and the qualitative performance

through an “error ratio” of the activity. The **relational** dimension enables to assess the personalisation of the services thanks to turn-over of clients (quantitative performance) and intensity of the service (frequency and duration of the service relation) (qualitative performance). The **innovative** performance characterised the ability of the supplier to design new knowledge and tools with and for the clients, in front of new technical problems, through R&D activities for instance. The **civic** dimension refers to the status of the providers. In some cases, providers of extension have other relations with their clients than only extension. Thus, they may have constraints and obligations about the service they provide, according the nature of their role for farmers: a farmer’s co-operative has not the same relations with its clients than a private company. Therefore, the quantitative performance of the civic dimension is measured by the percentage of the target clientele reached by the supplier, whereas the qualitative performance is measured through the equity of services between the beneficiaries of the services.

Thanks to this framework, it is possible to analyse which dimension of performance defines the modalities of development of front-office and back-office tasks for suppliers of commercial technical extension. Indeed, the five dimensions of performance are not independent from each other. For instance, increasing relational performance with some clients may limit the possibility to increase the impact performance of the services, as well as the will to increase financial performance in short term may limit investments in R&D activities for improvement of innovative performance in the long run.

2.3 Proposal of key elements to link effectiveness of extension services for agricultural policies and internal performance of extension suppliers

If some studies propose models to measure the impact of R&D and extension investment on productivity of agricultural production (Esposito, 2000), they do not aim at evaluating effectiveness of extension in a MFA context. To do so, it is necessary to deal with the difficulty of linking internal performance of services for suppliers and effectiveness at a global level. In order tackle this difficulty, I propose (as suggested by Gadrey (1995)) to distinguish direct effects of services – the quality and quantity of services consumed by farmers, and indirect effects of services at the scale of clients or at more global scales this indirect effects. For extension, these indirect effects are the effects of intangible investments: *the production, accumulation and distribution of knowledge which is incorporated in the long run in objects, people and organisations* (Epingard, 2001). Therefore, the link between effectiveness of extension as an intangible investment for MFA policies, and internal performance of extension for suppliers could be assessed through (Fig. 1):

- [A] the contribution of extension services to the production and accumulation of appropriate knowledge and references to deal with the multiple functions of agriculture;
- [B] the distribution of knowledge produced by extension to the range of farmers who contribute to the functions of agriculture supported by agricultural policies.

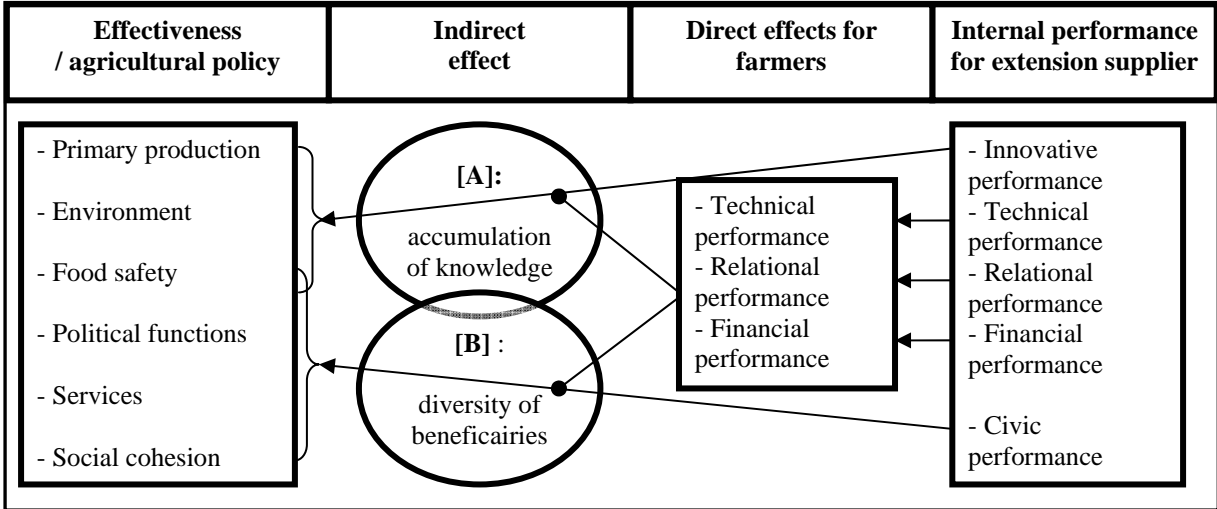


Figure 1. Proposal of a framework for the assessment of effectiveness of extension in a MFA context.

In such a conceptual framework, it would then be possible to understand whether the criteria of internal performance for suppliers of commercial extension services, contributes to enhance the effectiveness of extension for agricultural policies. In the next section, I present the method which was used to test the analytic framework.

