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# Multi-criteria decision aid as a new tool to apprehend factors affecting adoption of sustainable practices in ornamental greenhouses

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**Greenhouse surface areas have increased significantly and this cropping system has seen worldwide expansion. Furthermore, ornamental greenhouses are still having great environmental impact since they are the most intensive domains. New social and economic concerns are emerging, namely: effects on human health and environmental protection, as people become more aware and concerned about effects of pesticides. Integrated Pest Management (IPM) and biological control have been identified as methods to respond to these concerns and constraints. Despite the fact that these sustainable practices have been studied for a long time and that there are several evidences of IPM effectiveness, chemical control is still largely used for ornamental cultivation. The objective of this study was to identify the main driving forces and stumbling blocks to adoption of sustainable practices in ornamental greenhouses. Multi-criteria decision aid software was used to sort for information from the interviews in a panel of 34 growers representing the ornamental crop production population. Results indicated that there was a significant lack of information concerning alternative crop protection strategies such as tools and methods available, incentive and IPM effectiveness. The second major stumbling block correlating to information deficit is risk aversion.**

**Key words**: Integrated pest management, electre-tri, driving forces, practices adoption, sustainable practices, greenhouses

## INTRODUCTION

Since the 1980s and on a global scale, greenhouse surface areas have increased significantly, where the total area covered by greenhouses was estimated at 150,000 hectares (Wittwer 1995). In 2006, the total area devoted to greenhouses expanded to 2.5 million hectares (Zhang 2006). Currently, the real estimate seems even harder to obtain since this soaring cropping system in China has risen from 68,000 hectares in 1986 to 1.3 million in 1999 (Cantliffe and Vansickle 2002) and to more than 2 million hectares in 2004 (Zhang 2006). Thus, ornamental greenhouses have followed this worldwide expansion. The leading countries in the 70s include France, the Netherlands, Italy and Spain, Kenya (with more than 700 ha) and the Ecuador (with 2,500 ha) (Poncet personal data).

Furthermore, since the 1960s, there has been a gradual shift from vegetables to high-value ornamental plants, which have increased from 20% to 60% in 1990s (Gullino et al., 1999). The major production of cut flowers and foliage ornamental plants in France which cover 2,525 hectares is the rose (61.6%), followed by lily-of-the-valley (17.8%), carnation (11.1%) and chrysanthemum (9.4%) (Agreste 2005). In the Provence-Alpes-Côte d'Azur region (PACA) of France, ornamental plant production is the major agricultural activity where up to 50% of the total area is used for this purpose; indicating that the ornamental sector is a major economic stake for the south eastern France.

Ornamental greenhouse farming system is considered the most intensive cropping system with lots of energy, pesticide, water and fertilizer inputs. It is logical that products from these high-value crops must be perfect. However, the list of registered chemicals has declined over years. In future, use of synthetic chemicals will be shortened even more as a result of the Ecophyto Plan in 2018 for France or the Pesticide Plan for Europe. Alternative and more sustainable agricultural processes were employed to reduce greatly the utilization of agrochemicals in greenhouses (McDonald and Glynn 1994). In such farming system, biological control of bio-aggressors was studied in early 1970s (Helgesen and Tauber 1974; Ekbom 1977 and Iperti 1978), and recycling leachate on the crop was proposed in the 1990s (Brun and Chazelle 1996; Brun and Morisot 1996; Stanghellini et al., 2000; Brun et al., 2001; Poncet et al., 2001 and Chave et al., 2008). However, chemical control is still largely used for ornamental cultivation and surplus fertilizers often thrown out in the runoff. Ornamental greenhouses are, therefore, considered to have a strong impact on the environment. But despite the evidences of efficiency of IPM programs for ornamental plants under controlled environmental conditions, this management strategy is still not adopted widely by growers. Since the sustainable practices will almost become a rule imposed by new legislation, it is, therefore, logical to assume that the knowledge and attitude of growers towards this method will shift their production strategy.

## MATERIALS AND METHODS

### Research questions and survey design

The present study raises the traditional question of the factors determining the adoption of new agricultural technologies and practices. The importance of farmers' acceptance has long been of interest to public and private agricultural institutes and users. Several parameters have been identified to influence the attitude of farmers but qualitative and quantitative models were used to analyse the subject.

