Mendel University in Brno

Faculty of AgriSciences

Department of Agrosystems and Bioclimatology

Comments on Agricultural Education in the Czech Republic

Jan Křen

Outline

- Short information about the Czech Academy of Agricultural Sciences (CAAS)
- Brief characteristics of the Czech agriculture
- Relationship between society and agriculture
- Family farms x large agricultural enterprises
- Extension and knowledge implementation into the practice
- Current requirements for education in agriculture
- Secondary agricultural education
- Higher education in agriculture
- Conclusions

CAAS
Czech Academy of Agricultural Sciences

- is a specialized and professional scientific agricultural institution
- is a scientific advisory body to the Minister of Agriculture of the Czech Republic
- is a publisher of 11 international scientific agricultural journals, all of them are licensed in SCOPUS and 9 have an impact factor (IF)
- supports scientific research, popularization and practical application of scientific knowledge

- **=> MAIN PURPOSE of the CAAS is to improve the scientific level of research activities, to ensure systematic knowledge development and to popularize scientific research results.**

Long history of the CAAS

- **Established in 1924**

Current issues

- Identification of key topics of the agricultural research in the CZ and EU
- Presentation of research results through all communication channels
- Cooperation with other institutions such as National Museum of Agriculture (NMA), Museum of T.G.M. in Rakovník, Agricultural Association of the Czech Republic
- Assessment of The Minister's Awards
- Increasing impact factor of the agricultural journals

Future of the CAAS

- To be progressive and dynamic organization
- To increase the number of young and active members of the CAAS
- To prepare strategic materials in the field of agricultural research
- To promote international cooperation in the field of science and research
- To seek synergy in continuing cooperation with agricultural organizations
- To organize workshops and lectures in the “Discovery Room“ of National Museum of Agriculture

Agricultural journals

- Plant, Soil and Environment – IF (2016): 1.225
- Czech Journal of Animal Science – IF (2016): 0.741
- Veterinary Medicine – IF (2016): 0.489
- Czech Journal of Food Sciences – IF (2016): 0.787
- Agriculture Economics – IF (2016): 0.789
- Plant Protection Science – IF (2016): 0.742
- Czech Journal of Genetics and Plant Breeding – IF (2016): 0.532
- Horticultural Science – IF (2016): 0.566
- Soil and Water Research – IF (2016): 0.934
- Journal of Forest Science
- Research in Agricultural Engineering

www.agriculturejournals.cz

OPEN ACCESS scientific journals
Articles are published in English.

ISI Web of Knowledge SM, Web of Science®, Science Citation Index Expanded®, Agricola, Agrindex of AGRIS/FAO database, AGRIS International, CAB Abstracts, Current Contents®/Agriculture, Biology and Environmental Sciences, Czech Agricultural and Food Bibliography, Food Science and Technology Abstracts, SCOPUS, TOXLINE Plus

August 24, 2017 - The Minister's Awards ceremony in České Budějovice

November 22, 2017 - An important step towards cooperation between the Ministry of Agriculture of the Czech Republic and the University of Nebraska in the field of science and research

December 5, 2017 - Christmas meeting of representatives of research organizations and CAAS

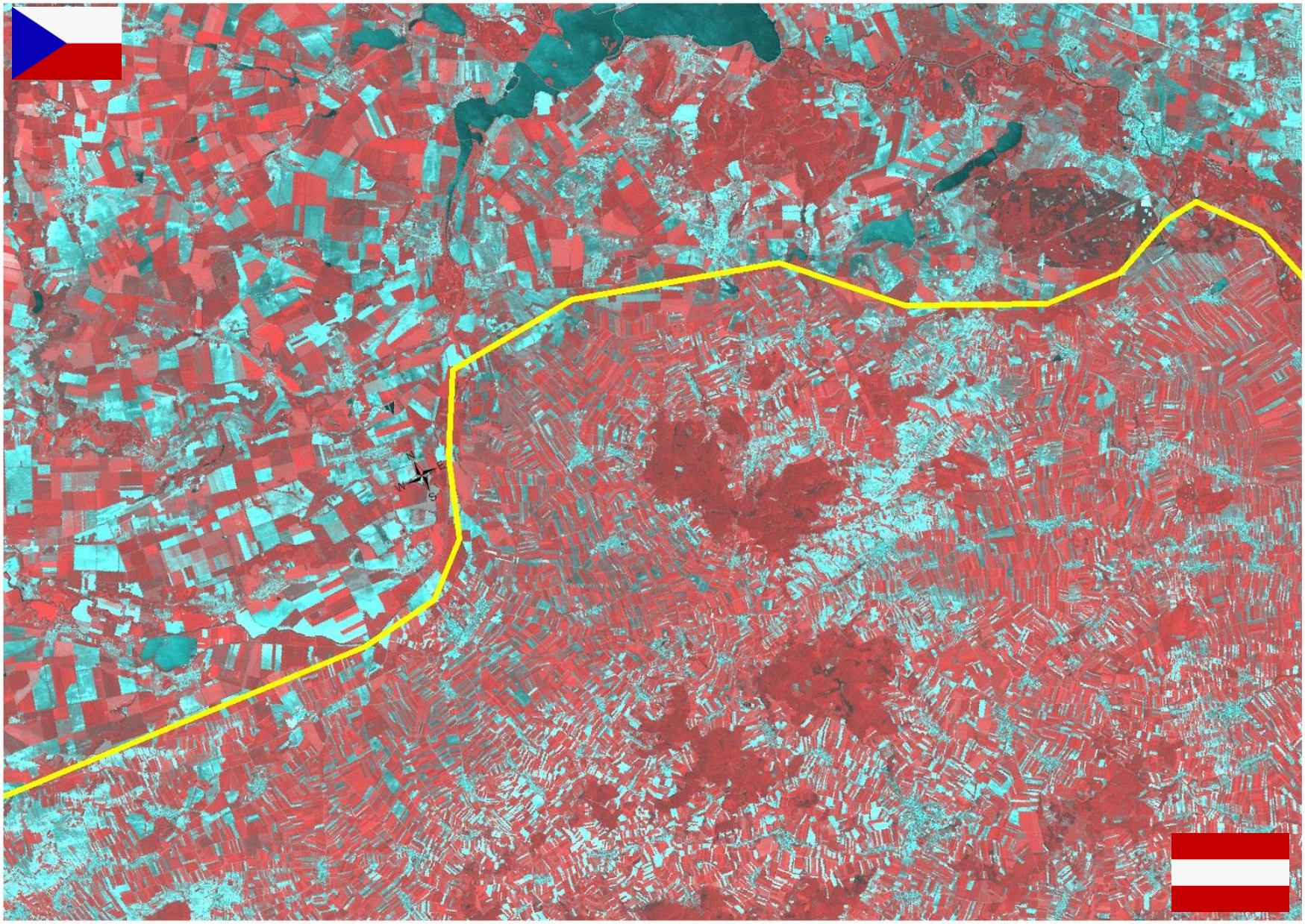
January 9, 2018 - Memorandum of partnership and cooperation was signed between CAAS and NMA

Czech agriculture faces a number of problems:

- deals with the socialist past
- loss of workers in primary production
- restoration of reduced livestock production
- ensuring quality care for leased land
- adaption to climate change
- to be able to use and implement scientific and technological developments
- to be in harmony with the CAP and meet its objectives, i.e. to be multifunctional, sustainable and able to compete

That means it has to ensure food production, but also landscape management, conservation of natural resources, sustaining of rural settlement etc. With all this, farming has to be economically viable.

