

8. Competencies and agricultural entrepreneurship of dairy farmers in Poland, Lithuania and Slovenia

C. de Lauwere¹, A. Malak-Rawlikowska², A. Stalgienė³, M. Klopčič⁴ and A. Kuipers⁵

¹LEI Wageningen UR, P.O. Box 35, 6700 AA Wageningen, the Netherlands; ²Warsaw University of Life Sciences – SGGW, Faculty of Economic Sciences, ul. Nowoursynowska 166, 02-787 Warsaw;

³Lithuanian Institute of Agrarian Economics, V. Kudirkos st. 18-2, 03105 Vilnius, Lithuania;

⁴University of Ljubljana, Biotechnical Faculty, Department of Animal Science, Groblje 3, 1230 Domžale, Slovenia; ⁵Expertise Centre for Farm Management and Knowledge Transfer, Wageningen UR, P.O. Box 35, 6700 AA Wageningen, the Netherlands; carolien.delauwere@wur.nl

Abstract

Farmers in Eastern Europe face important challenges. It is assumed that improved capacities of farmers on strategic management and entrepreneurship enable them to better anticipate towards the continuous changes and keep their farms viable. Therefore a study which aims to give insight in the competencies and entrepreneurship of dairy farmers in Poland, Lithuania and Slovenia was started in 2011. A survey amongst 1038 farms was carried out in 2011 and the beginning of 2012, of which 334, 334 and 362 dairy farmers in Lithuania, Poland and Slovenia, respectively, were included in the analysis. Most farmers interviewed (71.5%) characterised their farms as a specialised dairy farm. Expand dairy production and further specialisation were chosen most often as focus for the development of the farm in the coming 5 years (by 70.4% and 70.3% of the interviewed dairy farmers respectively). The farmers qualified the farming goals earn enough money to support the family, maximise profit, breed sustainable dairy cows (regarding longevity and fertility), keep costs as low as possible and improvement of animal welfare as (very) important. Perceived opportunities were technical developments, ICT applications, EU subsidies, advisory services and internet. The future reduction of direct payments was seen as the biggest threat. The interviewed farmers perceived the possibilities to perform their preferred strategies and their knowledge to do so as neutral or a little positive. They were quite positive about their entrepreneurial competencies (especially analysing and pursuing) and abilities for strategic reflection and perceived themselves as rather financially conservative. They appeared to be reasonably positive about their future. If a distinction is made between farmers with high and low competence levels, it appears that farmers with a high competence level make different strategic choices (more often directed to further development of the farm), have higher scores for entrepreneurial features, are more positive about their future and have bigger farms than farmers with a low competence level. The results of the survey serve as basic measurement for trainings on strategic management, innovation and entrepreneurship in Lithuania, Poland and Slovenia.

Keywords: agricultural entrepreneurship, competencies, strategic choices, development direction, future prospects

Introduction

Agriculture in Central and Eastern Europe (CEE countries) faces important challenges since the fall of the communist regime in the 1990s and the accession to the EU in 2004 and 2007. In combination with globalisation, this has led to big changes in the agrifood supply chains in terms of output, productivity, employment, investments, product standards, and the organisation of supply changes and the role of foreign investment (Dries *et al.*, 2009). Like in Western European countries, agriculture in CEE countries can keep up with these social developments only if the agricultural entrepreneurs are willing and able to deal with the radical changes that are facing them (De Lauwere, 2005). This asks for entrepreneurial competencies. In agriculture, these refer to the exploration of new pathways to growth, innovation and diversification and the ability of owner-managers to identify and pursue such opportunities (Man *et al.*, 2002; Lans, 2009). In this chapter emphasis is on agricultural

entrepreneurship, entrepreneurial competencies, the perceived availability of resources and future prospects of dairy farmers in Poland, Lithuania and Slovenia.

Method

A survey using a structured questionnaire was carried out in the autumn of 2011 and the beginning of 2012. 1038 questionnaires were collected. Big farms which were not run by one farmer/ entrepreneur but could be interpreted as companies rather than farms and which had more than 15 employees were excluded from the sample. Finally, 334, 334 and 362 dairy farmers were included in the analysis in Lithuania, Poland (Mazovia region) and Slovenia respectively. In Lithuania and Poland, the surveys were collected by employees of extension services who visited the farmers and completed the questionnaires together with them (without affecting the farmers although they could help to clarify a question). In Slovenia the questionnaires were spread during farmers' meetings.

