Training Needs and Job Satisfaction: a statistical test of the Inspectors in organic farming

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Abstract

In 1999, a mail survey was carried out in Italy, covering all Inspectors operating in organic farming. The 172 respondents (30.7%) were mostly well educated (18% Vocational Schools and 82% University) and 51% were part-timers. They rated information and continuous updating of great value. Pre-service training and updating were ensured by the Certification Bodies themselves.

The determinants of job satisfaction were analysed and it was found that dissatisfaction is mainly related with higher levels of education and with the demand for further education. Other variables (gender, age, region of duty, etc.) were not significant.

In order to avoid fast turn–over of personnel, two different strategies are suggested: either to employ technicians holding vocational school certificate, or to ensure better salaries and a more satisfactory working environment to university degree holders.

Résumé

En 1999, une enquête a été menée en Italie s'adressant à tous les " inspecteurs " qui oeuvraient dans le domaine de l'agriculture biologique. 172 interviewés (30,7%) possedaient un bon niveau de formation (18% provenant des écoles professionnelles, 82% ayant un diplôme universitaire) et 51% travaillaient à mi-temps. Ils ont indiqué que l'information et la mise à jour continue ont une grande valeur. La formation avant service et la mise à jour ont été assurées par les organismes de certification.

Les déterminants de la satisfaction professionnelle ont été analysés et on a ainsi constaté que le mécontentement était principalement mis en évidence aux niveaux les plus élevés de formation et exprimé par la demande d'une formation continue. D'autres variables (sexe, âge, région d'affectation, etc.) ne se sont pas révélées significatives.

Afin d'éviter un rapide changement du personnel, deux stratégies différentes ont été suggérées: employer des techniciens avec un certificat de formation professionnelle, assurer des salaires plus élevés

1. Foreword

Organic foods have been produced, for a long number of years, within a "friendly" environment, where consumers and producers shared the same beliefs, many food shops were managed by consumers' groups, most marketing was very local, international trade was almost non existent, etc.

The entire system was almost totally self-regulated, with norms and technical guidelines elaborated by national organizations and after 1972 by the International Federation of Organic Agriculture Movements (IFOAM). Self–supporting organic farmers' associations were responsible for knowledge circulation and the same persons were in charge of both technical advisory and quality control. In same cases, farmers themselves acted as advisors to other farmers and the prevailing direct sale of foods to consumers did not require any control activity (Tate 1994).

In the latest years, the organic food sector has changed dramatically. The consumption in some developed economies has exploded (Table 1). The number of farms has increased enormously, the physical and economic agricultural output has grown (Willer & Yussefi 2000). The number of off-farm processing plants has ballooned, international trade is augmenting every year, distribution finds place, increasingly, in the supermarkets' shelves and even through internet (Lockeretz & Geier 2000).

In a few words, the naïve world of the early pioneers and consumers is over and a more structured and complicated system is evolving. In order to ensure the consumers about the quality of their purchases and to defend the respectful producers against free riders, organic production systems now must be certified, at all steps of the production chain: from the field to the shelves (De Haen 2000)

One of the most important changes that is taking place is the appearing of a new professional profile, that of the "Inspector of organic products". Inspectors are technicians who must ensure the respect of the

Tab. 1. *Organic market in Europe, 1999*

Country	Billions of US$	% of total food market	Annual growth
Germany	1,8	1,2	5-10%
Italy	0,75	0,6	20%
France	0,72	0,5	20%
United Kingdom	0,45	0,4	25-30%
Switzerland	0,35	2%	20-30%
The Netherlands	0,35	1	10-15%
Denmark	0,3	2,5	30-40%
Austria	0,23	2	10-15%
Sweden	0,11	0,6	30-40%

Source: ITC 1999

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production, storing, processing, packaging and trading norms established by the national or international Bodies. Inspectors should not be confused with extension agents, advisors, or consultants, because the latter support, with their advice, the decision makers at farm or factory level, whereas the Inspectors should verify the respect of the norms and the correctness of the processes. As a matter of fact, this explosion of organic farming and processing is creating hundreds (thousands?) of new "green jobs", also in the tertiary sector, that have been described by several research activities (ISFOL 1997).