Land use structure x requirements for education of farmers



Web source: http://kontaminace.cenia.cz

N!KM národní inventarizace kontaminovaných míst

cenia

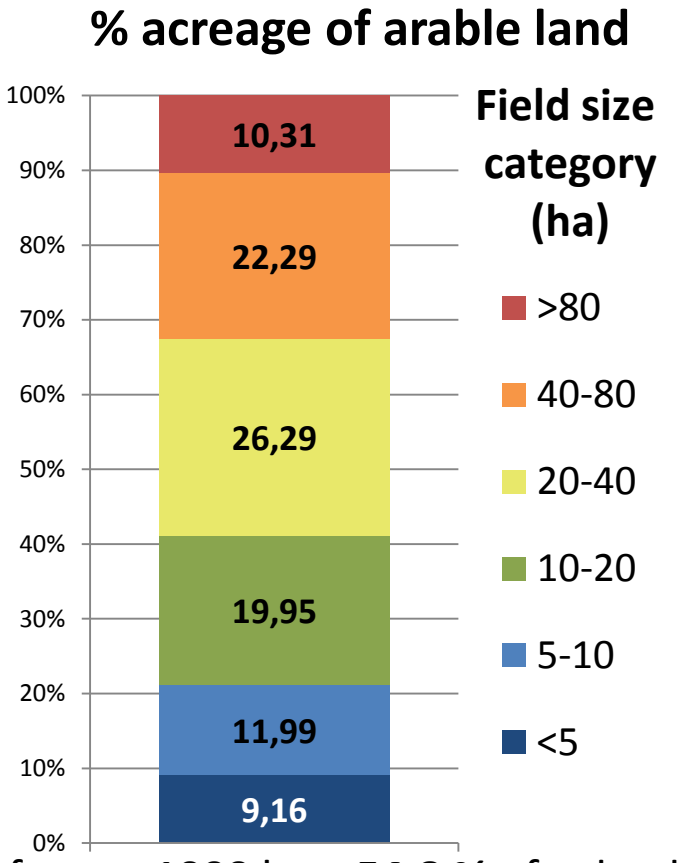
STÁTNÍ FOND ŽIVOTNÍHO PROSTŘEDÍ ČESKÉ REPUBLIKY

OPERAČNÍ PROGRAM ŽIVOTNÍ PROSTŘEDÍ

EVROPSKÁ UNIE Fond soudržnosti | Pro vodu, vzduch a přírodu

Acreage of the agricultural enterprises

Size category (ha)	Number of holdings		Agricultural land area	
		%	ha	%
> 0 < 5	24 066	**52.3**	37 595	**1.1**
5 < 10	5 616	**12.2**	39 136	**1.1**
10 < 50	3 947	**20.9**	216 145	**6.1**
50 < 100	2 058	**5.1**	162 258	**4.6**
100 < 500	2 308	**5.6**	564 979	**16.0**
500 < 1 000	2 421	**1.7**	577 227	**16.3**
1 000 < 2 000	2 620	**1.4**	934 025	**26.4**
2 000 <	1 459	**0.7**	1 005 423	**28.4**
Total	45 989	**100**	3 536 787	**100.0**



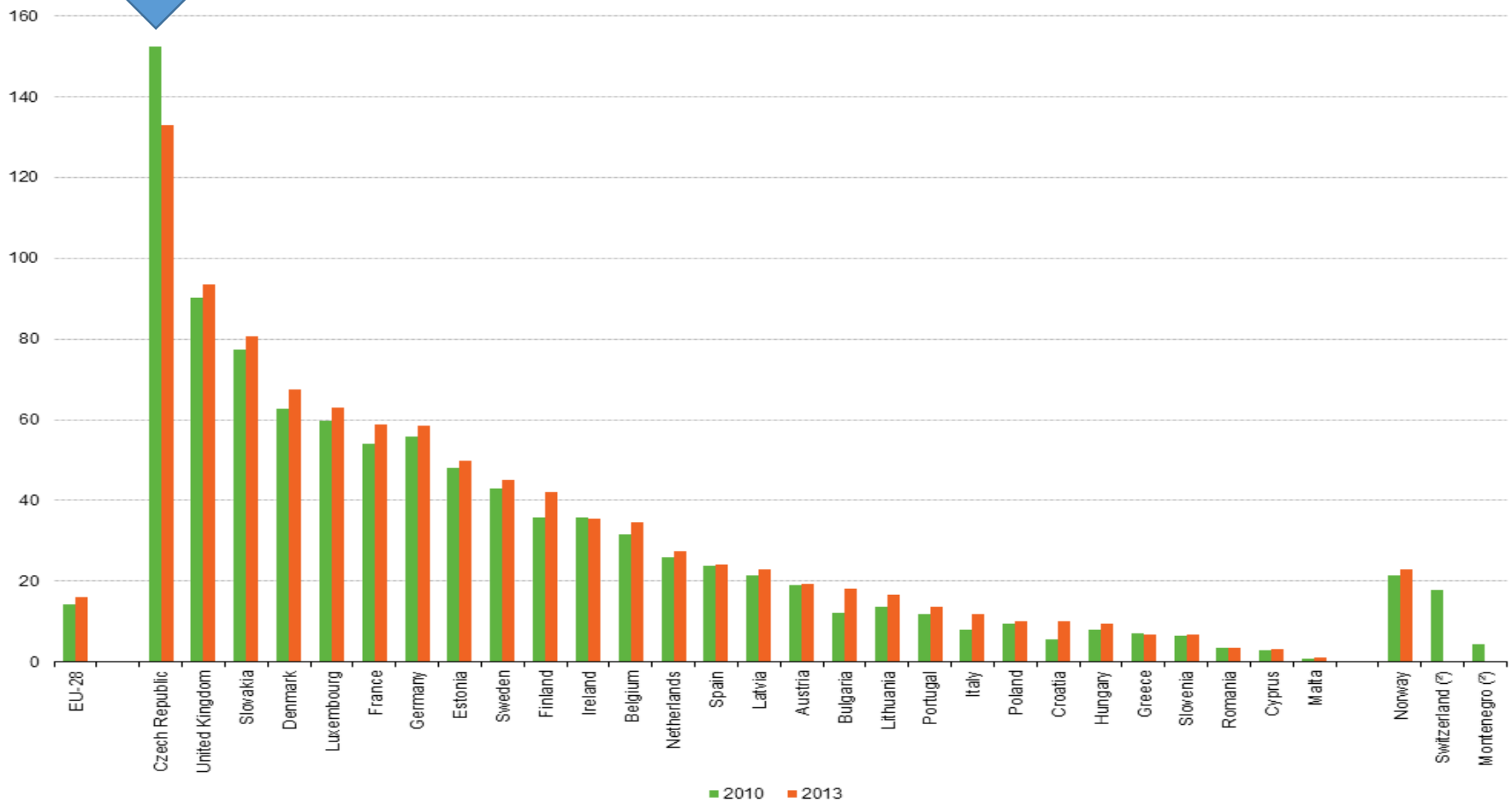
farms **>1000** ha = **54.8 %** of a. land