In each country the sample for the survey was based on specialised dairy farmers who delivered milk to the market. The structure of the sample was determined beforehand: 10% of participating farmers should have 5-9 dairy cows; 50% of farmers should have 10-19 dairy cows; 18% of farmers should have 20-29 dairy cows; 12% of farmers should have 30-49 dairy cows and 10% of farmers should have 50 or more cows. The sample was more or less representative in each country (for Poland for Mazovia Region) for the number of farmers with 10-49 cows, but the number of farms with 5-9 dairy cows was deliberately underestimated and the number of farms with 50 or more cows was deliberately overestimated.

The survey included questions about farm structure (no. of dairy cows and young stock, total ha of utilised agricultural land etcetera), farmer characteristics (age of the farmer), farm characteristics (specialised dairy farm or diversified farm), the farm focus for the next five years, the perceived availability of resources and opportunities and threats, future prospects, the farmers competencies performance, networking, openness, analysing and pursuing, and the entrepreneurial features ambition, financial conservatism, customer orientation, passivity, perceived possibilities for performing farm strategies (locus of control), knowledge on development direction and strategic reflection.

The questions regarding the perceived availability of resources and opportunities and threats, farmers competencies, entrepreneurial features and future prospects were asked on a 7-point scale ranging from very negative (totally disagree, not important at all, very difficult, very big threat) to very positive (totally agree, very important, very easy, very big opportunity).

Data regarding the farm characteristics and farm development are presented as percentages of farmers who made a certain choice in each country. Data regarding the qualification of farming goals, opportunities and threats, availability of resources, competencies and entrepreneurial features are presented as mean scores per country. Besides this, a distinction is made between farmers with high and low competence levels. This is based on a hierarchical cluster analysis. A Pearson's χ^2 -test is performed to check whether a relationship exists between competence level and farm focus. Differences between competence levels with regard to entrepreneurial features, perceived availability of resources, future prospects and some farm characteristics related to farm size (no. of dairy cows, milk production per cow and total ha of utilised agricultural area (UAA) owned or rented) are analysed by means of an univariate ANOVA analysis. SPSS 19.0 is used for the statistical analyses.

Results

Farm and farmer characteristics

Table 1 shows some general features of the farmers who participated in the survey in Lithuania, Poland and Slovenia.

Table 2 shows the farm characterisation per country. Overall, the number of farmers with a specialised dairy family farm was high due to the criteria on which the sample was based (see the methods section). Farm characterisation between countries seem to be different. In Lithuania, the number of interviewed farmers with a specialised large scale dairy farm was higher than in the other countries and the number of interviewed farmers with an agricultural diversified farm or a dairy farm with non-agricultural activities was lower. In Poland, the number of dairy farms with non-agricultural activities was lower than in the other countries, and in Slovenia the number of dairy farms with non-agricultural activities was higher than in the other countries (Table 2).

Table 1. General farm features of interviewed dairy farmers in Lithuania, Poland and Slovenia.

	Lithuania		Poland		Slovenia	
	Mean (std)	n	Mean (std)	n	Mean (std)	n
Age of farmers	46.1 (10.5)	334	41.4 (10.5)	330	48.4 (12.4)	361
No. of dairy cows	33.2 (31.1)	334	24.2 (18.5)	333	31.4 (20.1)	362
Milk production per cow in 2010	5,456.4 (1,208.6)	330	5,227.4 (1,465.3)	327	6,443.7 (1,573.2)	358
Total ha of UAA owned by farmer	41.3 (43.1)	334	27.2 (17.5)	334	13.9 (7.4)	362
Total ha of UAA rented by farmer	55.5 (64.5)	334	8.6 (14.4)	334	17.0 (16.4)	362
	%	n	%	n	%	n
Farmers who apply pasturing	94.6	334	75.1	334	39.5	362
Farmers with tie stall	78.1	334	86.2	334	60.8	362
Farmers with cubicle stall	21.3	334	17.4	334	47.0	362
Farmers with own cooling tank	81.1	334	94.3	334	91.7	362

std = standard deviation; UAA = utilised agricultural area.