A wide range of economic, social, physical, and technical areas of farming influences the choice of agricultural production technology. Several studies taken up in Europe (Charmala et al., 1996), in Asia (Patel et al., 1996) and in Africa (Adbelmagid et al., 1996 and Oladele 2005) have identified specific farming, as well as technological factors, policy variables, institutional and environmental factors that explain patterns and intensive use. However, this is interested in adaptation of Integrated Pest Management (IPM) in ornamental greenhouses. The major goals of the development of such IPM are: to prevent risk on human health and environmental problems due to water pollution, and to reduce sanitary and health problems in greenhouses and thus improves the production system effectiveness.

Usually, farmer's adoption of particular agricultural innovations were analysed via logistic (logit) or probit regression using a number of potential independent variables which have some statistically significant sense (Knowler and Bradshaw 2007). In this paper, we have chosen and analysed a multidimensional approach between social, agricultural sciences, farmers' motivation and capacity for sustainable practice adoption before a possible switch to another plant protection strategy; this is not generally done in sociology (Lamine and Bellon 2009). So we have attempted to answer the following question: What factors determine the decision to adopt IPM? To answer this question, we have looked into four principal areas in a local horticultural sector including the economic (efficiency of greenhouse system), the technical (towards techniques in pest management), the information (knowledge on IPM) and the behaviour (attitude towards IPM). We seek to determine which factors contribute to the adoption of IPM.

To assist in the decision-making process, a two-step approach is required: First, we identified the ability of greenhouses to set up IPM, the "targeted greenhouses". Secondly, we isolated within the "targeted greenhouses" and the "non-targeted greenhouses", driving forces and stumbling blocks to IPM implementation. This information is obtained by carrying out a survey on a representative panel of farmers in the PACA region in France.

### Investigation

During summer 2005, a list of producers in PACA was obtained from SCRADH and the Chamber of Agriculture. Targeted quota of 30 growers was chosen and proportional cluster sampling techniques (with the county defining the geographic and production cluster) were devised in which the number of growers from particular clusters was selected in proportion to the percentage of the population represented by that cluster. More companies were selected so that there were sufficient numbers of profiles. Cooperation was obtained from 71.5% of contacted producers. Time and economic constraints resulted in the final number of 34 farms, 20 of which were located in the Var (83) and 14 in the Alpes-Maritimes (06). The rose was selected as the major production (26), since it is the most important ornamental crop. The panel was rounded off with seven Gerbera crops and one producer of Anthurium. The total number is higher than 34, since some producers have two flower ranges. Within the list, a pre-selection was established. We targeted producers who were involved in sustainable production. By the same token, we selected growers disposed to collaborate with us over a long period. Moreover, we had to question producers we knew would have reliable answers.

All growers were informed in writing or by telephone about the procedure and an appointment booked. Personal interviews was carried out and lasted approximately 2 hrs. Producers could choose the place where they felt most comfortable (at home, on the field, at the office, etc.).

**Table 1.**Background characteristics of grower panel

| Treatment | Roses | Gerbera | Anthurium |
|---|---|---|---|
| Number of growers | 26 | 7 | 2 |
| Average grower age (year) | 48.9 | 60.7 | 44.7 |
| Average educational level* | 0.6 | 0.7 | 1 |
| Average flowers acreage ($m^2$) | 8073.7 | 8333.3 | 10600 |
| Average farm age (year) | 33.1 | 34 | 34 |
| Average permanent employees | 3.6 | 2.3 | 3.7 |
| Average seasonal and family employees | 0.8 | 4.7 | 3 |
| Average production varieties | 10.5 | 33.3 | 32 |
| Average production stems | 681000 | 1325555.3 | 648888.7 |
| Average farm income (in Euros €) | 164040.8 | 359728 | 488990.3 |

* For median educational level, 0 represents no ornamental crop training, and 1 indicates some farming training. Only one rose producer had a PhD in Economics and Communication

Moreover, great attention was paid at each stage to specify the confidential nature of the results. All interviews were carried out by the same people.