3. Method and research hypothesis about performance of technical extension services for cereal production in Ain (France) and Zeeland (Netherlands)

Some investigations were carried on in Ain (France) and Zeeland (Netherlands) in 2004. The purpose of these investigations was to collect data for the assessment of performance of technical extension for cereal production. Then, I will use the general framework presented above to understand the impact of internal performance of extension suppliers on goals of effectiveness related to multifunctional agriculture. Thus, a first step consists in the identification of these goals.

3.1 Preliminary results and research hypothesis

The main choice in terms of method was to carry on investigations in both France and the Netherlands. This was interesting for two reasons.

1) Rural development in the two countries emphasis the fact that agriculture plays multiple functions in rural development. With regards with cereal production, on top of primary production, there are regulations or projects of regulations to guarantee the sanitary quality of cereal production. At the same time, it appears that farm diversity plays a key role for other functions of agriculture such as social cohesion or services. In France, the diversity of systems of production and activity contributes to social cohesion in rural areas (Laurent and Rémy, 2000, Laurent and *al.*, 1998). This relation between MFA and farm diversity has been recognized in laws about rural development, for instance through the recognition of the role of part-time farmers (LOA, 1999). The Dutch program for development (2000-2006), stresses the fact that agriculture should provide other functions than primary production: protection of environment, services in rural areas, etc. It appears that farm diversity also plays a key role for these different functions in the Netherlands. For instance, small farms – in terms of Economic Size Unit (ESU) - do not play a key role for primary production, but contribute to other functions of agriculture such as social work, preservation of nature or agritourism (Fig. 2). In both contexts, small-sized and part-time farms play a role for functions of agriculture which could enable agriculture to contribute to trajectories of sustainable rural development.

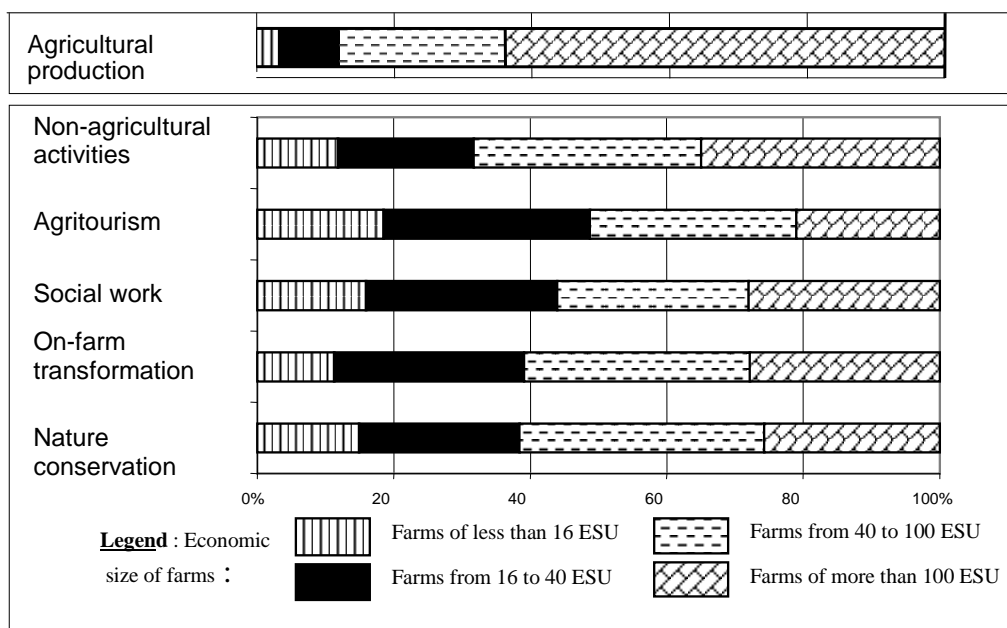


Figure 2. Contribution of Dutch farms to different functions of agriculture according to the economic size of the farm (source Central Bureau voor den Statistieken-CBS).

2) The evolution of State support to agricultural extension is very different in the two countries (Labarthe, 2003) : whereas there was a complete commercialisation of public extension services in the Netherlands during the 1990s, agricultural extension has been partly managed in France by Chambers of Agriculture which are run by Farmers' organisations since the 1960s. The contrast between these two contexts might give key elements to understand the consequences of this change in public involvement in AKS on performance of extension supplier.

In such a context, two hypotheses about the link between internal performance of commercial delivery of technical extension and effectiveness for agricultural policies of extension services are to be tested. [A] In a context of acknowledgment of MFA, extension should contribute to the accumulation of relevant technical knowledge and references about production systems of cereals which enable to combine goals of productivity and goals related to other agricultural functions than primary production. [B] In a context of acknowledgment of MFA, technical extension should be distributed to a diversity of farms (including small farms and part-time farms) which play a key role for multifunctional agriculture in the two countries.