Table 2. Characterisation of dairy farms per country (% of farmers).

Characterisation of farm	All countries (n=1,003)	Lithuania (n=316)	Poland (n=329)	Slovenia (n=358)
Specialised dairy family farm	71.5	73.7	75.1	66.2
Specialised large scale dairy farm with personnel	3.5	9.8	0.6	0.6
Agricultural diversified farm	21.0	15.8	22.8	24.0
Dairy farm with non-agricultural activities	4.0	0.6	1.5	9.2

Focus on development direction per country

The development directions chosen most often by the interviewed farmers appeared to be further specialisation in dairy farming and expand dairy production. In Lithuania, the development directions diversify into other agricultural activities and wait and see also were mentioned quite often, while cooperation with other farmers and chain integration were mentioned more often in Poland and Slovenia. Diversify in non-agricultural activities was chosen quite often in Slovenia and downscaling relatively often in Lithuania. The development directions relocate farm partly or entirely and start a new farm were not chosen very often in either of the countries (Table 3).

Qualification of farming goals

Farmers were asked to qualify different farming goals with scores ranging from 1 (not important at all) to 7 (very important). Farmers qualified the following farming goals as important to very important (average scores between 6 and 7): earn enough money to support my family (avg. score 6.6); maximise profit (avg. score 6.5); breed sustainable dairy cows (avg. score 6.4); keep costs as low as possible (avg. score 6.4); improve animal welfare (avg. score 6.4); run farm efficiently (avg. score 6.3); animal production with respect to animal welfare (avg. score 6.3); produce the best quality product (avg. score 6.2); breed cows with high milk production (avg. score 6.1); produce a safe product for consumers (avg. score 6.3); improve grassland management (avg. score 6.1) and maintain and develop nature and landscape (avg. score 6.1); and be my own boss (avg. score 6.0).

Farming goals which were qualified as slightly important to important (scores between 5 and 6) were: work with animals (avg. score 5.9); have the opportunity to work together with family (avg. score 5.9); be respected by the community (avg. score 5.8); work with machines (avg. score 5.8); keep farm management simple (avg. score 5.6); enjoy a rural life style (avg. score 5.6); provide my successor with an opportunity for dairy farming (avg. score 5.6); to work outside in the field (avg. score 5.6); have a high tech farm (avg. score 5.5); have sufficient leisure time/vacation (avg. score 5.5); reduce debts (avg. scores 5.4); improve management of maize production (avg. score 5.4); and keep the dairy tradition in the family (avg. scores 5.4). Farmers did not think that providing employment to others was very important for them (avg. score 4.0, which is the neutral score).

Table 3. Focus for farm development in the next five years per country (percentage of farmers that mentioned the presented development directions as 1st, 2nd or 3rd choice).

	All countries (n=1,030)	Lithuania (n=334)	Poland (n=334)	Slovenia (n=362)
Relocate farm partly or entirely	6.6	6.9	6.0	6.9
Expand dairy production	70.4	70.4	80.5	55.2
Start a new farm	3.8	5.4	4.5	1.7
Wait and see with attention for new developments	27.5	35.3	25.4	22.1
Downscaling (decreasing farm size)	9.8	13.5	8.7	7.5
Diversify into other agricultural activities	28.3	43.1	18.6	23.8
Chain-integration	30.4	16.2	36.8	37.6
Diversify into non-agricultural activities	15.0	7.8	8.7	27.3
Co-operate with other dairy farmers in machinery use, selling of products, etc.	35.9	21.9	47.0	38.7
Further specialisation in dairy farming	70.3	68.6	85.6	57.7

Opportunities and threats

Farmers were asked to qualify several agricultural developments as an opportunity or as a threat. They could give scores ranging from -3 (a big threat) to +3 (a big opportunity).