The objective of the questionnaire was to gather information on company strategy (*production* strategy, efficiency of the strategy, the most interesting crop production strategy related to the farm, and perception of the various possible strategies, etc., and on the producer behaviour - attitude to business management regarding pollution level, personal attitude with respect to environmental considerations, personal ideas on these problems, etc). Through the data obtained, possible incentives to set up a sustainable practice have to be analyzed.

The questionnaire included several series of questions separated into themes and gathered within categories. Two categories are defined as “Feasibility” and “Attitude”. Some questions are multiple choices and others were open-ended questions. To simplify interviewing, a number of these were pre-coded with answers obtained from questionnaire testing and through similar interviews. For answers which were unclear or undecided they were coded as missing and excluded from the analyses. Certain number of open questions were maintained in order to monitor the scale of possible answers, including those not under consideration as preliminary. It is also the best means of obtaining personal points of view based on the ideas underlying this study. As a consequence, this questionnaire offered greater reliability of information. Thus, the questionnaire was created to reduce socially desirable responses related to sustainable practices.

In Table 1, background characteristics of our sample growers are presented.

## Guidelines to understanding the terms used

The Multi-criteria Decision Aid (MCDA) is a method that provides tools for a decision-maker, enabling him to find a solution to problems where several points of view, often contradictory, must be taken into account. Our study tends to identify greenhouses ability to set up IPM and to give information regarding stumbling-blocks to IPM adoption. Decision is about actions. Our actions (or alternatives) are thus directed towards greenhouses (noted, $Ex_a$, $a = 1...$, $m$).The participants are individuals playing a role in the decision-making process. These are the various organizations and research institutes in the study case. The public authority retains the decision-maker’s role, which allocates the subsidy. The role of the various participants is decided by weight attribution to the latter (noted *k1, K2..., km*) based on the various criteria. This weight expresses the participants’ point of view on the criteria.

Evaluation of the action is based on the criteria (noted, $g_i$, $i = 1,..., n$). This will be used to compare the ornamental plant production. When several criteria are defined, they form a *category*. There will be two categories for the study. A comparison of two actions carried out with regard to a criterion can lead to several preference relationships between these two actions. Again, according to the level of likelihood - the likelihood and the inaccuracy inherent in the data required in elaborating the criteria- various thresholds are defined. These thresholds are discussed with the various socio-economic participants involved in this study. The table of performances (see Table 2) allows a clear view of each action according to each criterion.

## Implementation of MCDA tools

### Evaluation criteria

Greenhouses that are able to set up IPM were identified according to two successive cross-over classifications (Blanquart 2009).The first selection helps to identify greenhouses likely to set up IPM through economic and technical considerations. It is our *first category* of criteria (Table 2, $g_1$ à $g_5$). The second sort is achieved by looking into the information and attitude considerations, *i.e.* the horticulturist’s attitude to IPM and his capacity to develop

**Table 2**. Synthesis of information required in the multi-criteria data processing

| Criteria | Title | Nature of criterion | Unit scale | Weight | Preference | Definition & Data |
|---|---|---|---|---|---|---|
| $g_1$* | Greenhouses Life cycle | qualitative | 1 to 4 | 0.3 | ↑ | Measure greenhouse' economic health/ production ability/ short term solvency |
| $g_2$ | Competitiveness of greenhouses system | numerical | 1 to 4 | 0.3 | ↑ | Measure farm's long term solvency with regard to European competition/ Variety of plants |
| $g_3$ | Potential Ecological Risk (PER) | numerical | 0.64 to 3.97 | 0.1 | ↑ | Measure Potential Ecological Risk based on current pest management (chemical) / number of chemical treatments |
| $g_4$ | Potential Human Risk (PHR) | qualitative | 1 to 4 | 0.1 | ↑ | Measure Potential Human Risk based on current pest management (chemical) / number of hours exposed to chemical products |
| $g_5$ | IPM implementation | qualitative | 0 to 6 | 0.2 | ↑ | Measure horticultural farm's ability to adopt new SP/Risk for the growers |
| $g_6$** | Greenhouse farmers' impression regarding pest management | qualitative | 1 to 7 | 0.3 | ↑ | Measure the grower's satisfaction compared to his current chemical protection |
| $g_7$ | Professional position | qualitative | 1 to 8 | 0.2 | ↓ | Measure the grower's position within the profession / Indicate how information is spread |
| $g_8$ | Environmental involvement | qualitative | 0 to 3 | 0.1 | ↑ | Measure the integration of environmental problem by the horticulturist |
| $g_9$ | Bonds among greenhouse farmers | qualitative | 0 to 3 | 0.1 | ↑ | Identify the bonds among greenhouse farmers / numbers of farmers association, common transport and sales organisation |
| $g_{10}$ | Availability and reliability of information | qualitative | 0 to 3 | 0.3 | ↑ | Measure quality of information obtained by horticulturists on IPM (own readings, feedback on experience, institutes, training) |

