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Barriers to conversion to organic farming: A case study in Babol County in Iran

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Organic farming offers a more sustainable alternative to conventional agricultural production and its adoption is not an easy option for farmers, since it carries several barriers with it. The main purpose of this study was to identify these barriers in Babol County in Iran. A sample size of 150 farmers was selected for this research by using simple random sampling method. The result of factor analysis showed that major barriers or obstacles to the adoption of organic farming between farmers were: productive, natural, attitude and knowledge, infrastructural, institutional and economical barriers. These factors explained about 68% of the total variance of the research variables.

Key words: Organic farming, conversion, barriers, factor analysis, Babol, Iran.

INTRODUCTION

The adoption of new technologies in agriculture in developing countries has attracted much attention from scientists; since agriculture is an important sector in those countries and new technologies seem to offer opportunities to alleviate poverty. But the introduction of many new technologies has met with only partial success as measured by observed rates of adoption (Feder et al., 1985). One of the new technologies toward sustainable development is organic farming. This method contributes to food safety, greater product diversity, environmental benefits and provision of public goods linked to rural development (CEC, 2002; LD, 1999). Organic farming offers a more sustainable alternative to conventional agricultural production (Mader et al., 2002) and has experienced considerable growth since the 1980s in many regions of the world, but the conversion to organic stockless farms is connected with changes in farm management techniques, cognitive and psychological barriers. Therefore, it is a big challenge for every farmer (Hadatsch et al., 2000; Schneider, 2001; Schneeberger et al., 2002; Darnhofer et al., 2003). Adoption of organic

farming is not an easy option for farmers and it carries with it several barriers (Lampkin, 1990, Harris et al., 1998). These barriers could be technical, economic, social, cultural or legal (Dubgaard and Holst, 1994). Fairweather (1999) also concluded that dealing with issues of technical and economic viability of organic production more comprehensively, it would overcome a major obstacle for conventional producers and could result in higher rates of conversion.

Padel and Lampkin (1994) and Padel (1994) argued that conversion to organic production may be hampered by:

1. Perceptions (the image of organic farmers and the size of the market).
2. Access to technical and financial information.
3. Institutional barriers (problems in getting loans and certification constraints).
4. Social barriers (particularly in tight knit communities).

In two recent studies from Switzerland and the United States, farmers mentioned the professional challenge in organic conversion, rather than problems with conventional systems (Duram, 1999; Maurer, 1997). McEachern and Willock (2000) identified naturalness, market demand and policy factors as important for the conversion

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decision to organic farming. Worries about weeds and other technical problems were major reasons preventing interested farmers in New Zealand from going ahead with the conversion to organic farming. According to Schneeberger et al. (2002), Austrian cash-crop producers hesitated to adopt organic production due to problems with weeds, diseases and insects, and additional labor requirements. Non-organic farmers also listed yield reductions, higher weed and pest infestations and more disease damage on crops as problems associated with the conversion process (Niemeyer and Lombard, 2003). One technical problem for non-organic farmers in New York was their preference of pest and disease resistant crop varieties as compared to natural seeds (Buttel and Gillespie, 1988). The certification issue is another challenge facing organic movements, especially with regards to developing countries. However, according to Reynolds (2004), onerous and expensive certification requirements create significant barriers for entry of poor Southern producers and encourage organic production and price premiums to be concentrated in the hands of large corporate producers. Reynolds (2004) suggests that shifting certification costs downstream and empowering local producers to fulfill monitoring tasks should reduce barriers for small-scale producers.