This distinction does not apply only to individuals: in order to avoid conflicts of interest, international legislation obliges a net separation between the Agency that provides technical support and the Agency that provides certification. In order to respect the ISO 65 regulation (EN 45011 in Europe), Certification Bodies are being established in many Countries, either in developed economies and in developing Countries (Rundgren 2000, van Alzakker 2000). These Certification Bodies can be totally private firms, state controlled companies or no-profit non-governmental organizations. The problem of controls and inspections is particularly felt in Europe that now represents the biggest market for organic products and where agricultural subsidies are targeted towards farmers who are certified to follow the standards of organic production.

In most cases, Inspectors have the same educational degree as the advisors (bachelor in agriculture, university degree in crop sciences or in food sciences, university degree in veterinary sciences, biology and similar) plus a specific training about organic farming, processing and trading, that include a heavy component of legislation.

The aim of this paper is to investigate the relationship between socio-economic variables and Job satisfaction of the Inspectors. The relationship is empirically tested by the mail survey described in section 3 while, in section 4, we use a statistical approach to verify the meaningfulness of explicative variables in Job satisfaction.

2. Certification Bodies in Italy

Organic farming in Italy has risen dramatically, from 4,189 farms in 1993, before of the implementation of EU Regulation, to almost 50,000 in 1999. The area grown organically or under conversion was almost 800,000 hectares by the end of 1999.

Eight Certification Bodies were operating in 1998 in Italy, all of which recognized by the Ministry of Agriculture. These Agencies can certify nation- wide (Zanoli 1997).The Germany-based Biozert certifies only in the German- speaking Sud Tirol. One more Certification Body named BIOS was recognized in April 1999 by the Ministry and it was accepted within FIAO, Federazione Italiana Agricoltura Organica, only recently.

Some of these Firms have been established by/from pre-existing Associations and movements (Torquati & Foglia 1998). They were born before the above mentioned EU regulations and they originally had as main purpose the diffusion of organic farming, of natural foods, also because of the almost total lack of public extension and state-funded applied research in organic farming (Santucci 1993, Santucci 1995). Other Certification Bodies have started their operations more recently only for this purpose.

3. The survey

A mail survey was organized (without BIOS), based on a questionnaire with 22 closed questions. The questionnaire, together with an explanatory letter and an addressed letter, already with return stamp, had to be mailed individually. Names and addresses of the Inspectors had to be provided by the Certifiers. Ecocert Italia, Bioagricoop, CCPB, CODEX, QC&I e IMC have quickly provided such information. Suolo&Salute asked to have groups of questionnaires sent to the local people in charge of the Inspection, who had to deliver the questionnaires to the agents. AIAB decision to participate came quite later. AIAB also required to have all material sent to CEDA (their Documentation Centre). CEDA then mailed the questionnaire to the individuals.

On September 15, 1999, 172 questionnaires had came back (Table 2), with a 30.7% reply rate, percentage lower than forecasted but still acceptable for this type of procedure (Heberlein & Baumgartner 1978). The lowest reply rates were recorded in Southern Italy and with Suolo&Salute and AIAB, probably because of the problems linked with the double step in the questionnaire delivery, as described before.

The resulting sample is therefore slightly biased towards Central and Northern Italy and towards six of the eight Certification Bodies.

Most respondents are male and young: the average age

Tab. 2. *Questionnaires sent and received, by Certifiers* °°

Certification Body	mailed		received		rec/ mail
	no.	%	no.	%	%
Ass. Ecocert Italia*	15	2,7	3	1,7	20,0
AIAB	198	35,3	34	19,7	17,1
BioAgricoop	41	7,3	23	13,4	56,1
CCPB - Bologna	42	7,5	14	8,1	33,3
Codex Demeter	30	5,3	13	7,6	43,3
IMC	82	14,6	35	20,3	42,7
QCI	52	9,3	17	9,9	32,7
Suolo e salute °	101	18,0	11	6,4	10,9
Not indicated			22	12,8	
Total	561	100,0	172	100,0	30,7

- It has 11 inspectors more, who did not authorize to be interviewed
- ° A group of 14 questionnaires came back entirely

Tab. 3. *Post degree training (no.=172)*

Categories	%
Certificate holders with training	77.8
Uni degree holders with training	76.8
Title not declared, with training	65.0
Total, with training	76.2
out of which:	
1 - judgement	
poor	2.6
sufficient	17.6
good	60.8
very good	19.0
2 - usefulnes	
useless	12.5
useful	49.1
very useful	38.5

is 35 years and nobody is over 50. 81% of respondents work only part-time as Inspectors, integrating the income with other activities, such as advisory work, teaching, farming or co-operating with research institutions.