* $G_1$ to $G_5$ corresponds to criterion from "feasibility category" (feasibility to adopt IPM)
** $G_6$ to $G_{10}$ corresponds to criterion from "attitude category" (attitude with respect to the IPM)

'personal experience feedback'. This selection starts with identifying five criteria while considering specific problems connected to the information in the PACA region. These five criteria form the *second category* of criterion (Table 2, $g_6$ à $g_{10}$). Each criterion has been identified during a round-table session.

## Categories

We put the horticultural farms into three groups for the first criteria category, and in three groups for the second criteria category. The objective in this second stage is to identify horticultural farms taking into consideration, on one hand, the feasibility criteria and on the other hand, the attitude criteria. It is to be noted that the two selections are completely independent. The 'boundaries' of the three groups (Tables 3 and 4) were determined by experts and researchers using the category profiles. There are more relevant participants within horticultural exploitation needs with regard to IPM (Yu 1992; Maystre et al., 1994; Mousseau et al., 1999).

**Table 3.**'feasibility groups'

| $C_{f1}$ | $C_{f2}$ | $C_{f3}$ |
|---|---|---|
| Non feasibility of IPM implementation | Doubt for feasibility of IPM implementation | Feasibility of IPM implementation |

**Table 4**.'attitude groups'

| $C_{c1}$ | $C_{c2}$ | $C_{c3}$ |
|---|---|---|
| Attitude against IPM implementation | Unspecified attitude with respect to IPM implementation | Attitude for IPM implementation |

**Table 5**.Combination of categories criteria: "feasibility" and "attitude" (λ = 0, 75).

| Parameter | Value | Value | Value |
|---|---|---|---|
| Attitude for IPM implementation | | 4, 7, 8,10, | 3, 11, 13,20. |
| Attitude unspecified with respect to IPM implementation | 21, 22. | 5, 6, 9,12, 26, 28. | 15, 24, 31, 34. |
| Attitude against IPM implementation | 14, 27. | 1, 16, 17, 18, 19, 23,29, 30, 32, 33. | 2, 25. |
| | Non-feasibility of IPM implementation | Doubt for feasibility of IPM implementation | Feasibility of IPM implementation |

## Local survey on IPM

### The evaluation criteria of horticultural farms

In the local survey, evaluation was performed by assigning a qualitative appreciation, such as ''not at all'', ''generally not'', ''to some extent'' or ''fully'' to each criterion, divided into several indicators or a number. The questionnaire (cf. 3.1, p.3) helps to provide information needed in the evaluation of the horticultural farms.

## RESULTS DISCUSSION

### Panel analysis

Statistical results from the investigation revealed that there is a lack of efficiency of current pest management practices. For 47% of the panel, the efficiency of current chemical practices was bad, for 41% it is satisfactory and for 9% it was good. Above all, 76% of the panel was concerned about the increased use of chemicals in plant production. In addition, average exposure to chemicals in plant protection was over eight and a half hours per month, which is more than it is in traditional agriculture. 38% of the panel admits putting more than the necessary amount of chemicals. Only 38% of the panel received training for IPM.

### Analysis of survey results

Taking into consideration the survey results (Table 5), it appears that only 12% of the horticultural farms assessed were not economically sustainable. In addition, the multiple-criteria analysis of information confirms the existence of anti-IPM implementation behaviour for nearly 41% of the Agriculture Establishments (AE). Lastly, according to the multiple-criteria evaluation, four horticultural farms (3, 11, 13 and 20) seem to be capable of and willing to implement IPM. It is obvious that only two greenhouses were unable to implement IPM both for feasibility and attitude reasons.