3.2 Method

It is first important to stress the fact that the two countries lack of data about agricultural extension. The only available data basis was built thanks to specific questions about extension which were added to the French Agricultural Census (year 2000) in the Region Rhône-Alpes (Mündler and *al.*, 2004). But, the only available data of this basis determines whether farmers have access or not to extension services. That is why field work and direct investigation with supplier of extension were necessary to assess the performance of these suppliers. Concretely, investigations were carried on with providers of technical extension in the two regions: Ain and Zeeland (see Fig.3 for general information about these regions and their agriculture).

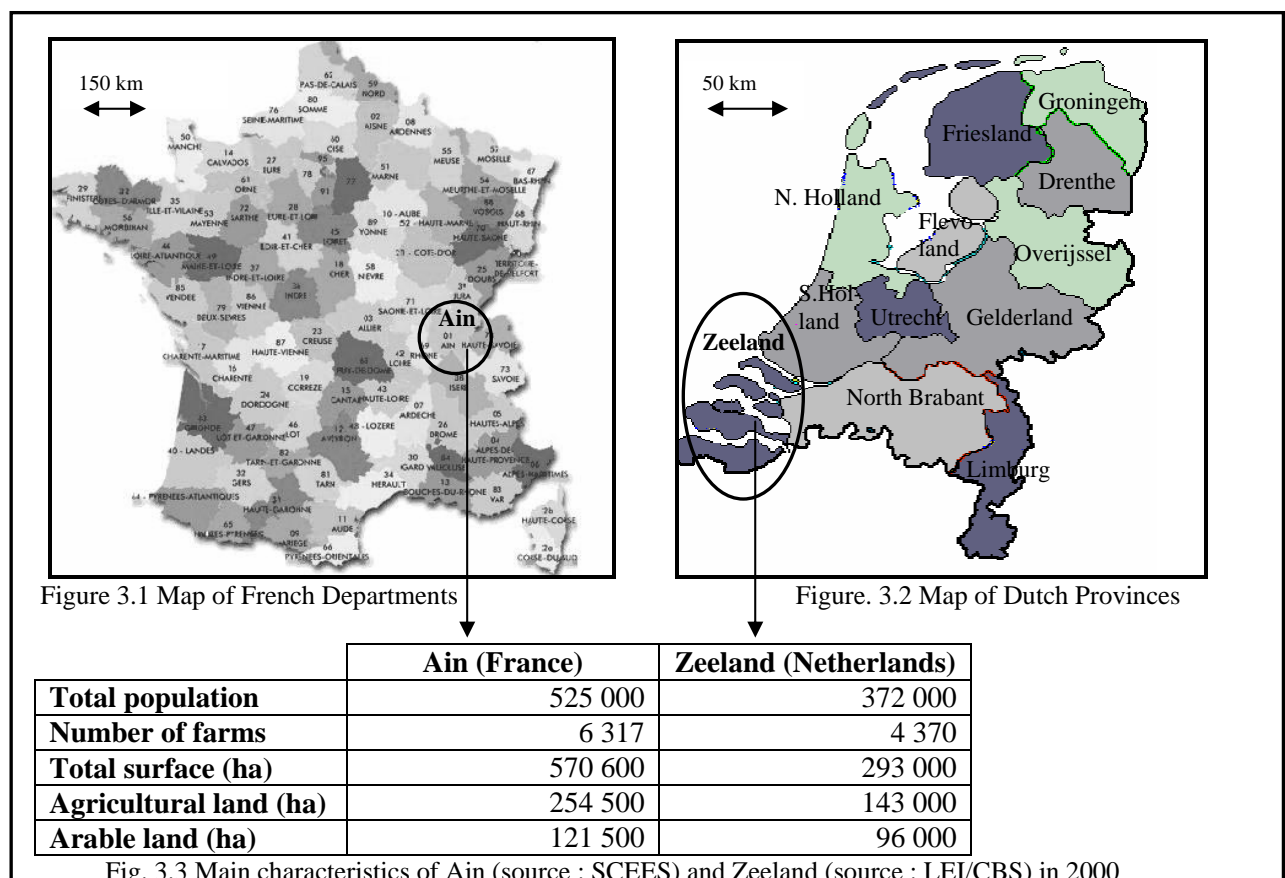


Fig. 3.3 Main characteristics of Ain (source : SCEES) and Zeeland (source : LEI/CBS) in 2000

Figure 3. Location and main characteristics of the department of Ain (France) and the province of Zeeland (Netherlands).

The investigations were exhaustive in terms of diversity of suppliers of technical extension for cereal production in the two regions, and they enabled to identify which were the main providers of extension (Table 2). In France, some investigations were also realised with farmers. The farmers interviewed were all specialised farmers in cereal production, but with a range of farms economic sizes (from 7 to 257 ESU).