82.2% of respondents have a 5-year University degree in Agriculture and the other ones hold a Vocational School Certificate in Agriculture (5 years or 3+2 years). After the degree (Table 3), 76% of them has attended various training courses, positively judged by 80% and considered useful or very useful for the present work by 83%.

Before becoming "Inspector in Organic Farming", 77% of respondents declare they had other working experiences, which are considered useful or very useful by 92.5% of them. A previous working experience is declared by 85% of the Certificate Holders, versus 78% of those with University Degree.

The pre-service training about organic farming and the continuing education of Inspectors are provided by the Certification Bodies themselves (71.5% of cases), followed by Private Training Institutions (39%), Organic Farmers' Associations (38%) and by Public Advisory Services (37%). The courses organized by such Entities are judged more or less positively, whereas the training courses organized by Conventional Farmers' Unions and by Universities receive a much lower opinion.

For the personal continuous updating (Table 4), respondents refer mainly to their Employer, quoted by 82%, followed by the farmers themselves (67%) and by other technicians (64%). If we also analyse the frequency, these first three sources are obviously consulted very frequently, whereas the other ones are referred to only occasionally. Formal research Institutions, as Universities, Ministry of Agriculture Research Centres, etc. are very poor providers of information about organic farming, because they have neglected this sector until recently.

79% of respondents assign a decisive role to information in organic farming and 60% think that information is an "integral part" of the value of production. The areas of information where it is easier to get information are "certification procedures" , "fertilizers" , "methods of pest control" , "fertility and plant nutrition" , "control of the quality" , "control of the process" and "cultivation techniques". It seems more difficult to get the information about "farm management" and "technologies for food processing". Consequently, the areas of knowledge where these Inspectors declare the highest needs are the "technologies for food processing" and the various aspects of "animal husbandry" techniques .

Poor circulation of information is attributed to the lack of a good technical magazine (40%), to the absence of specialized books written for the Italian organic farming systems (30%) and to the scarce number of technical meet-

Tab. 4. *Information sources and frequency of their utilisation*

Sources	Quotations		High		Medium		Low		Total
	no.	%	no.	%	no.	%	no.	%	score*
Certification Bodies	141	82,0	85	60,3	45	31,9	11	7,8	571
Organic farmers	115	66,9	59	51,3	48	41,7	8	7,0	447
Other technicians	110	64,0	50	45,5	46	41,8	14	12,7	402
Organic farmers associations	103	59,9	26	25,2	50	48,5	27	26,2	307
Regional research centres	83	48,3	16	19,3	30	36,1	37	44,6	207
Universities	94	54,7	8	8,5	36	38,3	50	53,2	198
Public advisory services	83	48,3	11	13,3	24	28,9	48	57,8	175
Ministry of agriculture research centres	77	44,8	4	5,2	20	26,0	53	68,8	133
farmers unions' advisory services	77	44,8	5	6,5	16	20,8	56	72,7	129
Publications	23	13,4	10	43,5	10	43,5	3	13,0	83
Other sources	8	4,7	5	62,5	3	37,5	-	0,0	34

* = Total score = (High* 5+ medium* 3+low)

ings of good level (28%).

For their own updating, 48% of respondents propose short multidisciplinary courses, focused on one subject, followed by 23% proposing multidisciplinary farming system courses, lasting 3-5 days, with a local approach.

4. Determinants of job satisfaction

In this section, the empirical links between socio-economic variables and the job satisfaction of the Inspectors are analyzed. In recent years, the Italian Public Sector has almost closed its doors for young agronomists and it is not easy to find a qualified position in the agri-food chain. This new profile "the Inspector" represents a good employment opportunity for high and medium-skilled individuals. On the other hand, there is empirical evidence of negative correlation between high education and satisfaction (Tsang et al. 1991). Furthermore, spatial differentiations and the labor market imperfections determine the condition for high-skilled individuals to find *second best* employment.

In the last years, the articles published about the determinants and implications of job satisfaction are increasing. In particular, these studies have used a simple relationship between job satisfaction and some socio-economic and demographics variables. Gender, age, education, wage are the independent variables more frequently used (Clark, 1997; Clark et al., 1996; Tsang et al., 1991; Clark and Oswald, 1996).