### Identification of driving forces and stumbling blocks to sustainable practice acceptance

Figures 2 compares the mean criteria of main farm groups created after selection procedures; AE which were well classified in the two categories of criteria and AE which were badly classified in these two categories. Compared to the panel, AE which were economically able to implement IPM, have perimeters on a greater scale (Figure 2 i. and 2 iii.). These are better than the panel in the following three criteria: "Life cycle of greenhouses", "IPM implementation" and "competitiveness of greenhouses system". The two other criteria were the same as the criteria of the panel i.e. "Potential ecological risk" or lower than average "Human potential risk". According to the Wilcoxon-test, only the first criterion, the "Life cycle of greenhouses" was significantly different from the average 5% risk (W = 274.5 and p-value = 0.002).

On the contrary, AE which were not economically able to implement IPM, have a lower than average criteria. One

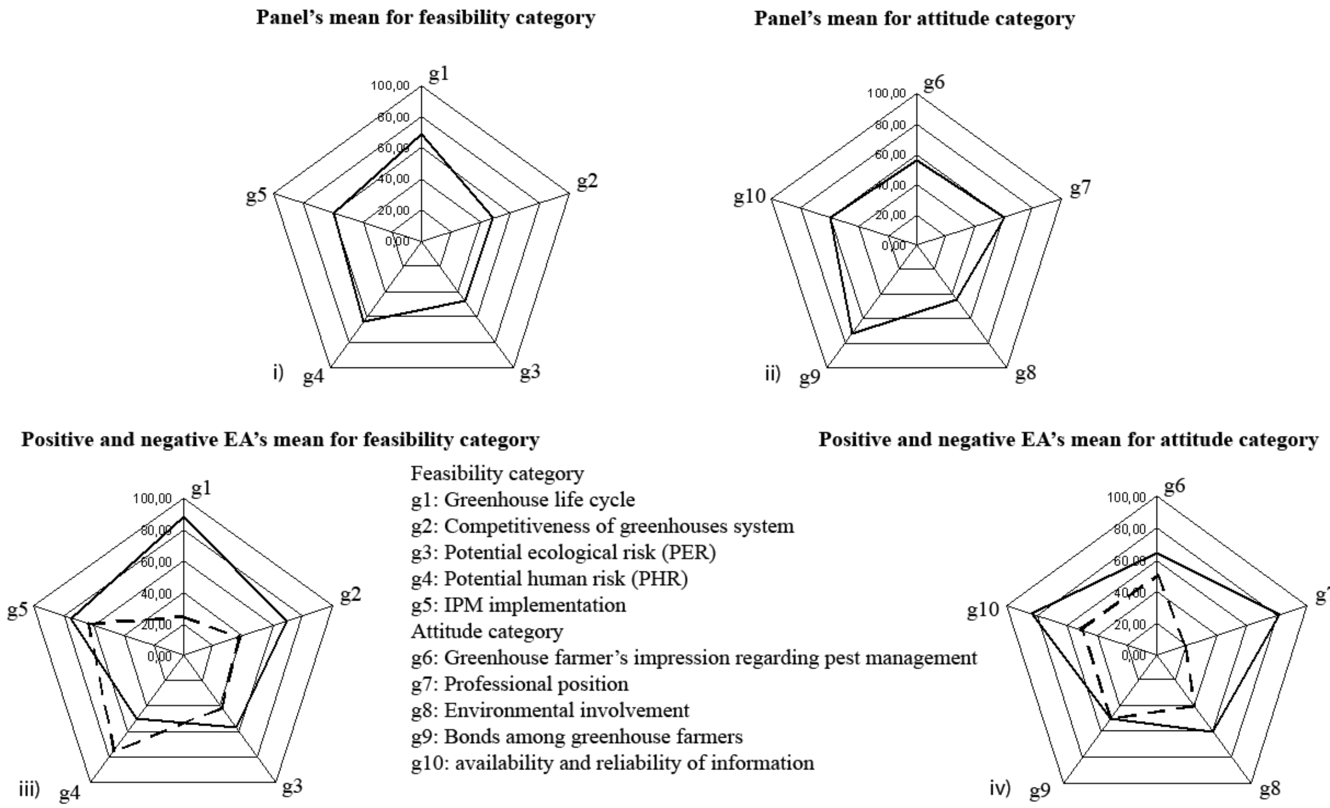


**Figure 1:** (i) "Feasibility" category: ornamental farm criterion mean values ; (ii )"Attitude" category: ornamental farm criterion means values.; (iii) "Feasibility" category: Top ranking ornamental farm criterion mean values (continuous line) and bad ranking ones (dropped line) ( iv) "Attitude" category: Top ranking ornamental farm criterion mean values (continuous line) and bad ranking ones (dropped line).

