

# Farm characteristics and economic behavior of a volatile economic environment: the example of Estonian farmers in 2013 to 2016

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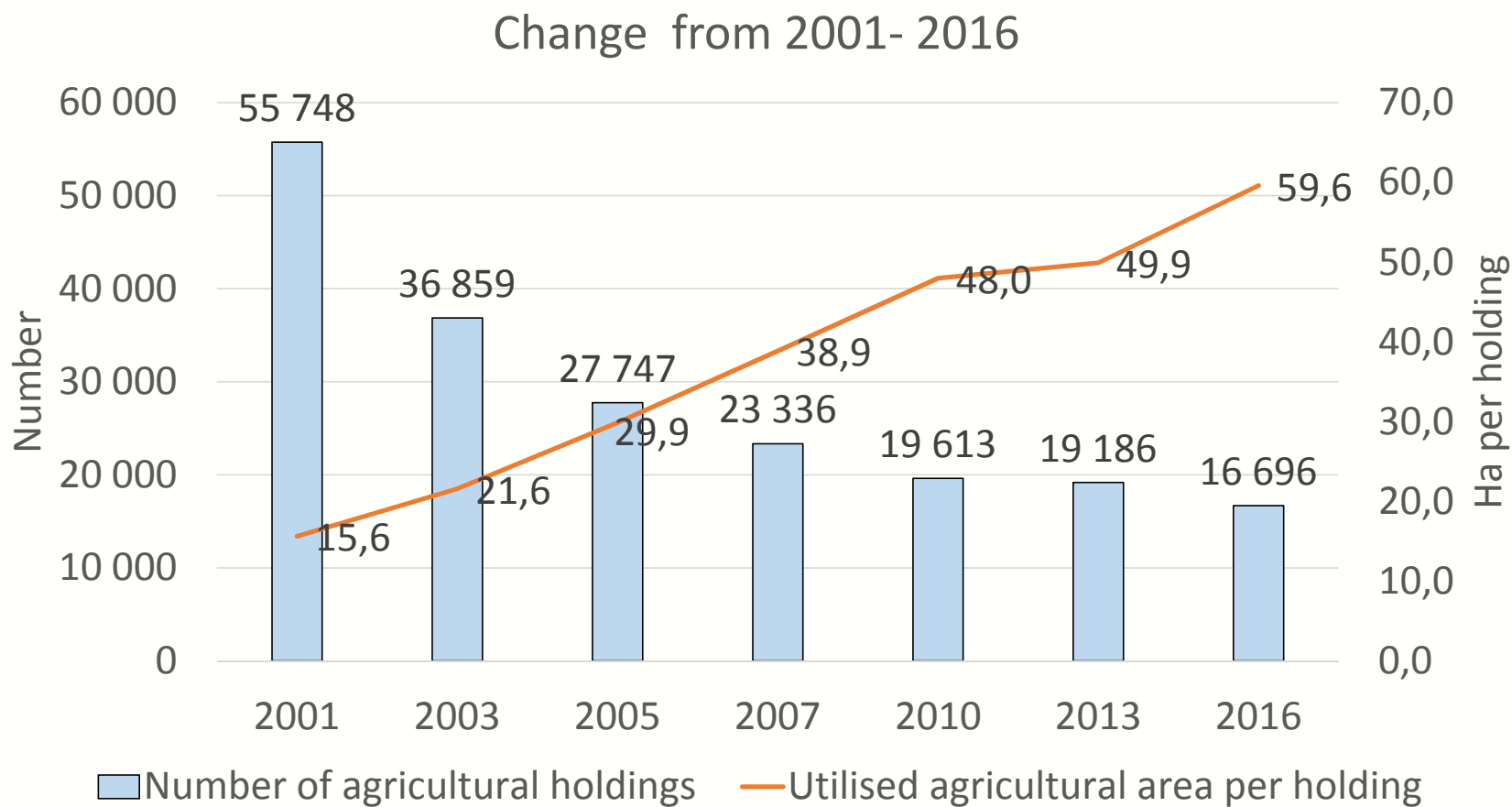
Conference “The Common Agricultural Policy of the European Union – the present and the future“ 5-7th December 2017, Stare Jabłonki, Poland