In this paper a different multivariate approach is proposed for testing job satisfaction using as hypothesis the Locke's argument (1976) that there is a significant link between job dissatisfaction and high turnover. In our empirical survey, the demand for updating (UPD) has been taken as proxy for the lack of satisfaction. The imperfections in labor market and the incomplete information do not allow for high labor flexibility. The dynamic monopsonistic market could determine for the Inspectors the condition for their permanence in this unsatisfactory situation.

4.1. Non parametric selection of the variables

The dependent and the explanatory variables can be grouped under various headings and under the principle of natural aggregation. In satisfaction variables the respondents were asked to rate their overall job satisfaction (JOBSAT) on a scale going from 1 (highly unsatisfied) to 10 (highly satisfied). The responses can not be treated as a continuous cardinal variable, so instead we enter two dummy variables indicating rising levels of job satisfaction, a) from 1 to 5 and b) from 6 to10. The unsatisfied (a) individuals form the reference category.

A first group of independent variables are the personal and family characteristics of the respondents; gender (SEX), age (AGE), education (EDU) and region (REG). The hypothesis that the individual characteristics can be affected by alternative job opportunities for highly qualified workers suggests that education is a proxy to explaining the determinants of turnover (Rumberger, 1987).

A second group includes indicators of the current job and individual performance. Other activity (ALT) is a measure of the willingness to search another job as to integrate individual income and/or to get more personal esteem. The full time or part time contract (FULL) indicates the individual engagement. Training before the present employment is codified as TRA.

The third group of variables represents a potential dissatisfaction. Information (INF) codifies the value attributed to information by the respondents, while LAC expresses the type of information sources required by the Inspectors. UPD identifies the demand for further education as expressed by this group of people. This variable represents the Inspector's consumption benefits, as non-pecuniary benefits.

Tab. 5. *Selection of the first esplicative variable*

Variables	$\chi 2$	p-value	y2	p-value	Degree of freedom
REG	1.378	0.502	1.404	0.496	2
SEX	0.024	0.877	0.024	0.876	1
AGE	0.339	0.844	0.332	0.847	2
CON	0.001	0.973	0.001	0.973	1
ALT	6.083	0.014	5.361	0.021	1
EDU	18.694	0.001	15.362	0.001	1
TRA	0.308	0.579	0.299	0.584	1
INF	0.681	0.712	0.675	0.713	2
LAC	0.333	0.847	0.328	0.849	2
UPD	36.585	0.001	27.314	0.001	2

In all tables non-parametric techniques have been used, to show how the job satisfaction is dependent from discrete explanatory variables and to report whether these dependences are statistically significant, using either an estimator χ^2 Pearson test or a maximum likelihood estimator (y^2).

Table 5 shows the results of the test under the null hypothesis of marginal independence. This table suggests that there is no link between satisfaction and some variables. Conversely to Clark's works (1996 and 1997) in the Inspector's job, sex and age are highly meaningless to separate the levels in job satisfaction. The individual supply of EDU is quite striking, because there is virtually a monotonic decrease in the job satisfaction as individuals become better qualified (Battu et al., 1999).

The results found are simple correlation between the

job satisfaction and each of the explanatory variables and they show that the first selected variable is UPD.

We move on to other selected variables of the determinants of job satisfaction, by test of conditional independence over UPD (Peracchi, 2000). The second variable is obtained as the sum of c2 value. The selected variable is EDU. The Inspectors with the highest degree of dissatisfaction are those with the highest education. High level of this variable is likely related to those Inspectors more willing to change work. The link between job satisfaction and education is favored by the unobservable determinants, such that the outside alternatives and the easiness of individual mobility.

Conditional independent tests for other variables show non-rejection of the null hypothesis of independence. Next section moves on to a more formal multivariate analysis of determinants of job satisfaction by estimating the logit equation in which the two explicative variables suggested by the non-parametric analysis are maintained.

4.2 Econometrics Results

We estimate the eight separate logit models to test the introduction of a new variable in the model. The result of the econometric analysis (Table 6) ALT is significant at 5%. The other variables are not significant at 10%. We accept the dependence of ALT and the job satisfaction, independently of the other two maintained variables. The specified model is structured by the JOBSAT and by three explicative variables. The unsatisfied individuals represent the reference category.