farms **>500** ha = **71,1 %** of a. land

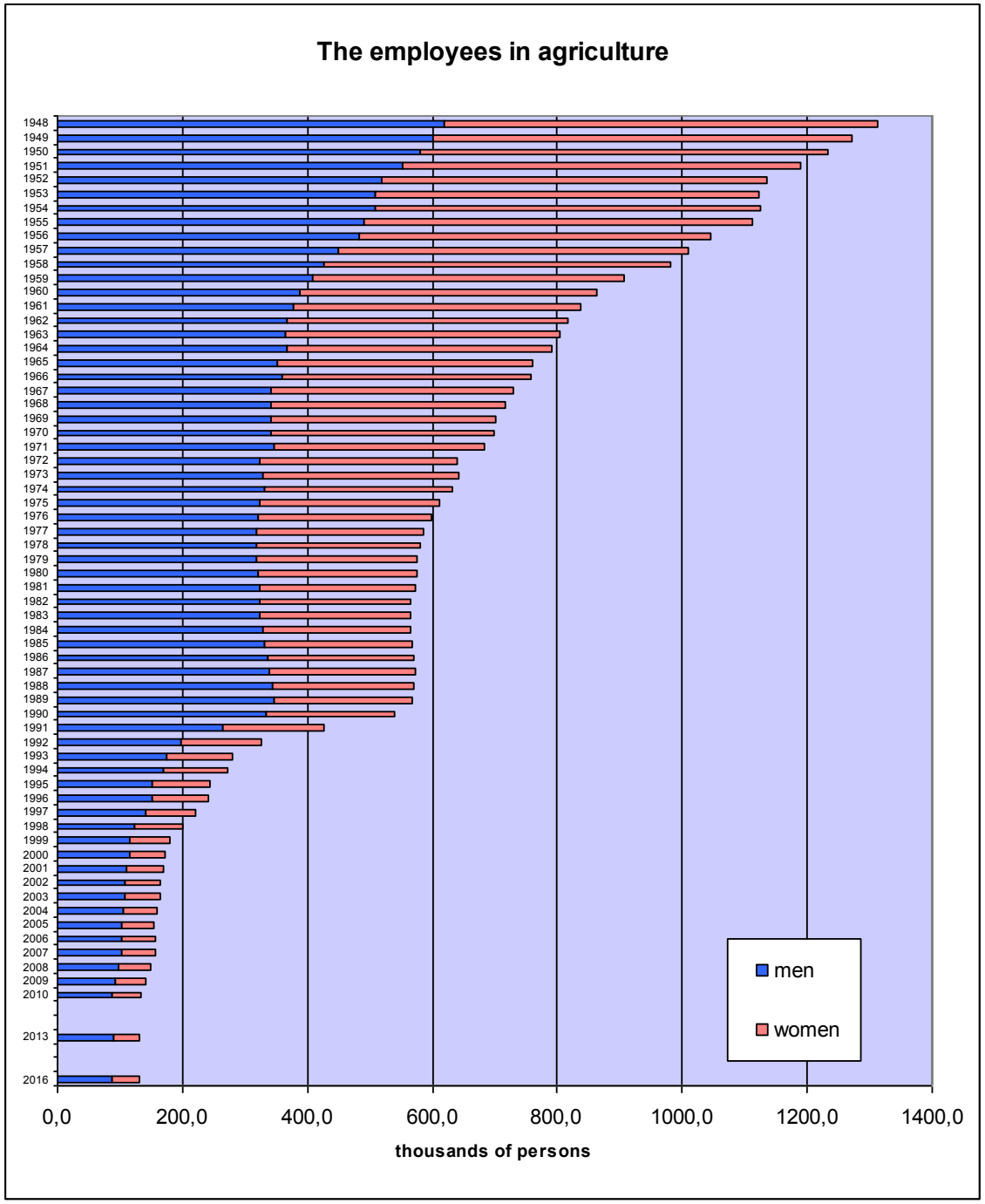
fields **>20 ha** represent **58 ,9 %** of arable land

Source: Statistical report of Ministry of Agriculture, Czech republic, 2009; LPIS, 2011

Average area of agricultural land per farm, 2010 and 2013 (hectares)



(¹) Iceland not shown for reasons of scale: 2010 value was 616 hectares.
(²) 2013: not available.
Source: Eurostat (online data code: ef_kvaareg)