was equal -"IPM implementation"- and one was better -" potential human risk"-. Regarding the previous point, the first criterion was the only one which was significantly different to the mean 5% risk (W = 126 and p-value = 0.004).

AE whose attitude is open to the integration of IPM have perimeters on a greater scale too (Figure 2 ii. and 2 iv.). All their criteria were better than the panel, except g9 "Bonds among greenhouse farmers" which was worse. Only the g6 criterion "greenhouse farmers' impression regarding pest management" and the g10 "Availability and reliability of information" were significantly different to the mean 5% risk: respectively W = 76, p-value = 0.045 and W = 220.5, p-value = 0.005.

With reference to the previous point, criteria from AE where behaviour is slowing down the integration of IPM were lower than average. The g10 criteria "Availability and reliability of information" was the only one which is significantly different to the mean 5% risk (W = 341 and p-value = 0.017).

In the "feasibility category", well-classified AE have better criteria than badly-classified AE. The g1 criterion "Life cycle of greenhouses" is the only one which differed significantly with a 5% risk (W = 40 and p-value = 0.001). The g4 criterion- "potential human risk" was not significantly different, although it seems to be higher for badly-classified AE.

Criteria from the "attitude category" were systematically better for the well-classified AE than for the badly classified ones. However, only the g6 criteria "Greenhouse farmers' impression regarding pest management" and the g10 criteria "Availability and reliability of information" were significantly different with a 5% risk: respectively W = 17.5, p-value = 0.006 and W = 104, p-value = 0.0007.

## DISCUSSION

### Contribution and limits of MCDA

Implementation of sustainable practices involves multiple stakes, participants and actions. In order to adapt sustainable practices, economic, socio-economic, technical-economics, informational and ecological stakes must be taken in consideration. Consequently, the multi-criteria tools for decision-making aids (MCDA) are particularly recommended to resolve environmental problems. Within this framework, we were able to put forward a final solution and classification for horticultural farming which takes into account different sorts of qualitative and quantitative criteria.

The sample farm panel questioned was restricted to the horticultural sector in PACA. Horticulturists are usually not very open to questionnaires. On the one hand, obtaining an appointment can take several weeks, thus slowing down the implementation of sustainable practice. On the other hand, once the appointment has been made, the chances of gaining valuable information were very good. Thus, to the following question: *Are you ready to test IPM?* Nearly 90% of the horticulturists answered affirmatively.

Regarding ELECTRE Tri, the definition refers to horticultural greenhouses, as well as the selection of threshold values, created methodological difficulties and implied an unavoidable randomness, which may significantly influence the results. Thus, a certain number of precise, solid analyses are required. The development of a qualitative performance scale for points of view also presents methodological difficulties. The development of a cardinal scale i.e. main point, for the evaluation of performances could be an appropriate alternative.

**Criteria highlighted by MCDA method**

In this study, the analyses were drawn that AE which are categorized in "non-feasibility of IPM implementation" are not biased in favour of IPM integration. However, the opposite is not true. AE categorized in "feasibility of IPM implementation" does not automatically have an open-minded attitude for IPM integration. Therefore, we can deduce that there is strong aversion to risk. The "Life cycle of greenhouses" was the only significant criterion with less than 5% risk. It is logical that these AE are either in stagnant phase or experiencing a downturn. Therefore, the long term outlook affects investment decisions in new practices- be it IPM or other.

It was very difficult to act on the farm life cycle and therefore difficult to act on this "feasibility category" of criteria. In order to take action using this group of criteria, it should be stressed that IPM increases the production system efficiency in case of major problems due to pesticide regulations. Since only 9% of operators consider efficiency of present practices (chemical) as good, we can conclude that it would be to their advantage to change practice. Furthermore, 76% of the panel was concerned about the increasing use of chemical protection for plants.