	Ain (France)	Zeeland (Netherlands)
Extension supplier	- 3 departments of the Chamber of agriculture - 2 private consultants	- 3 private companies
Extension software supplier	- 1 private company	- 2 private companies
Input supplier	- 1 farmers' co-operative - 1 private trader	- 1 farmers' co-operative - 1 private trader
Applied research institutes	- 3 departments of ARVALIS	- 3 research departments of PPO - Productschap Akerbouw
Farmers	22 arable farmers : - 11 part-time farmers - 11 full-time farmers	

Table 2. List of organizations interviewed for the assessment of performance of technical extension for cereal production in Ain (France) and Zeeland (Netherlands).

Specific questionnaire were used with firms which provide extension in order to collect data about the five dimensions of internal performance of service activity: technical performance, financial performance, relational performance, innovative performance, and civic performance. The purpose is not to compare performances of different extension suppliers, but to understand which dimensions of performance would be the most important for the development of extension activity according to the suppliers. The specific questionnaire used for investigations with farmers was aimed at assessing both in quantitative and qualitative terms the extension services according to the farmers. This assessment of the performance of extension services for a diversity of farms (mainly a diversity in terms of economic size) is one key element of effectiveness of extension for agricultural policies for which farm diversity matters.

4. Results: contradiction between internal performance of extension for supplier firms and global effectiveness of extension for agricultural policies in a context of acknowledgment of MFA.

In this section, results of field work will be presented, first by describing the criteria of performance for suppliers, and then by analysing whether these criteria could contribute or not to enhance the effectiveness of extension services for agricultural policies.

4.1 Who are the providers of technical extension for cereal production in Ain and Zeeland?

The first outcome of investigations carried on in Ain and Zeeland was to identify which are the most important suppliers of technical extension for cereal production in both Ain and Zeeland context. In terms of number of advisers, it appears clearly in Ain that input suppliers are the main providers of technical extension in the field of cereal production (table 3). Extension delivered by input suppliers – co-operative as well as private traders – is free, although some services, which need sample analysis, or individual software processing are partly directly charged to farmers. Extension is directly linked to and financed by commercial trades of material inputs (seeds, fertilizers, chemicals, etc.) with farmers. For the Chamber of Agriculture, technical extension is no more a priority as the focus has been put on environmental, territorial and socio-economic issues. At last, there are only two private consultants who work in the field of extension. They have few clients and propose some very specific services (extension for management of fertilization for instance). The situation in Zeeland is different. If the first providers of extension services are also input suppliers to farmers (farmers' co-operative and private traders), there is also a private extension company, which is specialized in technical extension for arable farming and has significant human resources (table 4).

	Number of advisers	Number of clients
Farmers' co-operative	- front-office : 25 - back-office (daughter company) : 8	3500
Private Trader	- front-office : 12 - back-office : 3	1000
Chamber of agriculture (department for environmental extension)	15	Unknown
Private consultants	1 + 1	150 + 60

Table 3. Main providers of technical extension for cereal production in Ain (France).

	Number of advisers	Number of clients
Farmers' co-operative	23	3000
Private Trader	9	1100
Private extension company	18	500

Table 4. Main providers of technical extension for cereal production in Zeeland (Netherlands).

In the two cases (Ain and Zeeland), it appears that there is neither public extension services nor public investment in the provision of technical extension for cereal producers, as the main extension suppliers are input suppliers and/or private extension company. Therefore, this seems to be a relevant study case for testing the consequences of a private and/or commercial delivery of extension services on its performance. In the next section, the performance of extension services of the main suppliers of technical extension services will be analysed: a farmers' co-operative in Ain, and a co-operative and a private extension company in Zeeland (respectively table 6, table 7 and table 8).

4.2 A commercial delivery of technical extension tends to put the priority on relational and financial delivery dimension of the performance of the service

Performances of the two farmers' co-operatives in Ain and Zeeland are quite look-a-like (table 6 and table 7). These co-operatives are about the same size (3000 farmers) and do have dominant situations on both input (seeds, chemicals, etc.) and output market: their clientele represent more than 50% of cereal producers of their areas. The **technical** yield of extension is about 130 farmers per adviser for the two co-operatives. This similarity could be related to a direct linkage between technical and financial performances. As the cost of extension activity is essentially embedded in salaries of advisers, the co-operatives try to increase the **financial** performance of their services by enhancing the quality of the connexion between commercial transactions of material inputs, and free delivery of services. Indeed, in order to improve the qualitative performance of the **relational** performance of their service activity, they segment and standardize the service relations with their clients according to the volume of commercial transaction of material inputs. Nevertheless, the strategies of the two co-operatives for this segmentation of the supply are different. For the co-operative in Zeeland, the segmentation has been realised in quantitative terms, thanks to a formal linkage between the intensity of the service relation with the clients and the volume of commercial trade of inputs with this client. The clientele of the co-operative has been divided in three categories (A, B, C) according to individual volumes of financial transactions, and for each category, the advisers are given instructions about quantitative levels of relational performance of the service (table 5). An analytic accountancy of the work-time of advisers is used to analyse how front-office tasks are distributed according to the clients and their level of input purchase. Consequently, small farms have access to less visits of adviser. Thus, the **civic** performance of extension activity of the co-operative could be discussed.