The farmers qualified the following agricultural developments as a moderate to big opportunity (avg. scores between +1 and +3): internet (avg. score 2.0); advisory services (avg. score 1.7); ICT applications (avg. score 1.5); EU subsidies (avg. score 1.5); technical developments (avg. score 1.4); veterinarians (avg. score 1.1); input suppliers (avg. score 1.1); colleague farmers (avg. score 1.1); and early retirement schemes (avg. score 1.0). They qualified the future reduction of direct payments as a moderate to big threat (avg. scores between -1 and -3) (avg. score -1.7).

The following developments were qualified as more or less neutral (avg. scores between -1 and +1): accession to the EU (avg. score 0.9); orientation on consumers/ the market (avg. score 0.9); the location of the farm (avg. score 0.8); cooperatives (avg. scores 0.7); consumer concerns (avg. scores 0.7); certifying organisations (avg. score 0.4); regulations for animal welfare (avg. score 0.3); regulations for veterinary and sanitary standards (avg. score 0.2); regulations on manure and fertiliser (avg. score 0.1); land property legislation (avg. score 0.1); the milk market (avg. score 0.1); international milk markets (avg. score -0.1); inspection services (avg. score -0.2); availability of land (avg. score -0.4); new EU agricultural policy (avg. score -0.6); and future milk quota abolition (avg. score -0.7).

Perception about the availability of resources

Table 4 shows how the interviewed dairy farmers in Lithuania, Poland and Slovenia perceived the availability of resources in their countries. It is obvious that the farmers in all countries are rather negative about the availability of land and the availability of labour (all average scores between slightly negative and negative). The farmers in Lithuania and Poland seem to be rather positive about the availability of knowledge (average scores between slightly positive and positive), while the average score of Slovenia is somewhat lower (between neutral and slightly positive). With regard to the availability of subsidies and milk quota, Lithuania and Slovenia have more or less neutral scores whereas Poland seems to be more positive about this. With regard to machinery, Slovenia seems to be more negative about this than Lithuania and Poland. In general, it is strikingly that Poland seems to be the least concerned about the availability of resources and Slovenia the most concerned.

Table 4. Perceived availability of resources by dairy farmers in Lithuania, Poland and Slovenia (mean scores and standard deviation between brackets).

	Lithuania		Poland		Slovenia	
	Mean (std)	n	Mean (std)	n	Mean (std)	n
Availability of land	2.5 (1.3)	334	2.9 (1.4)	328	2.5 (1.3)	354
Subsidies	4.6 (1.1)	334	5.2 (1.0)	330	3.8 (1.2)	346
Milk quota	4.7 (1.4)	261	5.2 (1.5)	301	3.9 (1.7)	284
Labour	2.6 (1.4)	310	2.6 (1.3)	312	2.9 (1.3)	302
Knowledge	5.6 (1.1)	329	5.7 (0.9)	327	4.6 (1.2)	347
Machinery	4.9 (1.6)	308	5.5 (1.5)	324	3.3 (1.6)	339

1 = very difficult to obtain; 2 = difficult to obtain; 3 = a bit difficult to obtain; 4 = neutral; 5 = a bit easy to obtain; 6 = easy to obtain; 7 = very easy to obtain; std = standard deviation.

Future prospects

The interviewed dairy farmers in Lithuania, Poland and Slovenia are moderately positive about their future. The average scores on questions related to positive future prospects are between neutral and slightly agree and the scores about negative future prospects are between slightly disagree and neutral (Table 5).

Farmers' competencies and entrepreneurial features

The farmers' scores on the farmers competencies performance, networking, openness, analysing and pursuing and for the entrepreneurial features perceived possibilities for performing preferred farm strategies (locus of control), knowledge on development direction, strategic reflection, ambition, passivity, customer orientation and financial conservatism are given for each country in Table 6. It appears that the farmers in all three countries are moderately positive about their competencies and entrepreneurial features. The average scores per country are mostly between 4 and 5, meaning neutral to slightly agree/ slightly positive. The average scores for the competencies analysing and openness and the entrepreneurial features 'knowledge on development direction' and 'customer orientation' are a little higher, mostly between 5 and 6, meaning slightly positive to positive. The

Table 5. Future prospects of farmers in Lithuania, Poland and Slovenia (measures on a 7-point scale).