With reference to "attitude category", criteria i.e. "Greenhouse farmers' impression regarding pest management" and "availability and reliability of information", were the most important to categorize AE. These two criteria reflect respectively growers' feelings about IPM and the quality of IPM information available. As a contrast to the analyses carried out before, these results are more relevant. There is a link between growers' feelings about their chemical pest regulation and the reliability of IPM information. Finally, it seems possible to act on these criteria.

Nonetheless, it is important to clarify what IPM really means. Indeed, literature provides no less than 65 definitions of this term (Propoky and Kogan 2003 and Poncet et al., 2012). Any party can find a definition that fits what they are already doing (Ehler 2005). As describe by Ehler (2006), IPM is sometimes defined as the discriminate use of pesticides. Although, the judicious use of pesticide is not bad and should be encouraged, still this approach often becomes an end in itself. It perpetuates a "quick-fix mentality" that result in a kind of "quick-fix shuffle", with monitoring and treatment thresholds and keep the farmer or pest consultant in a treatment or quick-fix mode. This targets symptoms and fail to address the root causes of pest problems (Ehler 2006).

As demonstrated by Mac Donald et al., (1997), IPM demonstration has had considerable impact on growers' attitude towards and acceptance of IPM. Furthermore, recent studies highlight the major role of social network and proximity between growers in the dissemination of information (Beckman and Xiarchos 2013, Caillaut et al., 2013) and role played by past experiences (Haden et al., 2012). So, participative projects with reliable growers seem a good way to help in the implementation or transfer to production sector IPM or other innovative crop protection strategies.

**CONCLUSION**

The first step undertaken in the study was to identify the horticultural farm target, while helping indirectly to determine those that will have financial assistance to take up sustainable practices. This role lies in setting up innovating practice that fully fits in with the conditions of current eligibility. The second step will thus, make it possible to address the problems of lack of information between the administration and the farmers. A financial subsidy to help with the installation of sustainable practice can be justified as an incentive.

As a consequence, better communication about IPM methodology, efficiency and assistance has to be ensured in order to help implementation. There is also the need for better communication about funding. Indeed, the government provides funding for the purchase of the predator to the tune of 1.60€ per square meter. If this is not sufficient, additional supplement of 60% is provided and due to this subsidy, the estimated cost of IPM is cheaper than chemical control. However, growers' have not received nor applied for such funding because they have no knowledge of this subsidy. Moreover, pest control consultants usually have little time for close monitoring of pests and its benefits and many of them are employed by pesticides companies or by bio-control manufacturers. So, it might appear that they have a built-in conflict of interest.

Again, other factors may induce risk aversion such as necessity to acquire new methods and changes in work habits. Indeed, use of IPM induces the presence of beneficial organisms, because they are voluntarily released on the crop and some pests or diseases which are necessary to maintain predators and/or parasitoïds. Legislation generally prohibits presence of organisms on horticultural production for export. As a result, with IPM used, French horticultural export could be blocked by monitoring agencies. So, before IPM implementation, regulations must be reviewed.

In conclusion, this practice should select reliable farms where multi-site experiments can be carried out. Reliable farms means those that will properly implement protocols and will disseminate honest information and feedback –that is say free of preconceived theories- either related to success or failure. So, this study may be seen as necessary preparatory work for the transfer of new technologies in the horticultural sector, with as an effective methodology to implement them.

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During the decision-aid procedure, the following organisations have been contacted:

1- The Regional *Council* ('*Conseil regional*') is the leading body among them, as it is the one that will make the final decisions regarding environmental policy.

2- Local Public Authorities ('*Conseil général*') who give farmers financial subsidies or other incitement to modify their agricultural practices towards environmentally and economically viable alternative agricultural systems.

3- Environmental Institutions such as FDGEDA (*Fédération départementale des groupements d'études et de développement agricole*) and the *Chamber of Agriculture in the PACA region*, are involved in the decision-making process to a lesser degree. Through their activities they support the implementation of some reduction measures and provide technical assistance.

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