Target group of farmers	« Winter » visits	« Summer » visits
Classe A (average size > 50ha)	<u>Minimum :</u> 2 visits of 2 hours each	<u>Minimum :</u> 10 visits
Class C (average size <15 ha)	<u>Standard :</u> 1 visit of 1 hour	<u>Standard :</u> 3 to 4 visits

Table 5. Link between time spent by advisers of a co-operative in Zeeland and the size of the farm

	Quantitative performance	Qualitative performance
Technical dimension	- 140 farmers / adviser	
Financial dimension	- Cost (= salaries + experiments) included in commercial transactions of inputs/outputs - No control of the connexion between costs of extension and trade of material inputs/outputs	- Toward a segmentation of the supply of “service relation” - Standardisation and segmentation of the supply by a diversification of extension products in terms of quality, outputs and personalisation of the products.
Relational dimension	- Low turn-over (5 to 10%)	
Innovative dimension	- Development of a daughter company which main targets are : <ul style="list-style-type: none"> ▪ Standardize back-office work and develop a range of commercial products of technical extension for cereal production (irrigation and fertilisation monitoring) ▪ Build a data basis with technical performance of clients ▪ Develop partnership for experiments 	
Civic dimension	- Some members of the co-operative do not have access to agricultural extension	- There are inequalities of service quality between members of co-op.

Table 6: Performance of extension services of a farmers’ co-operative in Ain.

	Quantitative performance	Qualitative performance
Technical dimension	- 130 farmers / adviser	
Financial dimension	- Cost (= salaries + experiments) included in commercial transactions of inputs/outputs - Control of the connexion between costs of extension and trade of material inputs/outputs	- Segmentation of the supply of “service relation” - Standardisation and segmentation of the supply thanks to a segmentation of the time spent with clients according to the volume of commercial transaction on inputs
Relational dimension	- Low turn-over of client (< 5%)	
Innovative dimension	- Research of external investment (Agro-industry, etc.) for access to technical ref. - Development of new tools for extension	
Civic dimension	- Some members of the co-operative do not have access to agricultural extension	- There are inequalities of service quality between members of co-op.

Table 7. Performance of extension services of a cereal co-operative in Zeeland.

	Quantitative performance	Qualitative performance
Technical dimension	- Clientele : 500 farmers - about 25 farmers / advisers	
Financial dimension	- 100% of Income = individual services for farmers - target income per adviser = (Salary + other costs + profit) / number of advisers	- Contracts with guarantee of minimum direct contact with the farmer - Flexibility of the offer - Diversification of the offer (management and monitoring of information on the farm, analysis of quality of products)
Relational dimension	- Low turn-over (4%)	
Innovative dimension	- Research of external investment (Agro-industry, etc.) for access to technical ref. - Development of new tools for extension	
Civic dimension	Irrelevant	Irrelevant

Table 8. Performance of extension services of a private extension company in Zeeland.

The co-operative in Ain does not use any formal linkage between time spent by advisers with farmers and the volume of inputs bought by these farmers. Nevertheless, there is a segmentation of the supply of services thanks to a strategy of diversification of standardized extension products. Thus, some new extension products (such as information system which allows helping farmers to monitor the management of irrigation or of fertilisation of their crops, for instance) are developed and proposed to client acknowledged as most important (according to the volume or the quality of production of these farmers). As a consequence, there are differences between the two co-operatives in terms of **innovative** performance. In France, a specific daughter company has been created by the co-operative for R&D activities. This daughter company is aimed at standardizing back-office tasks and developing a range of commercial products of technical extension for cereal production, but also building a data basis with technical performance of clients, and developing partnerships (with Applied Research Institute or Agro-Industry) for experiments on farms (about new varieties, new chemical products, etc.). This investment in R&D is part of the strategy of segmentation of the supply through the segmentation of quality of extension products. The co-operative in Zeeland has no specific staff for back-office or R&D activities: they are carried out by advisers as a low percentage of their working-time. The R&D activities of this co-operative are completely dependant on joint investment with Agro-industry. Indeed, Agro-Industries finance 75% of the cost of the co-operative R&D activities. If there are much more R&D activities and investment in the French co-operative (430 000 € for the French co-operative including salaries of back-office technical employees, 40 000 € for the Dutch co-operative), these investments are in both cases aimed at collecting information about performance of inputs (seeds, chemical, etc.) on productivity and quality of products rather than testing whole production systems which enable to fulfil different functions of agriculture.