	Lithuania		Poland		Slovenia	
	Mean (std)	n	Mean (std)	n	Mean (std)	n
Future prospects positive	4.8 (1.3)	334	4.5 (1.0)	331	4.8 (1.2)	357
Future prospects negative	3.3 (1.4)	333	3.4 (1.1)	332	3.3 (1.3)	355

1 = fully disagree; 7 = fully agree; std = standard deviation.

Table 6. Competencies and entrepreneurial features of dairy farmers in Lithuania, Poland and Slovenia (measures on a 7-point scale).

	Lithuania		Poland		Slovenia	
	Mean (std)	n	Mean (std)	n	Mean (std)	n
Performance	4.5 (1.1)	330	4.7 (0.8)	331	4.7 (1.2)	349
Networking	4.2 (1.2)	332	4.6 (0.8)	333	4.9 (1.1)	350
Openness	5.0 (1.2)	333	4.7 (0.9)	333	5.5 (1.0)	350
Analysing	5.3 (1.0)	332	5.1 (0.7)	333	5.6 (0.9)	352
Pursuing	4.9 (1.2)	332	4.8 (0.8)	334	5.3 (1.1)	351
Locus of control	4.4 (1.1)	334	4.1 (0.7)	333	4.4 (1.0)	355
Knowledge on development direction	4.7 (1.2)	334	4.4 (0.8)	332	4.5 (1.2)	356
Strategic reflection	4.5 (1.1)	334	4.3 (0.8)	330	5.0 (1.0)	355
Ambition	4.0 (1.3)	334	4.5 (1.0)	330	4.8 (1.2)	351
Financial conservatism	6.2 (0.8)	334	5.4 (0.9)	330	6.2 (0.8)	352
Customer orientation	5.2 (1.3)	329	4.9 (0.9)	330	5.4 (1.1)	350
Passivity	4.6 (1.4)	329	4.0 (1.1)	333	4.0 (1.7)	351

1 = fully disagree; 7 = fully agree; std = standard deviation.

farmers in all countries perceive themselves as rather financially conservative (score >6, meaning positive to very positive).

Effect of competence levels on various farm and farmers' characteristics

The success of farms also depends on the competencies of the farmers who run the farms. Therefore it was checked in the underlying study how their farm size, the strategic choices of the farmers, their entrepreneurial features, their perceived availability of resources and their future prospects were affected by the competence levels of the farmers. Two competence levels – relatively high and relatively low – were distinguished.

Effect of competence level on farm characteristics

Farmers with high and low competence levels also seem to differ with regard to their farm characteristics. Farmers with a high competence level had more dairy cows, reached a higher milk production per cow, and had more ha of owned and rented UAA (Table 7).

Effect of competence level on farmers' choices

It appeared that farmers with a higher competence level made different strategic choices. Farmers with a high competence level more often chose expand dairy production ($\chi^2=16.5$; $P<0.001$), chain integration ($\chi^2=12.7$; $P<0.001$) and further specialisation in dairy farming ($\chi^2=7.9$; $P<0.01$), and less often chose downscaling ($\chi^2=15.0$; $P<0.001$) or wait and see ($\chi^2=11.0$; $P<0.01$) (Figure 1).

Effect of competence level on entrepreneurial features

Farmers with a high competence level also had higher scores than farmers with a low competence level for the entrepreneurial features perceived possibilities for performing farm strategies (locus of control), knowledge on development direction, strategic reflection, ambition, customer orientation and financial conservatism (Table 8).

Effect of competence level on perceived availability of resources

The interviewed farmers with a high competence level were also more positive about the availability of subsidies, milk quota, knowledge and machinery than farmers with a lower competence level ($F=16.3$, $F=22.1$, $F=35.1$, $F=15.9$ respectively; $P<0.001$). However, no differences between competence levels seem to exist for the perception about the availability of land and the availability labour. All farmers had low scores for the availability of these resources (Figure 2).

Table 7. Some farm characteristics of farmers with high and low competence levels.