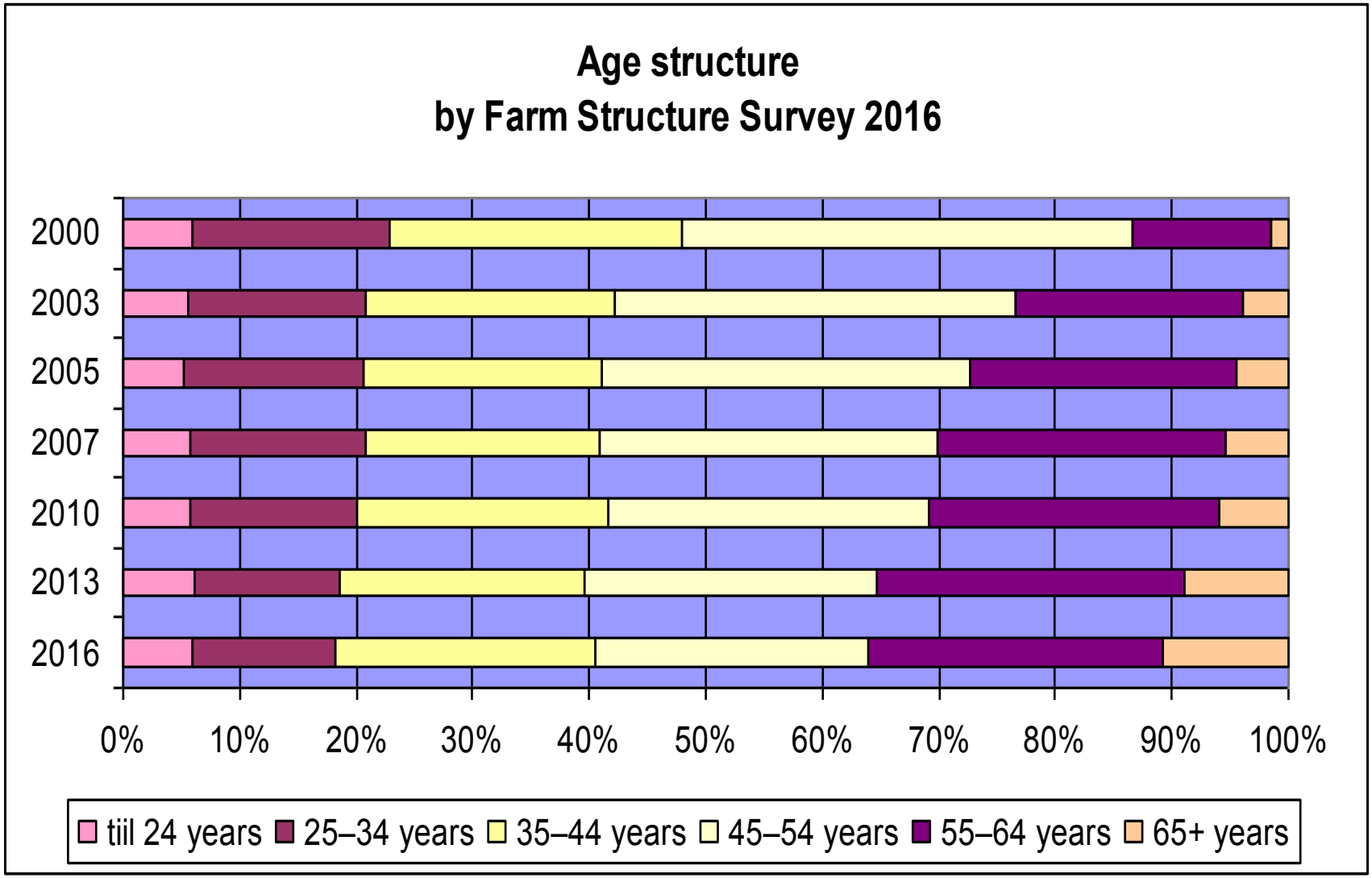


The employees in agriculture

*) since 2002 by EU methodology; since 2010 data only from Farm Structure Survey

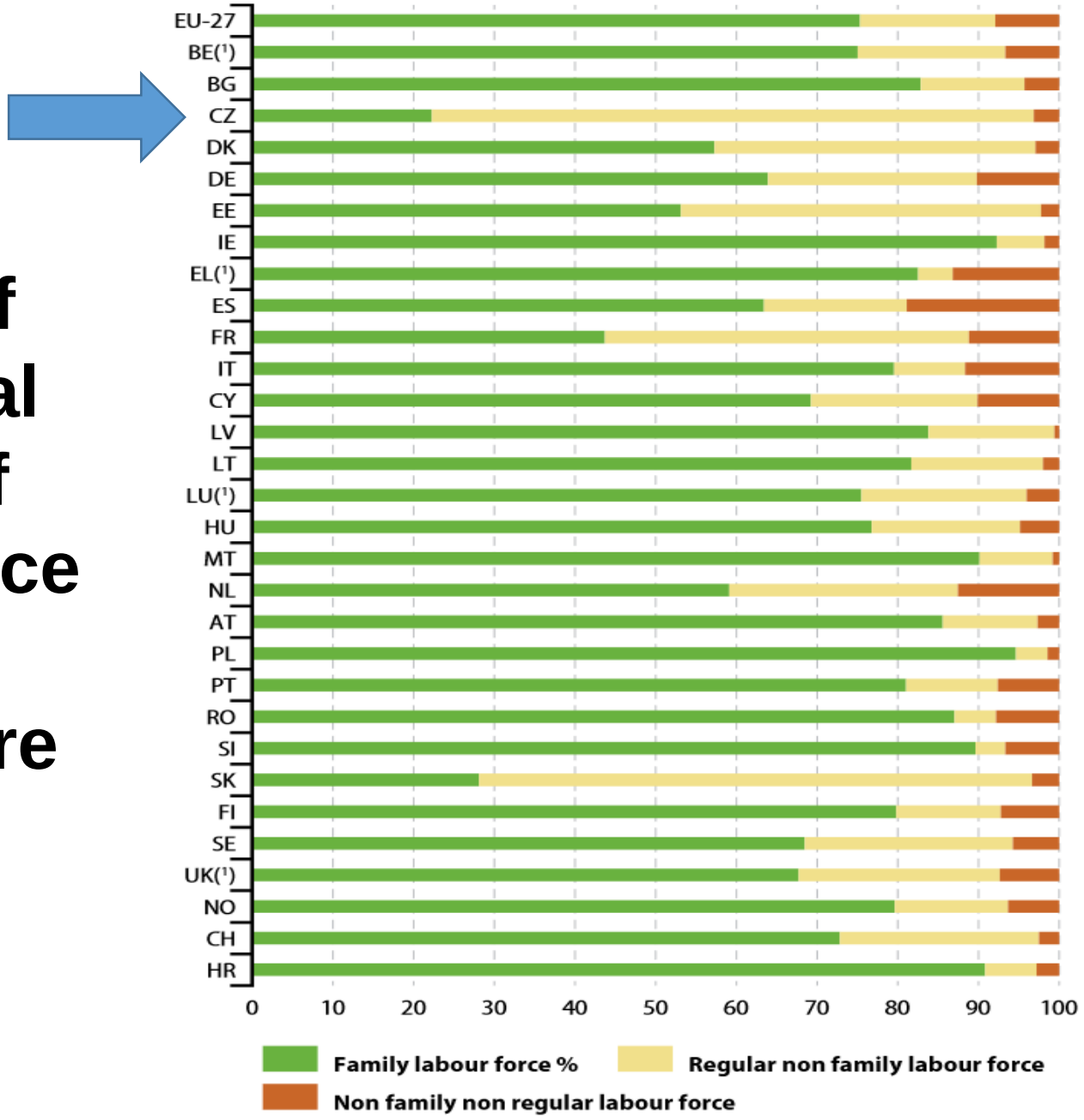
Czech agriculture, statistical view 1918–2017
Environment, agriculture
Author: Ing. Dana Sálusová
Publication code: 270219-18
No.: CSU-01076/2018-54
ISBN 978-80-250-2841-4

Age structure of the regular employees in agriculture



Source: Sálusová D. Czech agriculture, statistical view 1918–2017, ISBN 978-80-250-2841-4, © Czech statistical office, Prague 2018

Share of individual types of labour force in agriculture (%)



(1) BE, EL, LU, UK: provisional data.

Source: Eurostat (online data code: ef_lflegaa)

Large arable farms and industrial agriculture predominate

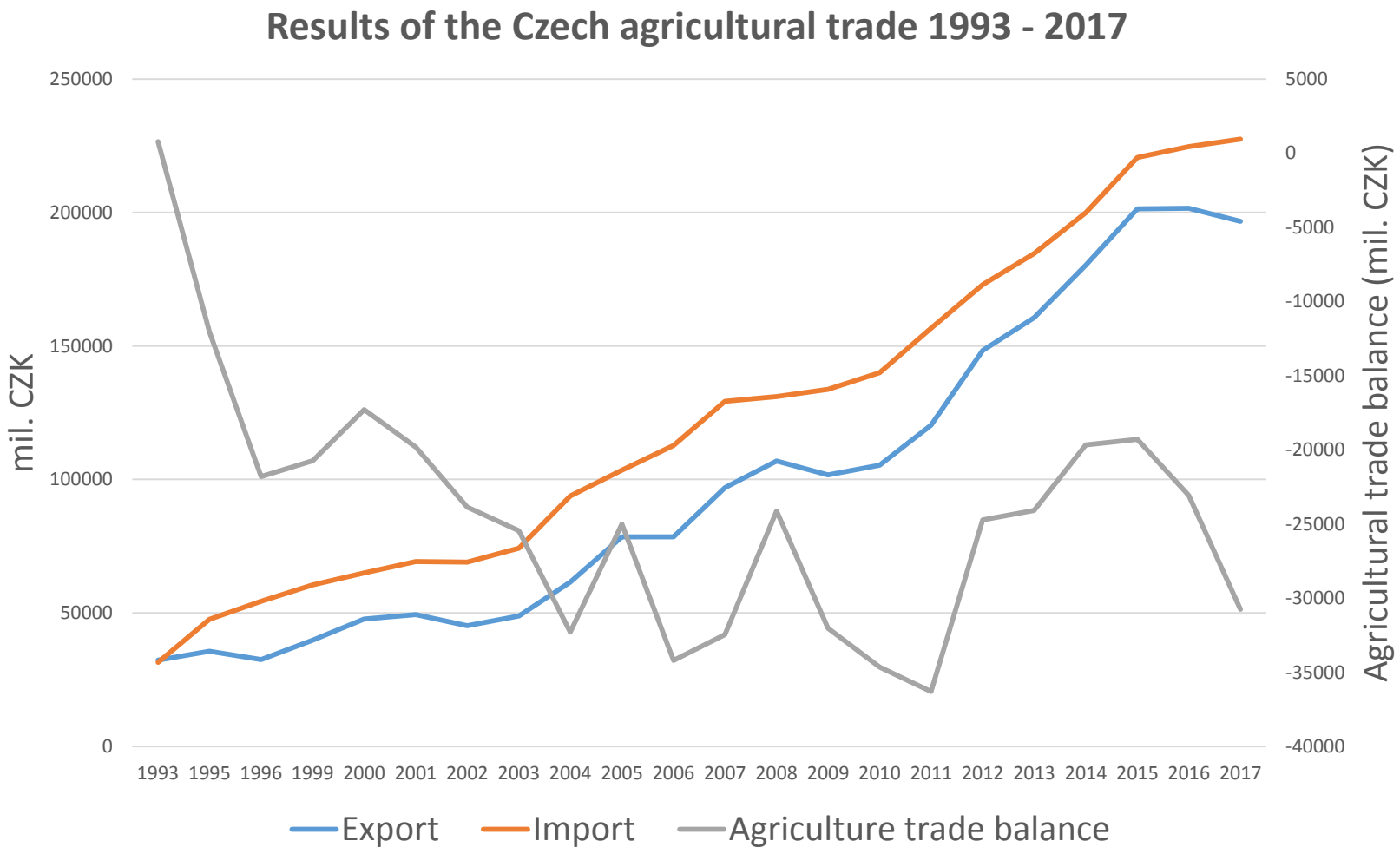
Livestock production dimension fails to increase

Self-sufficiency of CR in the production of main agricultural commodities in 2011

Commodity	Production (th. tons)	Import (th. tons)	Export (th. tons)	Consumption per capita (kg)	Self-sufficiency (%)
cereals	8 284.8	115	2 723	151.7	**149.9**
potatoes	973.9	320	153	70.0	85.4
vegetable	277.6	567	91.9	85.4	36.9
beef	92	23.3	39.5	9.1	**121.7**
pork	272.3	234.7	59.9	42.1	60.8
poultry	170.1	104.8	62.4	24.5	78.8
milk (mil. l.)	2 663.7	853	1 010	57.7 l	**124.6**
eggs (mil. pcs.)	2 168	647	157	254 pcs	87.6