Austrian farmers did not adopt organic practices for the following reasons: there were no compensation payments for organics and the willingness to forego net income for benefits of environmentally friendly farming was not there (Darnhofer et al., 2005). Loibl (1999) showed that the principal reasons given for not converting to organic farming were mainly economical, such as the lack of appropriate marketing outlets and additional requirements for labor. Large-scale and non-organic farmers in South Africa considered fewer marketing opportunities, no premium prices and the lack of subsidies as economic factors keeping them from adopting organic practices (Niemeyer and Lombard, 2003). Also, issues related to the financial viability of organic production systems were identified as barriers for conversion to organic farming. In particular, the studies identified uncertainty over the future level of premiums (Kirner, 1999; FIBL, 1997) perception of a limited future demand for organic products (Padel and Lampkin, 1994), higher labor demands of organic systems (Maurer, 1997; Kirner, 1999), access to more market outlets (Lohr and Salomonsson, 2000; Padel and Lampkin, 1994; Vogel and Hess, 1996) and the additional investments required complying with the standards. Furthermore, a lack of information (Padel and Lampkin, 1994; Kirner, 1999), particularly on technical issues such as alternative strategies for weed, pest and disease control (Padel and Lampkin, 1994; Fair-weather, 1999) and confusion with regards to the standards was frequently mentioned with other institutional barriers, including a lack in government's commitment (Padel and Lampkin, 1994; Lohr and Salomonsson, 2000; Michelsen and Soegaard, 1999; Padel et al., 1999).

MATERIALS AND METHODS

A survey study was applied as the methodology for the research work. Data were collected using a structured questionnaire that addressed farmer responses to the questions. The statistical population of the study consisted of farmers in Babol County and Mazandaran province in Iran. The sample size was determined by using Cochran's formula; however, the sample included 150 farmers. At first, a pilot study was conducted in the region, using 25 farmers and the aim was to test and improve the questionnaire. Revisions were made based on the pilot study and responses from the pilot test were not included in the final samples. However, Cronbach's alpha which was computed to measure reliability of the index that its amount was 0.83 showed that the index has high reliability. For determining the validity of the questionnaire, the content validity was used and the instrument was given to the Department of Agricultural Extension and Education, Faculty of Agriculture, University of Tehran.

The questionnaire included two parts consisting: first, 21 barriers of organic farming to be ranked and second, questions about the individual and land factors (level of education of farmers, age, knowledge, land area and...). Respondents were asked to rate, rather than rank the importance of the key practices using a six point Likert type scale, ranging from "not important" (1) to "very important" (6). Respondents were encouraged to add practices to the list as required. The rating approach allows respondents to assign the same rating to different practices and in the process need not simultaneously consider all the practices. Most importantly, data collected from rating is an interval-based scale, which is valuable for the follow-up analyses. As mentioned above, the second part of the questionnaire includes a number of questions about land factors and individual characteristics.

RESULTS

Individual characteristics

Based on the research findings (Table 1), majority of farmers were men and lived in rural areas. The average of their ages was 52 years which showed that the researchers have an old paddy grower's society. The educational level of the farmers' majorities (30%) was primary and their average of farming experience was over 30 years old. In terms of economic status, their average income was about 15,500 \$ per year and majority of them had income between 555 and 1,500 \$. Average number of the farmers' family size was five persons and they had an average distance of about 6 km from the service center, 2 from cooperative, 0.6 from asphalted road and 8 from the nearest city away.

Farming characteristics

The average size of each farmer's farm and irrigated land was equal to 3.8 and 3.3 ha, respectively and 2.9 ha of their lands were under rice cultivation. Farmers mostly had three or less pieces of land, but the average number for farmers under this study was three pieces. Majority of them were landowners and the dominant farming system in this region was sole cropping. Only 2% of farmers had

Table 1. Frequency table of some of variables related to individual characteristics.

Variable	Category levels (%)					Mean	SD
Literacy	Illiterate (16)	Able to read and write (23.3)	Secondary school (23.3)	High school (9.3)	Diploma (28)	-	-
Credits for organic farming	Yes (0.00)	No (100.0)	-	-	-	-	-
Participation in extension courses about organic farming	Non-participation (64.7)	Low (31.3)	Moderate (2.7)	High (0.0)	Very high (1.3)	-	-
Age (years)	Less than 30 (1.3)	30 - 60(80.0)	More than 60 (18.7)	-	-	52.2	10.57
Experience	Less than 10 year (4.1)	11-30 (61.0)	More than 30 (34.9)	-	-	30.63	11.96
Distance from services centre	Less than 5 (2.0)	5 - 7 (65.2)	More than 7 (32.8)	-	-	6.08	0.95
Agrarian land	Less than 3 (54.7)	3.1 - 7 (40.7)	More than 7.1 (4.7)	-	-	3.31	4.44
Paddy farm	Less than 3 (59.3)	3.1 - 7 (37.3)	More than 7.1 (3.4)	-	-	2.89	3.35
Income	Less than 500\$ (12.7)	500 - 1200\$ (42.7)	More than 1200\$ (44.7)	-	-	1380\$	169.90