	High competencies		Low competencies		F
	Mean (std)	n	Mean (std)	n	
Average no. of dairy cows in 2010	34.1 (26.2)	549	24.5 (20.3)	456	40.9**
Average milk production/cow in 2010	6,034.3 (1,610.8)	544	5,583.2 (1,495.2)	447	20.5**
Total ha of UAA owned by farmer	30.8 (31.8)	550	23.2 (25.6)	456	16.9**
Total ha of UAA rented by farmer	32.3 (53.0)	550	20.4 (29.0)	456	18.4**

** $P<0.001$.

std = standard deviation; UAA = utilised agricultural area.

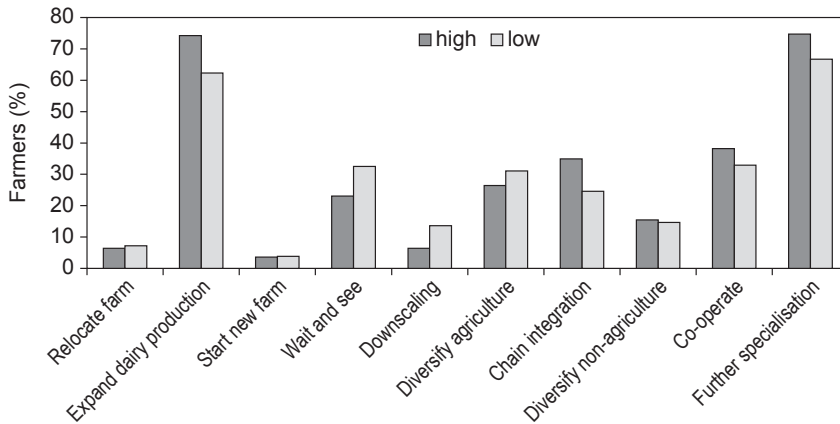


Figure 1. Farm focus of dairy farmers with high and low competence levels (percentage of farmers who mentioned the presented development directions as 1st, 2nd or 3rd choice).

Table 8. Entrepreneurial features of dairy farmers with different levels of competence in Lithuania, Poland and Slovenia (measures on a 7-point scale).

	High competencies		Low competencies		F
	Mean (std)	n	Mean (std)	n	
Perceived possibilities for performing preferred farm strategies (locus of control)	4.7 (0.9)	549	3.9 (0.9)	453	200.2**
Knowledge on development direction	4.9 (0.9)	549	4.1 (1.0)	451	143.6**
Strategic reflection	4.9 (0.9)	550	4.2 (0.9)	449	170.5**
Ambition	4.9 (1.1)	549	3.8 (1.1)	450	255.0**
Financial conservatism	6.1 (0.8)	549	5.8 (1.0)	450	22.9**
Customer orientation	5.5 (1.0)	548	4.9 (1.1)	446	78.3**
Passivity	4.1 (1.6)	548	4.3 (1.3)	449	7.3*

* $P < 0.01$; ** $P < 0.001$.

1 = fully disagree; 7 = fully agree; std = standard deviation.

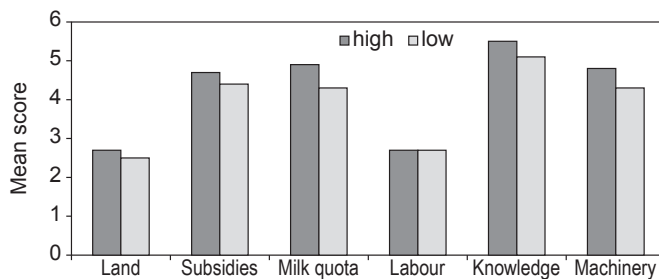


Figure 2. Perceived availability of resources by dairy farmers with different competence levels (mean scores). 1 = very difficult to obtain; 2 = difficult to obtain; 3 = a bit difficult to obtain; 4 = neutral; 5 = a bit easy to obtain; 6 = easy to obtain; 7 = very easy to obtain.

Effect of competence level on future prospects

With regard to their future prospects, farmers with a high competence level were more positive about their future as they have higher scores for positive future prospects ($F=194.8$; $P<0.001$) and lower scores for negative future prospects ($F=41.5$; $P<0.001$) than farmers with a low competence level (Figure 3).