Source: AK, Mze
http://www.financninoviny.cz/zpravy/klesajici-potravinova-sobestacnost-cr-pry-ohrozuje-stabilitu-zeme/834889

Development of the Czech agrarian trade in 1993 - 2017



Source: www.ceskenoviny.cz/zpravy/lonsky-schodek-agrarniho-obchodu-byl-nejhorsi-od-roku-2011/1584442

Technologies utilized in precision agriculture

Machinery guidance

Telemetry

Soil mapping

Crop sensing

Remote sensing

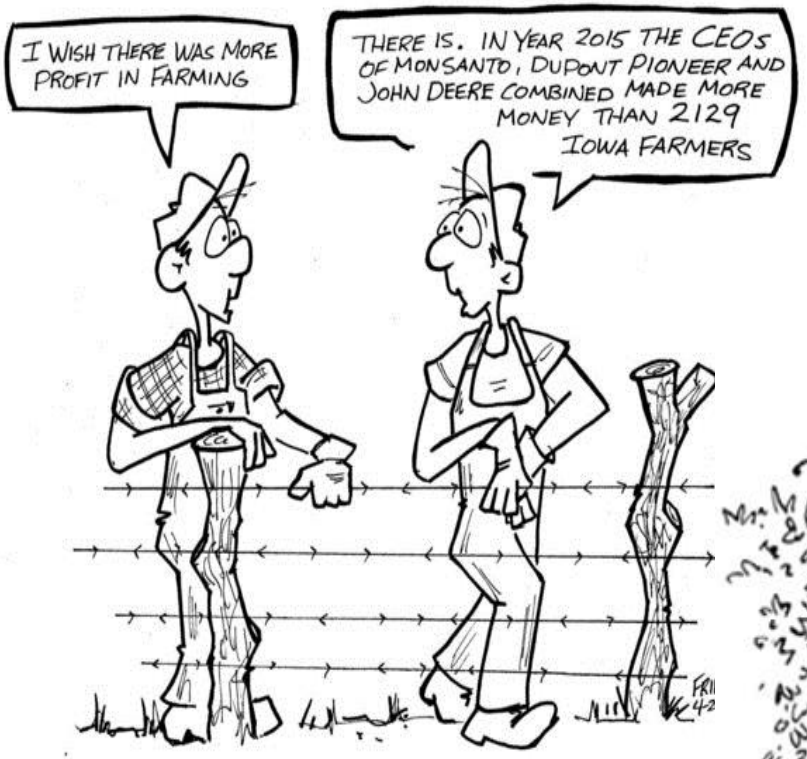
Yield mapping

VRA of fertilizers

Variable seeding

- **Positive trend in the implementation of new technologies, but unfavourable trend in the structure of produced commodities**
- **Reduction of the dimensions of Czech agriculture and the imbalance of dimensions important for sustainable development**

Relations between society and agriculture



Impact of subsidies !?

Influence of multinational companies on the chemisation and industrialization of agriculture.

"My fields are on the four-year rotation: car boot, campsite, pop festival, then set aside"

Reasons for reducing the image of farmers and their position in society

- **There is enough food and at an affordable price.**
- **People are poorly informed and motivated not to think about the problems of farming.**
- **Breaking farmers out of the other rural population - reducing the number of farmers.**
- **Farmers pollute the environment with agrochemicals. Insufficient awareness in the media -** dirty cars this year was mainly from the pollen of the forest trees, but in the media everything can be rape seed.
- **Farmers have large machines that make road traffic difficult.**
- **The number of family farms is still small enough to eliminate the industrial manifestations of farming large farms.**
- **People know that farmers receive subsidies but do not know the details.** This incomplete information worsens relations between farmers themselves and between farmers and society.
- **Envy - relationship of the landlord tenant - the rent.** People are pursuing the development of farms and investing in new means of production and technology. They understand this mainly as an increase in assets, not as a necessary need for innovation in technological development.
- **Livestock manure smells. It is no longer considered that it is a good organic matter which improves soil and landscape water retention.**

Impacts of reducing the image of agriculture

- Implementation of new technologies are associated with the still prevailing negative thinking of the society about agriculture.
- This reduces the attractiveness of agricultural studies and the interest of young people in farming.
- **The numbers of agricultural students are failing to grow, and they are rather the children of parents running on family farms as children of managers of large farms.**

Family farms x large agricultural enterprices

- In the Czech Republic the process of increasing the size of farms was accelerated by collectivisation in the period of socialism.
- Representatives of agriculture are rather concerned with obtaining subsidies for large farms than solving the structural problems.
- Our development of the agrarian structure differs from most of the EU countries and increases difficulty in harmonization of CAP rules and European subsidies.
- Family farms are difficult to compete with large agricultural companies in many areas (use of new knowledge and technology, concentration of capital and finacial power).
- For land purchases, CZK 1 million represents a different amount of finance for companies of different sizes.
- Family farms buy land in hectares. Large companies buy or take over entire farms and increase their size in the order of dozens but rather in hundreds or thousands of ha.
- **The agrarian structure in the Czech Republic should also be taken into account in the development of the concepts of agricultural education and the implementation of research results into practice.**

Family farms

- Farmer and family members are executive staff, working mainly manually.
- Professional issues including administration are provided by counselling (corporate or state), as well as accounting is often provided by services.
- In the Western European countries, family farms are grouped into cooperatives that range from tens to hundreds of thousands of hectares of land. Their employ specialists to provide the needed activities:
  - the purchase of inputs and the sale of production at advantageous prices,
  - consulting of crop management practices,
  - cropping measures using jointly owned special machines.
- **Bachelor's level of education prevails and is traditionally introduced for owners of family farms.**
- **Master's degree is used by specialists working mainly in professional services and consultancy.**

Large agricultural enterprises

manage about 70 % of agricultural land in the Czech Republic and employ their own specialists in the following professions:

- manager-economist, accountans, loans, insurance
- zootechnicians specializing in farmed animals (pigs, cattle, poultry)
- agronomists – crop nutrition and crop protection
- mechanization and navigation + precision and smart farming
- law over land and land use (full-time lawyer employment)
- work with LPIS, records of land use, livestock, fertilizers and pesticides, green diesel, subsidies and Cross compliance

Current rules require - records of pesticides and fertilizers, compliance with the GAEC standards with requirements for soil cultivation practices and SMRs mainly for animal husbandry. Working with hardware and software,.

Extension and knowledge implementation into practice I

Dobrý den, řekli nám, že se máme více snažit o přenos našich vědeckých poznatků do výroby. Tak vám tady nesu kompletní soubor mých impaktovaných publikací.

Hallo, they told us that we should try to transfer our scientific knowledge to practice. So here I am carrying a complete set of my peer-reviewed publications.

Extension and knowledge implementation into practice II

- Technological consultancy is mainly provided by private companies, or directly by agrochemicals and machinery producers.
- For them, it is more effective to deal with big companies (for a number of reasons).
- Suppliers of inputs and buyers of outputs prefer large farms, specialists there are usually better professionally prepared and technically equipped to implement new knowledge and technology.
- Family farms are more dependent on extension services and on companies that use their less expertise and technical capabilities.
- The government is trying to compensate the disadvantages of small family farms under the rural development program.
- The small farms owning the land will survive in competition, as big companies have more financial power to pay rent.
- 70 % of the leased land is still in the game and depending on who owns it, Czech agriculture will change.
- Small family farms at a loss will be bought mainly by large farms.
- **The capping of agricultural subsidies is therefore still a current problem!**

Current requirements for education in agriculture

Short introduction:

The number of people working in agriculture has declined.

The number of secondary agricultural schools has decreased.

We still have three universities providing education in agriculture!

Low interest to work in agriculture in agricultural graduates themselves.