# Background

- Highly volatile economic environment
- African swine fever outbreak from 2014
- Decrease of pig farmers by 56% from 2014 to 2016
- Russian sanctions in 2014
- Milk producer price drop from all time high of 403 eur per ton in April 2014 to 200 eur per ton in July 2016
- Decrease in number of dairy cows from 97.9 thous. in 2013 to 86.1 thou. in 2016
- Decrease of holdings with dairy cows from 2532 in 2013 to 1742 in 2016 (-31.2%)





**Figure 1. Number of agricultural holdings in Estonia**

**Agricultural holding** –technically and economically single unit with single management, and which produces agricultural products or maintains its land in good agricultural and environmental condition, where:

- there is at least one hectare of utilised agricultural land or
- there is less than one hectare of utilised agricultural land but agricultural products are produced mainly for sale.

Source: Statistics Estonia (2017)



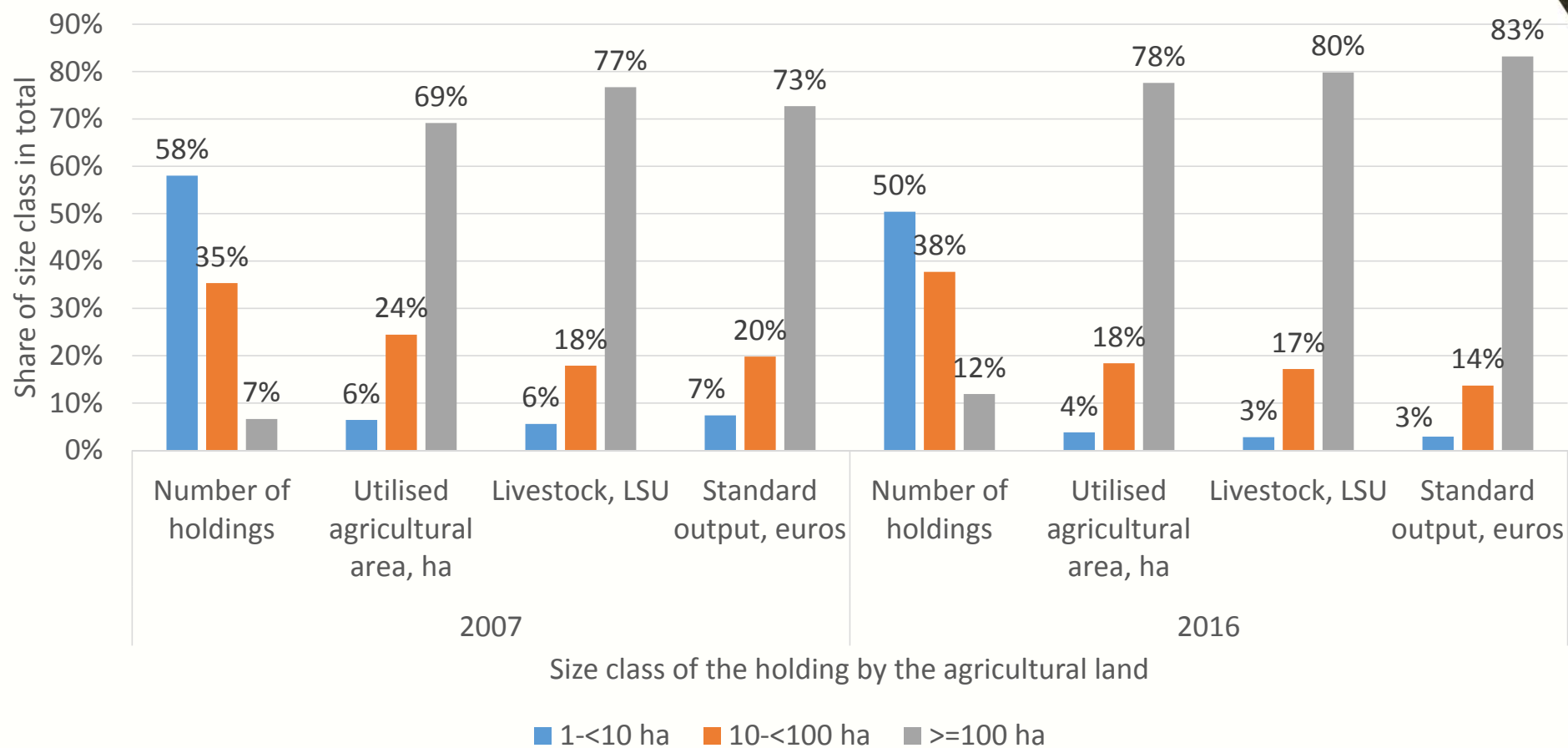


Figure 2. Share of holdings by the key indicators by the size class of agricultural land

Source: Statistcis Estonia (2017)



Table 1. Changes from 2013- 2016

Source: Statistics Estonia (2017)

		Size class by agricultural land		
		1-<10 ha	10-<100 ha	>=100 ha
2013	Number of agricultural holdings	9719	7077	1794
	Utilised agricultural area, ha per holding	4.6	29.5	392.5
	Livestock, LSU per holding	0.6	5.4	106.9
	Standard output, euros per holding	2 102	13 231	273 936
2016	Number of agricultural holdings	8070	6036	1900
	Utilised agricultural area, ha per holding	4.79	30.5	406.55
	Livestock, LSU per holding	0.7	6.1	89.5
	Standard output, euros per holding	2 676	16 836	321 313