It is interesting to compare these results about the performance of extension services of farmers' co-operatives with performance of a private extension company (table 8), as the contrast gives information about the consequences of fee-for service delivery of extension services on the performance of these services. First of all, it appears that the **technical** performance of the private company is much lower than for the co-operatives, with only 25 farmers per adviser. On the one hand, the income of this extension company comes 100% from direct payments of farmers for individual services, as this company does not receive any subsidies, and its main costs are salaries of advisers (70% of total costs). On the other hand, the population of farmers decreases, and the potential for increasing the clientele is low. As a consequence, the most important dimensions of the performance of extension services are according to the manager of this company: 1) the individual **financial** performance of each adviser (target income per adviser) which guarantees the profitability of the company; 2) the quantitative dimension of **relational** performance. Indeed, the sustainability of the company is dependant on a low turn-over of clients. In order to limit this turn-over, a range of services is proposed to the client, which enables strong, frequent and flexible direct contacts with the clients (table 9).

Description of the service relation	Intensity of the service relation (front-office time)	Price of the service
Optimisation of the farming system (Total Package)	2 winter visits 7 summer visits	1980 €
Quality control (analysis incl.)	1 visit / month	900 € + analysis costs

Table 9. Examples of extension services for cereal production of a private company (Zeeland)

For such a company, the financial performance of advisers depends on the amount of time spent in direct contact with the client (FOT), as every hour of front-office work could be charged entirely to the client. There is a direct relation (Equation 1) between the price of front-office work per hour charged to clients (FOP), and the costs of services which can be proportional to FOT (travel expenses and other costs linked to front-office- FOC) or not, such as cost of back-office R&D activities (BOC).

$$(1) \quad FOT.FOP + Subsidies = Salaries + Profit + FOC + BOC$$

As this firm does not receive any subsidies for its back-office tasks, an increase of the volume of back-office activities and costs would induce an increase of the price per hour of front-office work that the client may not be willing to pay for. That is why **innovative** performance of the company is focused on standardizing methods of back-office tasks – thanks to software and data basis management -, and that no investment (in experiments or in specific R&D staff) would be made in acquisition of technical references through scientific experimentation. For acquisition of such technological or scientific knowledge, this company is totally dependant on external sources (Research Institutes, Applied Research institutes, Agro-Industry, etc.).

As conclusion of this analysis of the performance of services in Zeeland and Ain, it appears that the main providers of technical extension for cereal production are input suppliers in Ain and input suppliers and private extension company in Zeeland. The performances of these providers rely on the one hand on the personalisation of the services and on the other hand on segmentation of the clientele. In terms of innovative performance both co-operatives and private extension companies are dependant – at different levels - on external or joint-investment (mainly with applied Agro-Industry) for the production of technical references through R&D activities.

4.3 Criteria of internal performance of private extension suppliers could limit the effectiveness of extension for agricultural policies goals

To assess the effectiveness of extension as an immaterial investment which support agricultural policies based on the acknowledgment of MFA, two key elements were proposed: [A] the contribution of extension to accumulation of technical references relevant to MFA; [B] the distribution of knowledge co-produced by extension among the range of farmers contributing to the different functions of agriculture acknowledged by agricultural policies, including small-scaled farms and part-time farmers. The analysis of criteria of internal performance of service for the supplier reveals contradiction with these two elements.

[A] Private supplier of extension services seems to be dependant on external or joint investment to produce technical references through R&D activities. At the same time, applied research institutes are going through deep evolutions characterised by the decrease of both public investment and mutual investment of farmers at national scale, although some macro-economic works indicate a positive impact of public R&D and extension expenditure on agriculture (Esposito, 2000). As a consequence, R&D activities are more and more dependant on Agro-industry investment. This tendency raises two kinds of questions about the effectiveness of extension services for agricultural policies supporting MFA.

- Would intangible investment financed through agro-industries enable creation of technical references about other functions of agriculture than primary production and quality of products?
- Would the reference and knowledge created thanks to Agro-industry investment in R&D be excludable by Agro-Industry or available for other R&D activities?

[B] In order to improve the financial performance of the commercial provision of their services, suppliers tend to segment their offer according to the level of possible commercial transaction with the clients. As a consequence, some farmers may have difficulties to have access to enough relevant technical knowledge co-produced with extension services.

In case of fee-for-service delivery of extension, some small-scaled farms may not be able to pay for services as the cost of the service is too high compared to the capacity of investment of the farm (table 10).