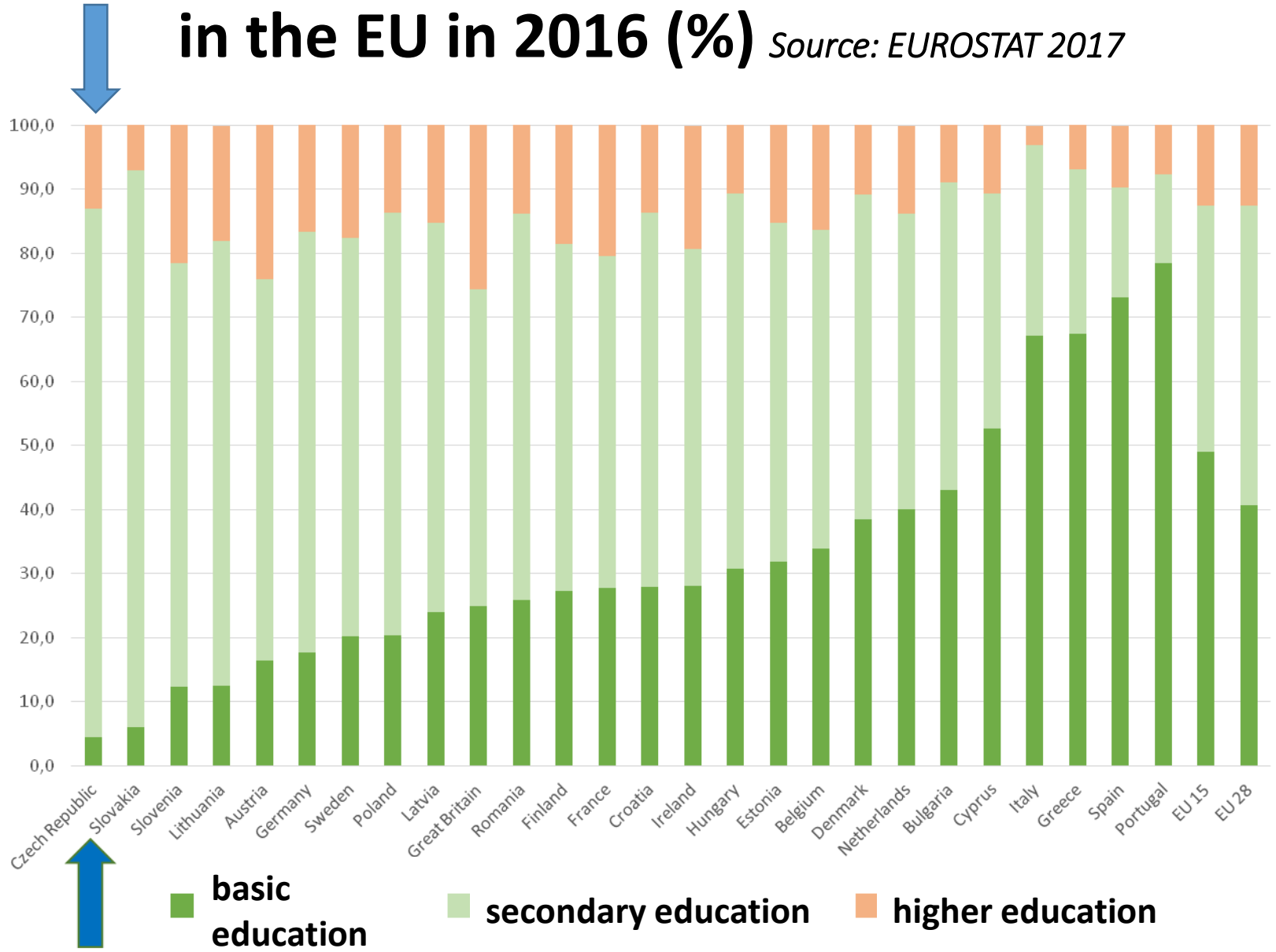
There is a shortage of skilled workers at all levels of education in agricultural companies.

Disparity between the needs of agricultural employers and the supply of skilled workers on the agrarian labour market.

Institutions providing education in agriculture should address:

- How to raise interest in young people in agriculture - although it still works with manure, it is more about the use of information technology.
- How to prepare bachelors graduates to run a family farm.
- How to ensure the necessary level of knowledge of experts in different positions on agricultural holding.

Education structure of employees in agriculture in the EU in 2016 (%) *Source: EUROSTAT 2017*



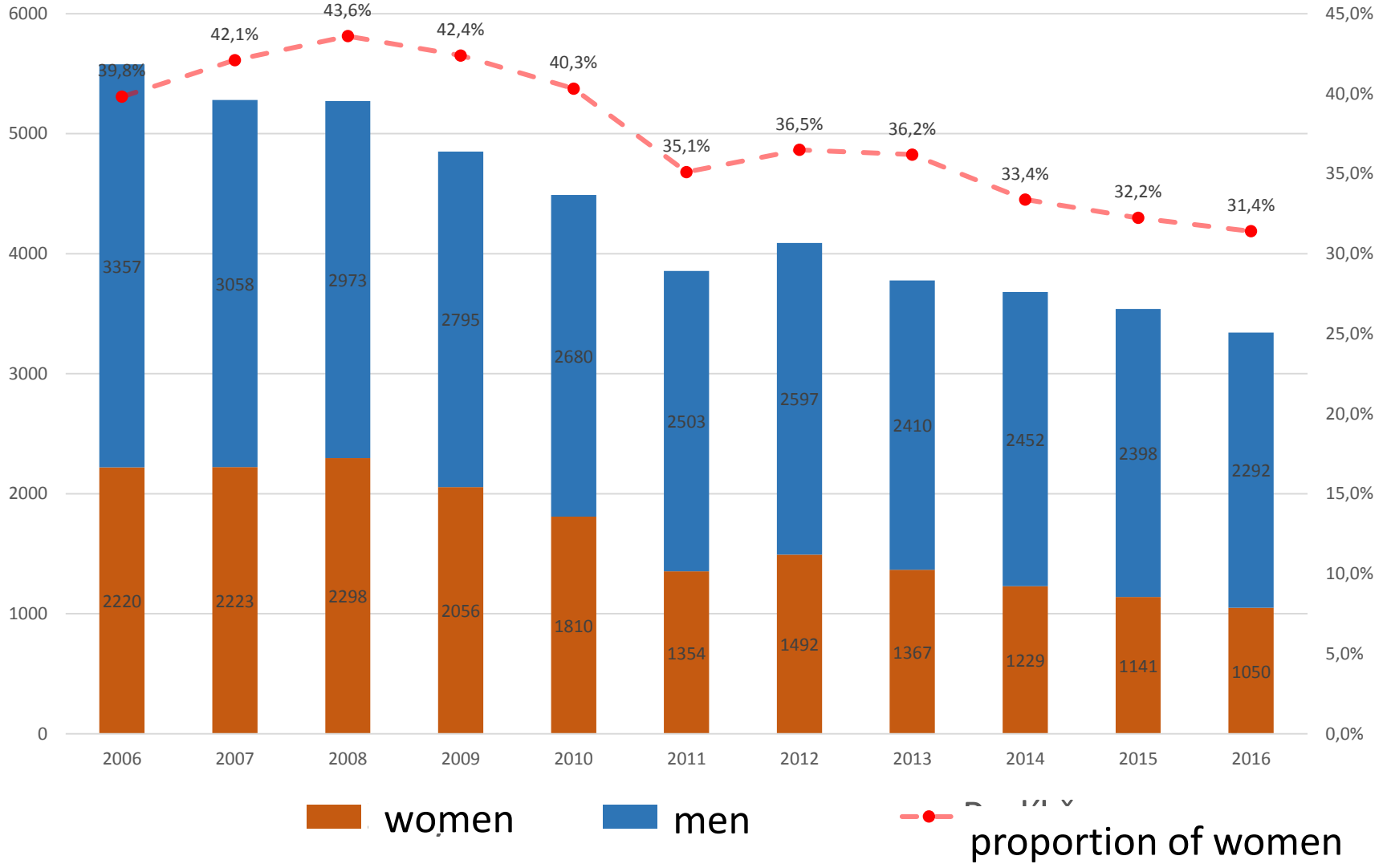
Secondary agricultural education

- The training of a skilled labour force for agricultural companies takes place mainly at secondary agricultural schools.
- With the decline of agricultural workers, the number of agricultural secondary schools has decreased. Many have changed or integrated with other disciplines.
- Some secondary agricultural schools have lost school farms and are difficult to adapt to the requirements of current practice. These have a shortage of teachers of special subjects.
- Declining interest of young people for study of agriculture.
- There has been no continuous prosperity of agriculture during the last 10 years, which affects the relationship of society to agriculture, a longer period of prosperity is needed.
- The relationship of people to the land interrupted during the period of socialism fails to recover.
- Salary - at the time of normalization (seventy and eighties), there was a great interest in studying agriculture.
- **Large companies are trying to address the shortage of skilled workers by setting up their own secondary agricultural schools.**