received any loan for organic farming.

Social characteristics

Based on the research findings, majority of farmers are members in rural institutions and cooperatives, but only 12% of them were members in Islamic Council. Only one farmer among the others in this study was selected as a model farmer and one as an extension worker.

Extension Indicators

Majority of farmers (64.7%) had not participated in any of the extension courses and so most of them (80%) have not visited any demonstration farms related to organic farming. About 98% of farmers so far have not visited any agricultural fair related to organic farming and majority of them had not participated in visiting any outside village fields related to organic farming.

Ranking of barriers to organic farming

Farmers believed that the most important barrier to application of organic farming was lack of organization to verify organic products. Without these organizations, consumers will not be able to identify organic from non-organic products. The second major obstacle to using organic agriculture was economic factors. Farmers

complain that consumers are not willing to pay more money for organic products. The third obstacle was the lack of governmental support when organic products were destroyed due to pest. Other barriers according to the amount of importance are presented in Table 2.

Factor analysis of barriers to organic farming

The factor analysis was utilized to summarize the variables of the research to a smaller quantity and to determine the effect of each one of the factors to confine organic farming. The implemented computations revealed that the internal coherence of the data is appropriate (KMO = 0.733) and Bartlett's test statistical data was at 0.01 level significance (1051.776). According to Kaiser Criteria (Table 3), there were six factors in which the Eigen values were extracted more than 1 (Table 4).

The research variables were categorized into six factors by using Varimax Rotation Method (Table 4). The variables of each factor were extracted based on Table 3 and described as follows: According to factor analysis, the barriers of organic farming were categorized into six groups and the first one was called the productive barriers. This factor had the highest Eigen value (4.473) among others. In addition, it explained 16.141% of the total variances of the variables (Table 5). The second factor was called the natural barriers. This factor had an Eigen value of 2.958, which explained 13.211% of the total variances of the variables (Table 6). The third factor was called the attitude and knowledge barriers. It has an

Table 2. Ranking of barriers to organic farming.

Descriptions	Mean	Rank
Lack of organization and organization that verify these organic products	4.66	1
People are not willing to pay more for organic products	4.63	2
Government do not have commitment for payment when destroyed organic products due to pest	4.19	3
Lack access to required input	4.16	4
Lack access to appropriate markets to purchase these products	3.93	5
I do not know how to do cultivation.	3.85	6
Research and quantitative studies are low about this methods	3.80	7
Lack of clear standards for this production methods	3.75	8
Not being enough organization to produce natural defiant Insects	3.69	9
Government does not support organic products.	3.67	10
I do not have enough Knowledge and education about organic farming.	3.61	11
Farm soil does not allow the culture and we must use chemical fertilizers and pesticides.	3.51	12
Existent natural resources is not suitable and chemical material is required	3.39	13
Lack of governmental subsidies	3.18	14
Lack of access to productive Capital required for organic productions	3.09	15
I do not have interest and willingness to culture products of this type.	2.64	16
I do not have enough time for organic cultivation	2.61	17
Weather conditions do not permit this type of culture products.	2.47	18
Brokers and buyers lower the price they purchased.	2.08	19
Lack of access to transportation equipments	2.02	20
Lack of access to Appropriate place to store these products	1.99	21

Table 3. KMO measure and Bartlett's test to assess appropriateness of the data for factor analysis.