# Farm survey

- In 2013, as part of project „The efficiency of the use of the main production resources in Estonian agriculture“ a questionnaire survey of Estonian farmers on their production technologies, management, future plans
- The sample was formed from 2289 Estonian farmers – 1474 crop producers, 811 dairy producers.
- Sample was formed in the basis of data from Estonian Agricultural Registries and Information Board (ARIB; paying agency), animal registry etc. Criteria for crop producers was at least 10 ha of arable land under cereal, legumes or oil seed crops
- In 2012, 64% of Estonian arable land under cereal, legumes and oil seed crops was cultivated by the farmers in the sample
- 93,5% of Estonian dairy cows in 2012 belonged to farms in the sample

- 633 respondents (28% response rate) – 311 dairy farmers (49% of respondents), 323 crop producers (51%) from farm survey
- Respondent characteristics:
  - 81% men
  - Average age 52.4
  - In 2013, mean arable land per dairy producer 380.6 ha; crop producers 249.4 ha
- In 2017, the survey data from 2013 was supplemented with information on the single area payments in 2016 from the paying agency

# Objective of present analysis

- The aim of present paper to study what happened to the farmers after 2013, specifically which farmers exited and their characteristics
- Multinomial logistic regression to study if selected farm characteristics and plans in 2013 had impact on their behaviour by 2016

## Change in arable land used as proxy

- Exit- respondents, who had applied for subsidies in 2013, but that did not apply for subsidies in 2016 (arable land in paying agency's data 0 in 2016)
- Stable- the change of arable land from 2013 to 2016 between -5% to 5%
- Decrease or increase – arable land in 2016 decreased or increased by more than 5.1% in comparison with 2013