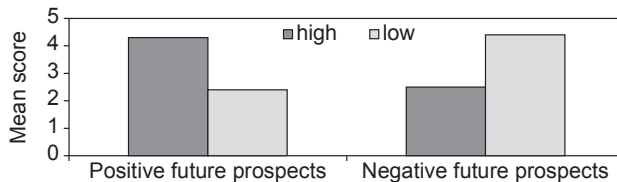


Figure 3. Future prospects of farmers with high and low competence levels in Lithuania, Poland and Slovenia (mean scores; measures on a 7-point scale). 1 = fully disagree, 7 = fully agree.

Discussion and conclusions

Based on the survey amongst 334, 334 and 362 farmers in Lithuania, Poland and Slovenia respectively, it can be concluded that the interviewed farmers seem to be rather positive about their future. They quite often chose farm focusses such as expand dairy production, further specialisation, co-operate with other dairy farmers, chain integration and diversification which are directed towards further development of their farms. They also seem to be positive about the agricultural developments they face as they tend to qualify these developments more often as an opportunity than as a threat. They only qualify the future reduction of direct payments as a moderate to big threat. This is understandable as direct payments are rather important for farmers in Lithuania, Poland and Slovenia (EC, 2008).

The interviewed dairy farmers in Poland and Lithuania seem to be moderately positive about the availability of subsidies, milk quota and machinery while the interviewed dairy farmers in Slovenia are slightly negative. All farmers seem to be rather positive about the availability of knowledge. The availability of land and labour however seems to be a concern of the interviewed farmers in all three countries. This has been found before in a survey in Slovenia amongst 525 dairy farmers (Bergevoet *et al.*, 2010).

The interviewed dairy farmers also are moderately positive about their competencies and entrepreneurial features. This is important because competence development is important for growth, innovation and diversification of enterprises and to continuously recognise new business opportunities (Batterink *et al.*, 2006; Nuthall, 2006; Lans, 2009). This is confirmed by the results that the interviewed farmers with higher competence levels more often chose further specialisation in dairy farming, expansion of dairy production and chain integration and less often chose downscaling or wait and see than farmers with low competence level. Moreover, farmers with a higher competence level had higher scores for entrepreneurial features, were less concerned about the availability of resources were more positive about their future and had bigger farms.

References

- Batterink, M.H., Wubben, E.F.M and Omta, S., 2006. Factors related to innovative output in the Dutch agrifood industry. *Journal on Chain and Network Science* 6: 31-44.
- Bergevoet, R.H.M., Kuipers, A. and Klopčič, M., 2010. Examination of Slovenian farmers' strategies and perceived opportunities and threats as part of rural development. In: Kuipers, A., Verbic, M., Glavac, J., Kos-Skubic, M. and Klopčič, M. (eds.) *Producers and consumers' choices regarding cattle farming systems and products – surveys in Slovenia*. Ministry of Agriculture, Forestry and Food (MAFF), Ljubljana, Slovenia, pp. 31-42.
- De Lauwere, C.C., 2005. The role of agricultural entrepreneurship in Dutch agriculture of today. *Agricultural Economics* 33: 229-238.
- Dries, L., Germejani, E., Noev, N. and Swinnen, J.F.M., 2009. Farmers, vertical coordination, and the restructuring of dairy supply chains in central and Eastern Europe. *World Development* 37: 1742-1758.
- European Commission (EC), 2008. Direct payments distribution in the EU-25 after implementation of the 2003 CAP reform based on FADN data. EC, Brussels, Belgium. Available at: http://ec.europa.eu/agriculture/rica/pdf/hc0304_distribution_eu25.pdf.
- Lans, T., 2009. Entrepreneurial competence in agriculture. Characterization, identification, development and the role of the work environment. PhD thesis, Wageningen University, the Netherlands.
- Man, T.W.Y., Lau, T. and Chan, K.F., 2002. The competitiveness of small and medium enterprises – a conceptualization with focus on entrepreneurial competencies. *Journal of business venturing* 17: 123-142.
- Nuthall, P.L., 2006. Determining the important management skill competencies: the case of family farm business in New Zealand. *Agricultural Systems* 88: 429-450.