Bartlett's test of sphericity		
KMO	Approx. chi-square	Sig.
0.733	1051.776	0.000

Table 4. Number of extracted factors, Eigen values and variance explained by each factor.

Factors	Eigen value	% of variance	Cumulative % of variance
Productive barriers	4.473	16.141	16.141
Natural barriers	2.958	13.211	29.352
Attitude and knowledge barriers	1.705	11.214	40.566
Infrastructural barriers	1.487	11.091	51.657
Institutional barriers	1.162	8.279	59.936
Economical barriers	1.027	7.736	67.672

Eigen value of 1.705 and explained 11.214% of the total variances of the variables (Table 7). The fourth factor was called the infrastructural barriers. It has an Eigen value of 1.487 and explained 11.091% of the total variances of the variables (Table 8). The fifth factor was called the institutional barriers. It has an Eigen value of 1.162 and explained 8.279% of the total variances of the variables (Table 9). The sixth factor was called the

economical barriers. It has an Eigen value of 1.207 and explained 7.736% of the total variances of the variables (Table 10). As shown in Table 4, the above six factors explained about 68% of the total variance of the research variables. In other words, 32% of the total variance that pertains to other variables was not explained and these portending values have not come true in this analysis. The result of factor analysis is shown in Figure 1.

Table 5. Variables loaded in the first factor using varimax rotated factor analysis.

Factor	Variables	Factor loadings
Productive barriers	Lack access to productive Capital required for organic production	0.78
	Need to many labor	0.43
	I do not have enough time for organic cultivation.	0.83
	Lack access to required input	0.84
	Not being enough organization to produce natural defiant Insects	0.72

Table 6. Variables loaded in the second factor using varimax rotated factor analysis.

Factor	Variables	Factor loadings
Natural barriers	Weather conditions do not permit this type of culture products.	0.83
	Existent natural resources is not suitable and chemical material is required	0.78

Table 7. Variables loaded in the third factor using Varimax Rotated Factor Analysis.

Factor	Variables	Factor loadings
Attitude and knowledge barriers	I do not have interest and willingness to culture products of this type.	0.76
	I do not have enough Knowledge and education about organic farming.	0.82
	I do not know how to do cultivation.	0.73
	Research and quantitative studies are low about this methods	0.82

Table 8. Variables loaded in the fourth factor using Varimax Rotated Factor Analysis.

Factor	Variables	Factor loadings
Infrastructural barriers	Lack of access to transportation equipments.	0.89
	Lack access to Appropriate place to store these products.	0.89

Table 9. Variables loaded in the fifth factor using Varimax Rotated Factor Analysis.

Factor	Variable	Factor loadings
Institutional barriers	Government does not have commitment for payment when organic products are destroyed due to pest.	0.88
	Government does not support organic products.	0.60
	Lack of governmental subsidies.	0.44
	Lack of clear standards for this production methods	0.50