	Average value (2000)
Farm net income	5540 €/year
Cost of one hour of extension services	60 to 80 €/hour
Cost of a contract for a year of services	1980 €/ year

Table 10. Comparison between farm income of an average small-scaled farm in the Netherlands (<16 ESU) (source: Landbouw Economisch Instituut) and costs of extension services for the farmer.

In the case of services from cereal co-operatives, it appears that there are strong connexions between the size of the farms and the access to extension services of the co-operative. In terms of impact performance, there is a strong and positive relation between the percentage of farmers who have access to extension and the economic size of their farms (Figure 4).

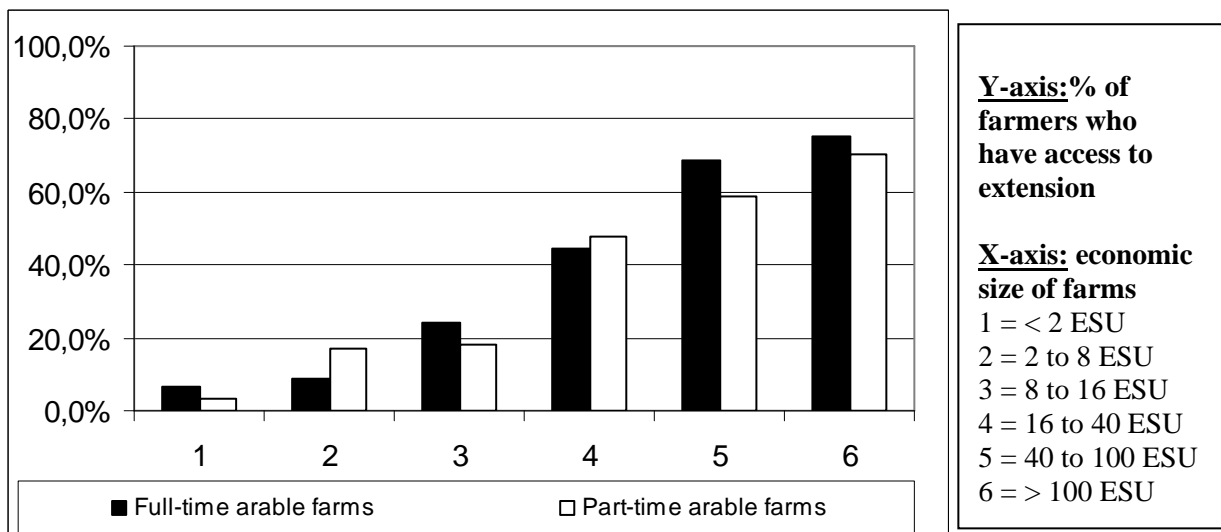
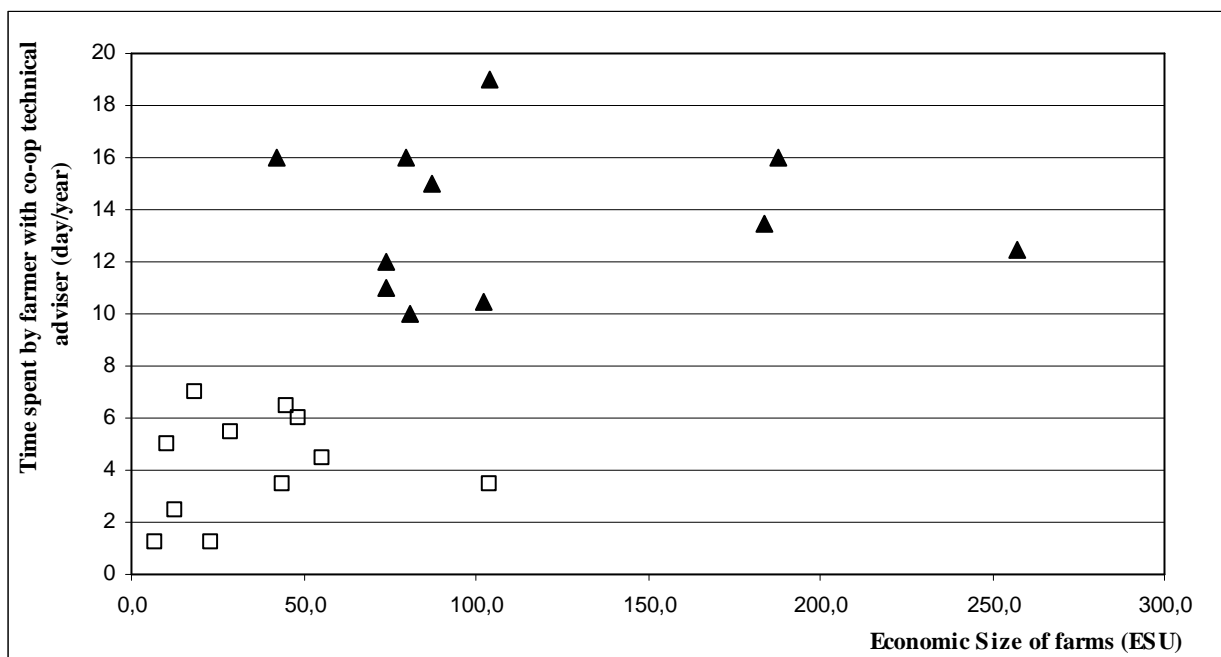