Agro 2000 Ltd. - one of the largest agricultural companies in the CR

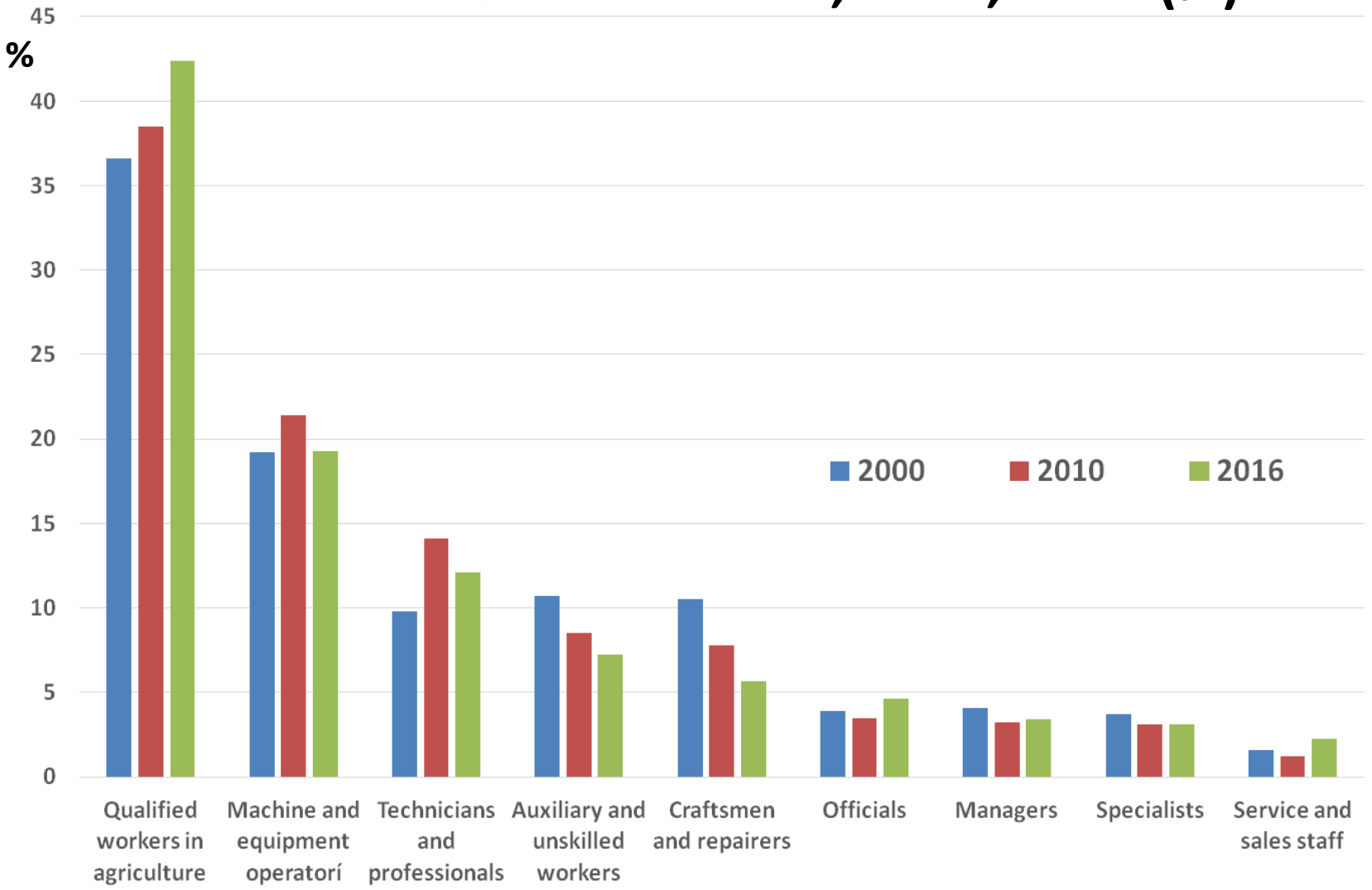
decided to establish a private high school for agriculture

Development of the number of graduates of secondary agricultural schools in 2006-2016 by sex (abs) and share of women (%).



Source: NÚV, in Spěšná D. et al. Analýza vzdělávacích potřeb resortu s důrazem na střední odborné školství, Tématický úkol pro MZe č. 39/4217

Development of the professional structure of agrarian sector workers in 2000, 2010, 2016 (%)



Source: Spěšná D. et al. Analýza vzdělávacích potřeb resortu s důrazem na střední odborné školství, Tématický úkol pro MZE č. 39/4217

Higher education in agriculture I

- Similarly to high schools, agricultural universities have multiplied and adapted their training programmes.
- There are tens of thousands of students studying at our three agricultural universities, but only a few of them study the fields required in current agricultural practice.
- Agricultural universities are only slowly adapting the study programmes to the requirements of practice.
- Teachers of agriculture should know the theory and have practical experience.
- Unfortunately, they are ranked according to the same criteria as teachers in basic science disciplines at major universities.
- **Reserves are in both areas - what to teach and how to teach!**

Current problems of education

Honorabilis, we have since 1990 the twentieth minister of education minister.
That's 16 months per one!
Well, in such a short time they could not do much damage!

So last semester I submitted one project to the TAČR, one to the GA ČR and two to the OP VVV. I completely forgot to teach bachelors. Nobody missed it, they came only for the credits ...

Higher education in agriculture II

- At all levels of education, it is necessary to increase connection of theory and practice.
  For example, detailed knowledge of all pests is not equally necessary, but only those that generate the greatest economic damage.
- Slow implementation of operating bachelor's degree programs.
- Increasing knowledge of the languages by graduates of agricultural fields of study.
- Experts from agricultural research and practice should be involved in teaching of students. They have the ability convincingly present and share their knowledge and experience.
- For professionals successful in practice, teacher salaries are to low.
- Interconnection and harmonization of courses at Bc. and Mgr. degree studies.
- In a number of disciplines the structure and continuity of the subjects on Bc. and Mgr. are not yet solved, heavy subjects are at the beginning of study.
- So far, we are unable to harmonize with the western countries of Bc. and the follow-up Mgr. degree of study.
- The old concept of five-year engineering studies appears to be more advantageous for the remaining agrarian structure?
- **Deepening cooperation between universities and agricultural companies in practice, the possibility of introducing a so-called dual study.**

So I did, despite my supervisor, finish a dissertation, I learned to clean up and serve beer at brigades, but what next?