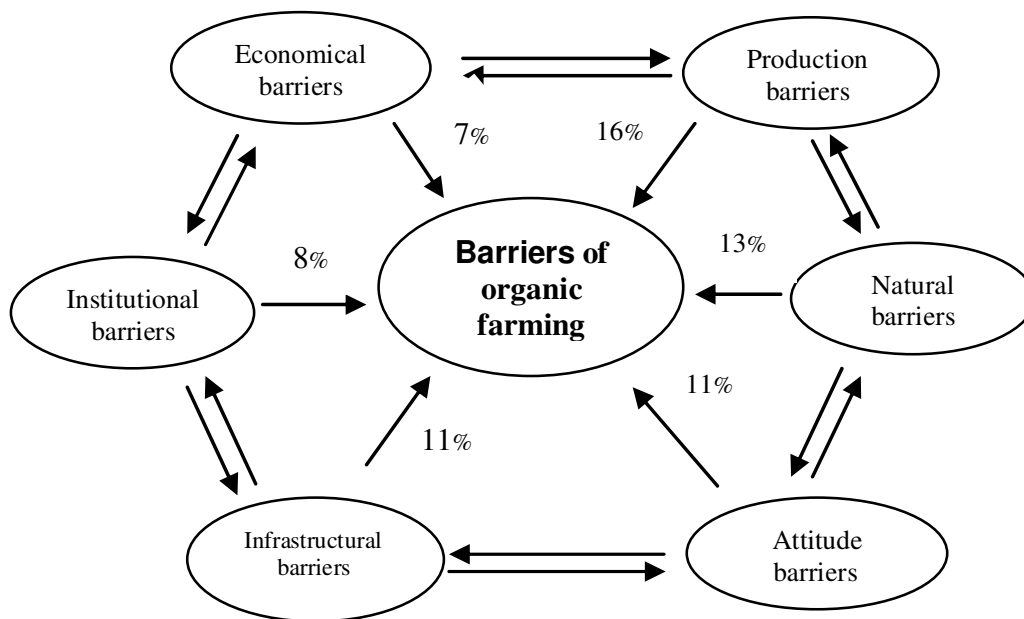
DISCUSSION AND CONCLUSION

As Lampkin (1990) and Harris et al. (1998) expressed, adoption of organic farming as an innovation will not be easy and will be faced with simple barriers. These barriers can include institutional, cultural, economic, social

and technical barriers (Schneeberger et al., 2002). Therefore, the purpose of this study was identifying these barriers in Babol county of Iran and the investigation of its impact on adoption of organic farming. The result of the study showed that farmers had high age and low level of literacy. They lived far from service centers and this factor

Table 10. Variables loaded in the sixth factor using varimax rotated factor analysis.

Factor	Variables	Factor loadings
Economical barriers	People are not willing to pay more for organic products.	0.81
	Brokers and buyers lower the price they purchased.	0.56
	Lack access to appropriate markets to purchase these products.	0.49

**Figure 1.** The barriers for adoption organic farming between farmers.

has caused lack of access to new information about agricultural activities. One of the most important obstacles in the study was lack of access to extension courses and willingness among farmers to participate in these courses, whereas they are important tools for accepting any type of technology (Noe, 2000; Oldrup, 2000; Hansen, 2003).

According to results of barriers ranking, farmers expressed that lack of access to required inputs for organic farming was one of the important barriers because they believed that this kind of agriculture without access to natural defiant insects is not possible. They also believed that there is no organization for verifying organic products and this factor has led to consumers not being able to identify organic from non-organic products and therefore do not pay more money for this product. This led to the third and fifth barriers from farmers' viewpoint. The results of factor analysis showed that the measured barriers for using organic agriculture could be categorized into six factors which consist of production, attitude and knowledge, infrastructure, institutional, organizational and economical barriers. These factors explained 70% of the organic agricultural barriers. From the farmers' viewpoint, production barriers were the most

important for adoption of organic farming in the region because until farmers have access to required inputs such as labor (Maurer 1997; Kirner 1999), required natural capital (Raynolds, 2004; Kirner, 1999) and natural defiant insects production centers, they cannot make use of organic farming methods. Schneeberger et al. (2002) called these technical barriers and lack of inputs such as seeds, natural insects and need for more labor were known by him as barriers for using organic method among Austrian farmers. Natural barriers such as lack of adequate soil moisture, lack of suitable vegetation on the soil and lack of soil fertility were also important barriers that prevent farmers from using organic farming.

The second factor was attitude and knowledge barriers that were mentioned from farmers' viewpoint. It seems that low level of literacy among farmers, lack of awareness about organic methods and about benefits of organic farming (according to results obtained by Kirner, 1999; Vogel and Hess, 1996; Padel and Lampkin, 1994) and also lack of proper research about organic agriculture in the region led to farmers not having the willingness to use organic method in Babol County. However, farmers' trends and willingness to use organic farming methods can improve, if their information about

organic farming and its method of management increases. Lack of required facilities for transport and storage products was recognized from farmers' viewpoint as important barriers, but institutional and organizational were recognized as critical barriers beside the infrastructural barriers (in accordance with the results of Padel and Lampkin, 1994). Also, lack of governmental supports for organic products and lack of organization that verify these products are considered as important barriers. The result of farmer's agronomy characteristics showed that farmers did not receive any loan and subsidy from government for using organic farming in this region. So, to improve the use of organic farming, government and financial services have to support organic farmers.