The estimation in Table 7 shows positive sign in the explicative variables and significant parameters. The UPD is an individual non pecuniary job characteristic, as a consequence of their particular employment. These benefits include standard fringe benefits (health care plans, pension plans), working conditions (decibel level, temperature), and consumption benefits (number of subordinates, frequency of deadlines) (Atrostic, 1987). In a market system, price estimates between the wage and non-pecuniary job characteristics are not completely significant, showing relationships of negative price elasticity (Atrostic, 1987). These results, i.e. complementary behavior, allow separated interpretations of the non-pecuniary variables with respect to the other variables or proxies under the market's imperfections. Individuals with higher education or with further training, or with long-term unemployment, may either have fewer alternative opportunities, or they find potential satisfaction in UPD inside of their own firm (Hall, 1982).

Also the relation between EDU and JOBSAT has the predicted sign. Education is negatively correlated with job satisfaction. In empirical analysis, Hersch (1991) finds that overqualified workers are less satisfied with their jobs and they are more likely to quit. Although workers can be overqualified in a number of ways, educational requirements are a common factor in most employment decisions and they are easily quantified (Tsang et al., 1991). The educational functional separation in this Italian sample confirms higher dissatisfaction for University degree holders. Considering the lack of alternatives, the responding Inspectors optimize their choice a) by accepting a job that does not always require their level of education, b) fulfills their needs (both material and not) with a second job.

Our empirical results are coherent to Rumberger (1987); he shows that there is strong evidence of a negative relation between percentage of workers with surplus schooling and average satisfaction, and a strong positive relation between percentage of workers with surplus schooling and intentions to quit.

ALT represents the third variable that enters into the model. Since education and earnings are highly correlated, workers with difficulties to find jobs whose educational requirement matches their educational attainment, increase their utility function earning money from other jobs. Considering the ALT coefficient in Table 7, it is interesting to note that we find evidence of a statistically significant influence of ALT in Job dissatisfaction, as a proxy of wages. This would suggest that the Inspector's job is responsive to market signals to the wage rate against leisure behavior (Wales, Woodland, 1977), which is consistent with the picture that we have built of the respondents with the previous two variables. Even with non-pecuniary job characteristics, wages and prices are important determinants of labor supply. Negative high correlation between non-pecuniary job characteristics to wages rate, could be overevaluated by endogeneity bias in the model, because the good level of job satisfaction increases the productivity and consequently increases the wage rate.

Tab. 6. *Selection indipendent variables in logit model*

Variables	Coefficients	Standard Dev.	t-Student	p-value
REG	0.715	0.403	1.770	0.135
SEX	0.032	0.671	0.001	0.964
AGE	-0.045	0.441	-0.010	0.918
CON	-0.476	0.599	0.630	0.427
ALT	1.064	0.555	3.681	0.050
TRA	-0.101	0.535	0.041	0.851
INF	-0.153	0.351	0.191	0.663
LAC	0.044	0.372	0.011	0.907

Tab. 7. *Estimation of the logit model*

Variables	Coefficients	Standard Dev.	t-Student	p-value
Constant	-8.179	1.425	-32.961	0.000
UPD	1.626	0.385	17.861	0.000
EDU	2.285	0.598	14.591	0.001
ALT	1.064	0.555	3.681	0.050

5. Conclusions

This mail survey on the training needs of Italian Inspectors in organic farming shows a young, well educated and well trained workforce, generally with a part- time relationship with the Certification Body. They are employed for controlling the respect of EU Regulations 2078/92 and 2091/92 and for the control of other organic production norms, not yet covered by Legislation. They were mostly trained, on organic techniques and bureaucratic procedures, by the Certification Bodies themselves or by other Actors within the organic farming sector.

They are conscious of the fast evolution of knowledge required by organic farming and they call for solutions. Such solutions, far from being impossible and costly, are feasible and traditional: a journal, some books, in-depth and short multidisciplinary training courses.

A major worry derives from their level of job satisfaction, that is not excellent. Since it is negatively linked with the level of education and positively linked with the demand of continuing education, a likely solution could be to employ people with lower education and to ensure a permanent educational environment. Other solutions, for improving job satisfaction of the University Degree Holders, might be to ensure more job security, better salaries, less bureaucratic activities and so on, but this second option appears to be less feasible and therefore less likely.

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