Expectations of graduates from their future employment (%)

Expectations of future employment *	Men	Women	Total
Apply in practice the knowledge gained by studying	68,0	64,0	65,8
Opportunities for further professional growth	51,2	69,7	63,1
The opportunity to see the results of your own work	57,5	59,6	58,6
Working in a good team	45,0	63,5	57,0
Job security	55,0	50,0	52,1
Possibility to work independently	47,5	42,1	43,3
High income	31,2	31,5	31,2
Interesting or provocative work	26,2	29,8	28,5
Opportunity to manage and influence people	40,0	15,2	22,8
Career and achievement of prestige position	27,5	19,7	21,7
Extraordinary working conditions	30,0	14,0	19,0

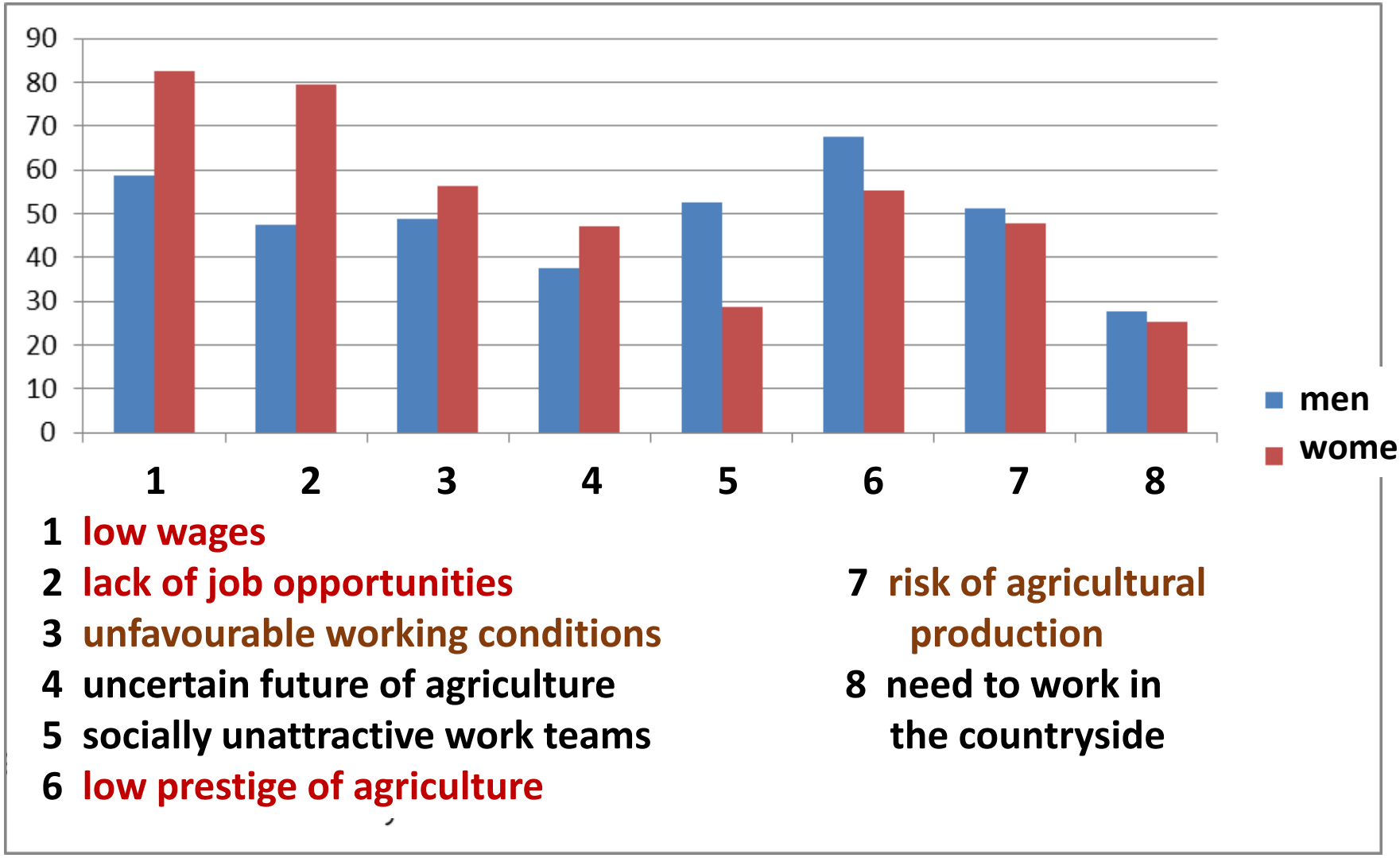
** Respondents were asked to select the 4 most important items, so the sums do not give 100%.*
Source: Empirical investigation among AF MENDELU graduates, ÚZEI 2013

Professional interest of graduates of the Faculty of AgriSciences of Mendel University in Brno (%)

Professional interest of graduates of AF MENDELU	Mem	Women	Total
He does not know yet	28,7	25,8	26,7
In research, education, government, counselling	10,0	31,5	24,7
In agricultural production	25,0	15,7	18,3
In another sectors	12,5	10,7	11,0
In related sectors	13,8	8,4	10,6
Wrong answer	10,0	7,9	8,7
Total	100,0	100,0	100,0

Source: Empirical investigation among AF MENDELU graduates, ÚZEI 2013

Reasons for lack of interest in working in agricultural practice



1 low wages
2 lack of job opportunities
3 unfavourable working conditions
4 uncertain future of agriculture
5 socially unattractive work teams
6 low prestige of agriculture
7 risk of agricultural production
8 need to work in the countryside

Source: Empirical investigation among AF MENDELU graduates, ÚZEI 2013

Notes on the Bachelor's degree

- Bachelor's degree is still underestimated.
- The bachelor is considered to be a better technician in larger companies.
- Graduates of secondary schools are still young and they mature (cheer up) during university studies. This has a great impact on the development of young people.
- The bachelor's study should be well connected to the secondary agricultural schools with the introduction into practice.
- Bs. should prepare graduates to manage a private family farm.
- Graduates of a bachelor's degree should be able to ask professional experts and business representatives for expert advice.
- So that companies can not underestimate and abuse their ignorance.

Notes on the Masters's degree

- The Czech agrarian structure is favoured for the specialists with a master's degree.
- Specialists in various fields (from the economy to plant and livestock production, law and informatics) can find job in large companies, in services and counselling.
- Specialists often lack experience and general knowledge of farming in the agricultural landscape.
- In the case of masters specialists, the teaching of the concept of sustainable development in rural areas should be strengthened.
- Also, better knowledge of languages should be required.
- Students in the agricultural fields are less involved in international exchange under the ERASMUS program.
- More foreign students arrive compared to our students going to study abroad.

Notes on the Ph.D.'s degree

- In recent years the interest in doctoral studies has declined - the reason was a small scholarship.
- Increase in the demand for innovative results (similar to the major science disciplines at major universities, IF, patents, varieties).
- Only few students meet high demands (those who know the practice usually do not know the languages and basic science disciplines and vice versa).
- At the time of generational exchange, for the graduates of the Master's degree, there are more interesting offers in practice (especially in the implementation of precision and smart farming technologies).
- Methodology of science, biometrics and statistical methods of evaluation of results should be strengthened.
- Ph.D. in agricultural studies should take four years (the need for three-year results of the field trials).
- Agricultural sciences require knowledge of practice (by evaluating results only according to IF of journals, they can be handicapped compared to basic science disciplines at major universities). By breaking away agricultural sciences from practice they lose their identity.

Conclusions

- I tried to draw attention to the problems of contemporary Czech agriculture – and there are many.
- They are the result of a number of influences, as well as misdirections carried out during the past and recent times.
- Agricultural practice deals with these problems according to its possibilities and according to the rules established by the government and CAP.
- The development of agriculture is not always consistent with the requirements of sustainable development of the people's society.
- Institutions providing education in agriculture are affected by these influences.
- They also have a number of reserves in both what is right to teach and how to effectively teach.
- **If I managed to motivate you to think about these issues and their solutions, it will be the greatest appreciation for this presentation.**
- I believe that during this conference, you will try to find solutions of a number of the mentioned problems.

Thank you for your attention

and I wish you successful and fruitful negotiations, enlightened ideas of valuable results that can be published in the scientific journals of CAAS

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