The last important barrier from farmers' viewpoint was economical barrier (confirmed by Fair-weather 1999). It means that access to proper market for organic products was unavailable (confirmed by Niemeyer and Lombard, 2003; Vogel and Hess, 1996; Kirner, 1999; Padel and Lampkin, 1994) because consumers were not willing to pay more money for organic products (Darnhofer et al., 2005; Niemeyer and Lombard, 2003) and as a result, organic farming did not have more income than conventional method. According to the barriers mentioned above, the following suggestions should be expressed. First, required inputs for organic farming should be provided and made available for farmers. Secondly, government should encourage farmers in using organic method with institutional support such as setting up organization that verify these organic products and providing financial services such as loans and subsidies for farmers (confirmed by Niemeyer and Lombard, 2003). Also, with attention to holding extension courses related to organic farming and participation of farmers in it would increase the farmers' awareness about organic farming methods and ensure their realization of its benefits. Padel and Lampkin, 1994 also concluded that farmers were worried about products diseases because they did not have enough information related to organic products. Finally, for the extension of organic farming usage, it is suggested that farmers should go near the pioneers because they are higher literates, younger and more risk taking than normal farmers.

REFERENCES

- Buttel F, Gillespie GW (1988). Preferences for crop production practices among conventional and alternative farmers. *Am. J. Alternative Agric*, 3(1), 11-16.
- CEC (2002). Analysis of the possibility of a European action plan for organic food and farming. Commission staff Working Paper, Brussels: Commissions of the European Communities.
- Darnhofer I, Schneeberger W, Freyer B (2003). Converting or not converting to organic farming in Austria: Farmer types and their rationale, ISSN: 0889-048X. *Agric. Hum. Values*, 22(1): 39-52;
- Darnhofer I, Schneeberger W, Freyer B (2005). Converting or not converting to organic farming in Austria: Farmer types and their rationale. *Agric. Hum. Values*, 22: 39-52.
- Dubgaard A, Holst H (1994). Policy issues and impacts of government assistance for conversion to organic farming: The Danish experience. In Lampkin N. H, Padel S (eds.): *The economics of organic farming. An international perspective*. CAB International, Wallingford, pp. 383-391.
- Duram LA (1999). Factors in organic farmers' decision making: Diversity, challenge, obstacles. *Am. J. Alternative. Agric*, 14(1): 2-9.
- Fair-weather JR (1999). Understanding how farmers choose between organic and conventional production: Results from New Zealand and policy implications. *Agric. Hum. Values*, 16: 51-63.
- Feder G, Just RE, Zilberman D (1985). Adoption of agricultural innovations in developing countries: A survey, University of Chicago. *Econ. Dev. Cultural Change*, 5: 254-297.
- FIBL (1997). *Biostatistik*. Forschungsinstitut für Biologischen Landbau. Frick.
- Hadatsch S, Kratochvil R, Vabitsch A, Freyer B, Götz B (2000). *Biologische Landwirtschaft im Marchfeld. Potenziale zur Entlastung des Natur- und Landschaftshaushaltes*. Monographien, Band M-127, Umweltbundesamt Wien.
- Hansen L (2003). *Forst med hjernen – sa' med hjertet. Et antropologisk speciale om konventionelle landmænds erfaringer med omgning til økologisk jordbrug (First with the brain, then with the heart. An anthropological thesis on conventional farmers' experiences with conversion to organic farming)*. Master's thesis, Department of Anthropology, University of Copenhagen, Denmark.