Figure 4. Percentage of farmers who do not have access to extension according to the economic size of the farm (source SCEES, agricultural census, Region Rhône-Alpes, 2000)

In terms of relational performance, it appears through investigations made with 22 farmers in Ain, that there is also a positive relation between the time spent by advisers of cereal co-operative with farmers and the economic size of their farms (Figure 5): advisers spend far less time with small farms. Therefore, in qualitative terms, the relational performance of extension services could be low for small scaled farms.



Note: the white squares represent part-time farms whereas the black triangles represent full-time farms

Figure 5. Time spent with co-op advisers (days) according to the economic size of the farm.

This structural inequality for access to knowledge produced through commercial extension is well known (Umali et Schawtz, 1994 Hanson and Just, 2001): as intangible investments for production of knowledge are not proportional to the economic size of the farms, small farms may lack knowledge when produced thanks to fee-for-service extension. But this problem of inequalities is often considered as an externality of extension services: the problem would be that small farms should increase their productivity in order to be able to invest in extension rather than extension should be provided to these farms so that they can increase their profitability (Carney, 1999). Nevertheless, history of agricultural extension in the Netherlands shows that specific and free extension services supplied to individual small farms could be an effective intangible investment for the development of agricultural sector (van den Ban, 1984). Indeed, the “*Dienst voor Kleine Boredeij*” (translation: “service for small farms”) was a rather successful institutional framework which had provided extension in order to modernize small-scaled farms and make them contribute to the improve of productivity of agricultural sector in the Netherlands (Penders, 1956, Sommers, 1991, Devienne, 1989).

5. General conclusion

The purpose of this article was to propose an analytic framework for the assessment of performance of technical extension for cereal production. This alternative framework, based on the analysis of extension as a service activity, assesses five dimensions of internal performance of extension provider: technical, financial, relational and innovative, and civic performances. As a result, it allows putting under the spotlights the contradictions between these dimensions. If extension is delivered by private firms on a commercial basis, financial and relational dimensions of performances are of greater importance for the firm than innovative or civic performance. In order to increase the financial and relational dimensions of internal performance of their services, private suppliers tend to enhance the personalisation of the services for clients whom they have the most commercial trade with. As a consequence, they provide less services to other clients (small farms for instance), and have limited capacities for investment in back-office activities such as R&D. In a context of acknowledgment of Multifunctional Agriculture, such tendencies may not contribute to enhance the effectiveness of intangible investments. On the one hand, the question of a sustainable accumulation of technical knowledge relevant to MFA is raised, as extension providers are dependant on joint-investment with Agro-Industry for their R&D activities, and as public investment in applied research is also decreasing. On the other hand, the fact that farms – such as small-scaled farms – which contribute to MFA may lack technical knowledge to conceive production systems which combine the different functions of agriculture may limit the range of possible trajectory for agricultural and rural development. If extension is suppose to play a key role for implementation of CAP cross-compliance, exclusion of farmers from extension services might have consequences on the profitability of these farms. Therefore, it is important that the diversity of farms and its contribution to MFA should be taken into account to assess the effectiveness of extension to support a sustainable development of agricultural sector. But contributing to collective functions (social cohesion, maintenance of environment, etc.) has a cost for private providers of extension services. Indeed, developing services for small farms or accumulating knowledge for environmental issues relevant in local context might be activities which decrease the internal performance of the firms. In order to gather internal performance of extension services and their effectiveness for collective functions in a context of acknowledgment of MFA, specific financing are necessary and should be imagined. Some solutions exist and have already been implemented or tested inside our outside agricultural sector. Within Irish agricultural sector, a “*Technology and business Service*” which is involved in transfer of technology and delivery of services to individual farmers on a fee paying, and a “*Rural Viability Service*”, which target part-time and smaller scale farmers and proposes to them free services, are developed jointly within the Agricultural and Food Development Authority (TEAGASC). Outside agriculture, the same kind of questions is also settled by the privatisation of services such as Post-office (Gallouj and *al.*, 1999), as these services also have both individual and collective functions. Therefore, it is necessary to carry on developing analytic framework and collecting data about the possibility of gathering performance of commercial service and maintenance of services of public interest through mutual or public investment of extension services.

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