# Changes in agricultural land

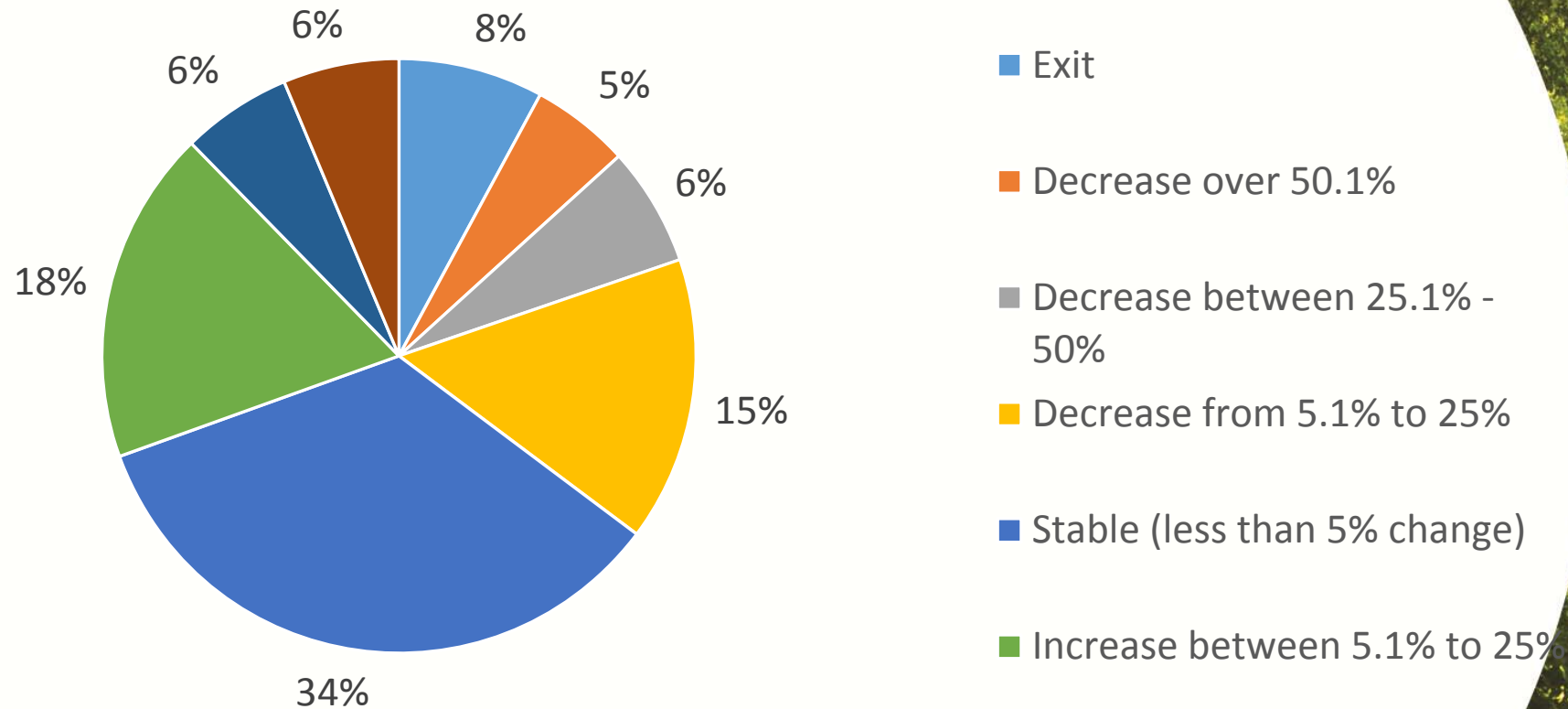


Figure 3. Change in agricultural land from 2013 to 2016 (% of respondents)