- Harris PJC, Lloyd HD, Hofny-Collins AH, Barrett HR, Browne AW (1998). *Organic agriculture in Sub-Saharan Africa: Farmer demand and potential for development*. HDRA, Coventry.
- Kirner L (1999). *Teilnahme an den ÖPUL-Massnahmen "Biologische Wirtschaftswiese" und Betriebsmittelverzicht (Betrieb)" ab dem Jahr 2000*. Institut fuer Agrarökonomik der Universität für Bodenkultur; Vienna.
- Lampkin NH (1990). *Organic farming*. Farming Press, Ipswich. LD (Ministry of Agriculture 1999) St.meld. nr. 19 (1999-2000) Om norsk landbruk og matproduksjon (Norwegian agriculture and food production), Oslo: Det Kongelige Landbruksdepartement.p. 19.
- Lohr L, Salomonsson L (2000). Conversion subsidies for organic production: results from Sweden and lessons for the United States. *Agric. Econ*, 22(2): 133-146.
- Loibl E (1999). *Die Beweggründe, Biobauer zu werden - Voraussetzungen und Ursachen*. Forderungsdienst 47(10): 344-346.
- Mader P, Fliebach A, DuBois D, Gunst L, Fried P, Niggli U (2002). Soil fertility and biodiversity in organic farming. *Sci*, 296: 1694-1697.
- Maurer J (1997). *Umstellung auf Biolandbau in der Schweiz- Motivation und Hemmnisse*. In: *Beiträge zur 4. Wissenschaftstagung zum ökologischen Landbau*, pp. 3-4. (U. Köpke and J. A. Eisele). Verlag Dr. Köster, Berlin; Bonn, pp. 523-529.
- McEachern M, Willock J (2000). A philosophical investigation into producer attitudes towards organic farming. In: *IFOAM 2000 The world grows organic. Proceedings of the 13th International IFOAM conference*. (T. Alföldi, W. Lockeretz and U. Niggli). IFOAM Tholey-Theley; Basel, p. 737.
- Michelsen J, Soegaard V (1999). *Policy instruments for promoting conversion to organic farming and their effects in Europe 1985-1996*. Unpublished interim report to the EU commission for project FAIR CT 96 1794, University of Southern Denmark. Esbjerg.
- Niemeyer K, Lombard J (2003). Identifying problems and potential of the conversion to organic farming in South Africa. Paper presented at the meeting of the Agricultural Economic Association of South Africa (AEASA), Pretoria, South Africa.
- Noe E (2000). *The organic network in Lemvig*. In F. Just, (ed.), *Farmers_Networking and Sustainable Agriculture in Denmark. National Report with Case Studies*. Retrieved from [http:// adm websrv3a.sdu.dk/mas/Reports/NationalReportDK.pdf](http://adm.websrv3a.sdu.dk/mas/Reports/NationalReportDK.pdf) on May 13, 2007. *Conclusions and Recommendations* pp. 64-79.
- Oldrup H (2000). *Case study 3. The organic fresh food terminal in Soenderjylland – transforming marketing net-works*. Research report, Institute of Political Analysis, University of Southern Denmark, Esbjerg, Denmark.
- Padel S, Lampkin N (1994). *Conversion to organic farming: An overview*. In Lampkin NH, Padel S (eds.): *The economics of organic farming. An international perspective*: CAB International, Wallingford, pp. 295-310.
- Padel S, Lampkin N, Foster C (1999). *Influence of policy support on the development of organic farming in the European Union*. *International Planning Studies*, 4(3): 303-315.
- Raynolds LT (2004). *The globalization of the organic agro-food networks*.

World Development, 32(5): 725-743.

Schneeberger W, Darnhofer I, Eder M (2002). Barriers to adoption of organic farming by cash-crop producers in Austria. *Am. J. Alternative. Agric.*, 17: 24-31.

Schneider R (2001). Umstellung von Marktfruchtbetrieben im Marchfeld und Weinviertel auf die biologische Wirtschaftsweise – Umstellungshemmnisse, Umstellungsprobleme und Wirtschaftlichkeit. Dissertation Universität für Bodenkultur Wien.

Vogel C, Hess J (1996). Ein Land stellt um? *Ökologie und Landbau* 24(1): 27- 32.