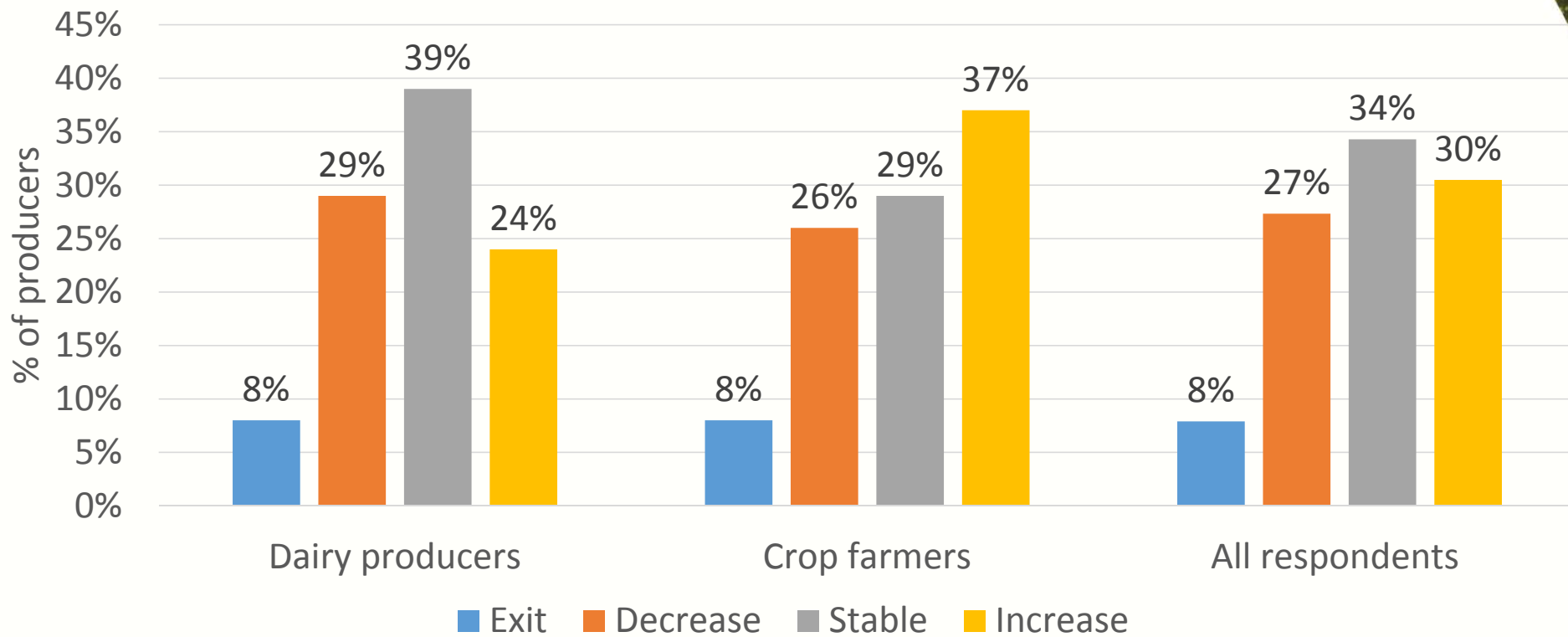


Figure 4. Change in agricultural land from 2013 to 2016 by type of producer

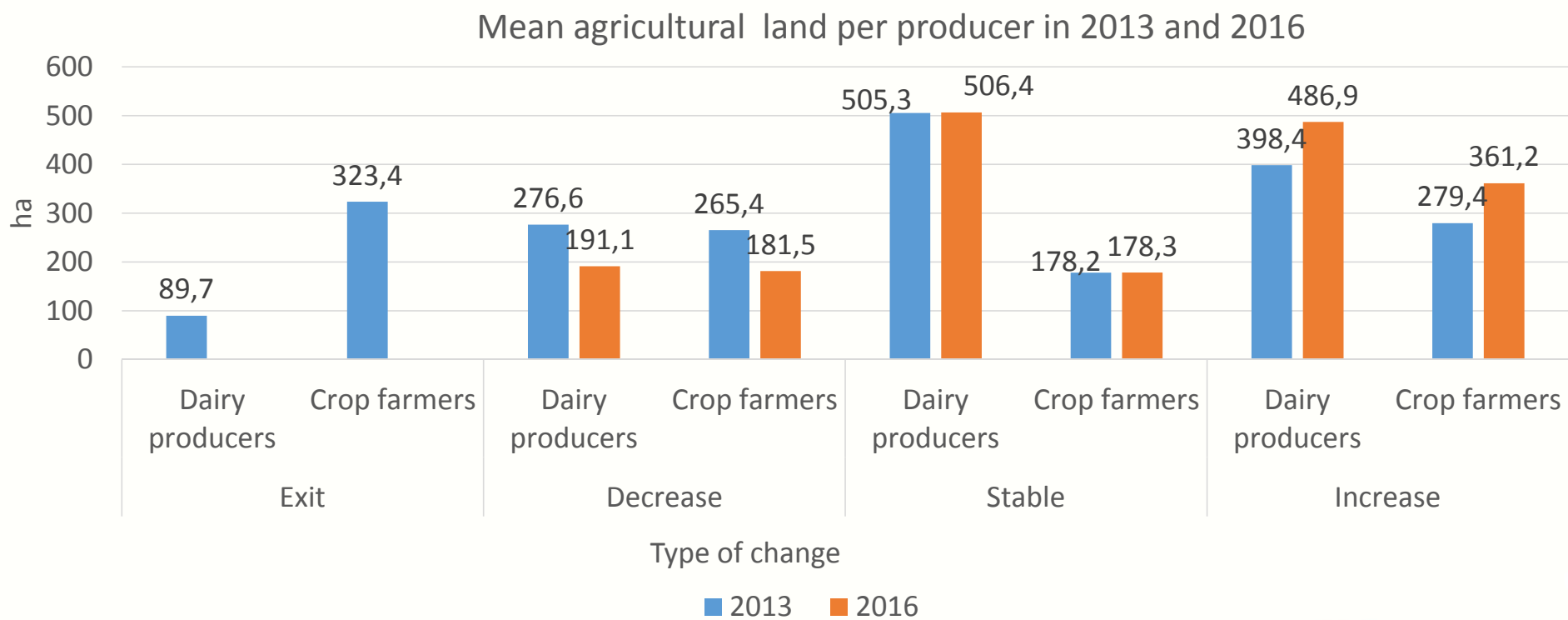


Figure 5. Mean arable land per producer in 2013 to 2016

# Multinomial logistic regression

## Variables

Dependent	Explanation	Scale	Obs
Change from 2013 to 2016	Change in arable land by 2016	1= exit (agricultural land 0 in 2016)	28
		2= decrease ( $> -5.1\%$ )	114
		3= increase ( $>5.1\%$ )	134
		4= stable (change between $-5\%$ to $5\%$ ; reference category)	139



Independent	Explanation	Scale	Obs	Mean	SD	Min	Max
Age	Age of farmer	years	415	51.1	12.4	19	85
Exit plan	How likely the farmer was to exit in the coming years in 2013?	Scale of 5: 1- very unlikely ... 5 – very likely	415	1.95	1.252	1	5
Farm type	Crop or dairy producer in 2013	Crop producer Dairy producers	232 183	0.44	0.49	0	1
Off farm	The farm operator had off farm job in 2013	No Yes	329 86	0.21	0.40	0	1
Family farm	Did the farmer characterize its farm as a family farm in 2013?	Scale of 5: 1- certainly not ... 5 – certainly yes	415	3.77	1.34	1	5
Owners involvement	Were the owners involved in everyday running of the farm in 2013?	No Yes	31 384	0.93	0.263	0	1

Variable	Exit	Decrease	Increase
Intercept	-2.612 (1.28)**	-1.309(2.84)*	1.693(0.75)**
Age	0.006 (0.20)	0.000(0.01)	-0.062(0.12)***
Exit plan	0.405(0.15)***	0.192(0.10)*	0.069(0.11)
Farm type	0.065 (0.43)	0.399(0.26)	0.821(0.27)***
Off farm	-0.360 (0.52)	0.467(0.36)	-0.046(0.02)
Family farm	0.026 (0.16)	0.046(0.09)	0.182(0.10)*
Owners involvement	-.0701 (1.09)	-0.837(0.17)	0.629(0.48)

Figures in parentheses are standard errors  
Nagelkerke's pseudo-R2 0.2



# Conclusions

- After the slowdown of farm exits in the beginning of decade, increased pace of farm exits in 2013- 2016
- Off-farm employment – in some of our previous research (Viira et al. 2013) off-farm employment significantly increased exits in the middle of 2000nds. In present analysis, this and owners involvement was insignificant.
- Possible explanation that it was a factor in the massive exits in the middle of 2000nds, but now those who have remained in the sector are less likely to have both off-farm jobs and keep a farm beside it as a life-style choice

- Assessments in 2013 that the farmer is more likely to exit in coming years also predicted that they exited or declined in size
- Younger farmers were more likely to increase their agricultural land
- In case of farm increase, family farms were more likely to increase, however the effect was very moderate
- Crop producers were more likely to increase in size than dairy producers



# Conference „Biosystems Engineering“ 9-11th May 2018, Tartu, Estonia

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- Abstract submission deadline Dec.1st; however, possible to still submit
- Papers (deadline in Feb.) published AGRONOMY RESEARCH
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Thank you for your attention!

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