

REPUBLIC OF CROATIA
METEOROLOGICAL AND HYDROLOGICAL SERVICE



ROVING SEMINAR
"WEATHER, CLIMATE AND FARMERS"
OSIJEK, December 5, 2014



Zagreb, February 2015



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Dr. Višnjica Vučetić
Petra Sviličić, mag. phys-geophys.



Zagreb, February 2015

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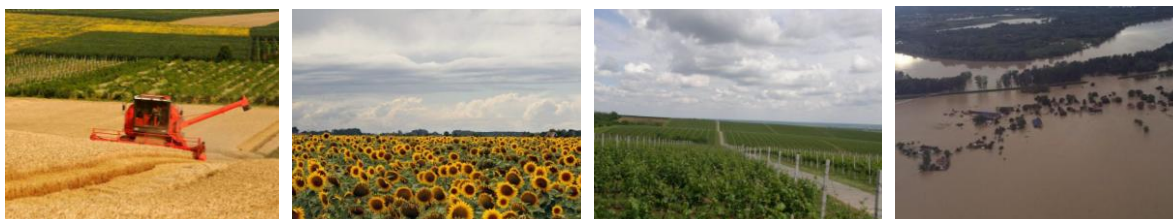
1. INTRODUCTION

A strategic issue of each country nowadays is how to provide enough quality food to feed its population. With regard to climate change, more frequent extreme weather and climate disasters, as well as to natural hazards, our areas belong to endangered areas – particularly coastal and eastern Croatia. Hence, it is necessary to make strategic plans to mitigate their consequences in agriculture. Consequently, it is of extreme importance to know the agroclimatic conditions in Croatia, especially in the last three decades, when there has been significant change. In such cases the development of modern agriculture can no longer be imagined without the application of the latest results of agrometeorological and climatic research.

Thus, agrometeorological research, which will serve as a basis for agronomic experts and policy makers in the development of strategic plans, is necessary for the promotion of sustainable farming systems. Agricultural production should not be left to chance. Instead, it should be strictly planned. Therefore, all of this agrometeorological knowledge and information should be presented, not only to scientists and experts, but also to direct users, farmers and all those to whom agrometeorology can help in food production.

The World Meteorological Organization (WMO) has recognized the activity of Croatian agrometeorological scientists and experts in the popularization of agrometeorology. They proposed the organization of the Roving Seminar "Weather, Climate and Farmers" to the Meteorological and Hydrological Service (DHMZ), and offered their financial support. Because of this DHMZ was able to organize the Roving Seminar for farmers, along with its co-organizers: the Croatian Agrometeorological Society, the Faculty of Agriculture in Osijek, the Extension Service, the Croatian Soil Tillage Research Organization and the Informal Advisory Service. The Ministry of Agriculture was the patron of the gathering.

Eastern Croatia – the Pannonian Plain



2. PRACTICAL ORGANIZATION

2.1. Selection of the host site for the seminar

When choosing the location, we took into account that this is an area with developed agriculture and predominantly inhabited by farmers. Also, it was important that it has good transport links and that it is at risk due to climate change. All these conditions are met by eastern Croatia, located in the southern part of the Pannonian Plain. It is the granary of Croatia, where cereals grow, but also corn, soybean, sunflowers, sugar beet, oilseed rape and similar crops. It is bordered by vineyards producing quality white wine. In the last decade there has also been production of red wine, thanks to more frequent hot and dry summers. Although eastern Croatia is located between three major rivers – Sava, Drava and Danube – a small portion of agricultural land is irrigated. Therefore, farmers experience problems with long periods of drought, such as, for example, those in the years 2011 and 2012. In contrast, 2014 will be remembered for catastrophic floods. Taking all this into account, the city of Osijek, as the centre of modern agriculture towards which the whole of eastern Croatia gravitates, was selected as the venue of the seminar held on December 5, 2014. The Roving Seminar was held in the new building of the Faculty of Agriculture in Osijek (Fig. 1).



Fig. 1 Position of Croatia, Osijek-Baranja County, City of Osijek and Faculty of Agriculture in Osijek

2.2. Composition of the training team

The team of trainers comprised a number of good communicators specialized in various domains and able to develop a rapport with the audience. Eight speakers came from DHMZ (four from the Agrometeorology Department and one each from the Department for Climate Research and Applied Climatology, Department for Weather Analysis and Forecast, Remote Sensing Department, Department for Control and Processing of Data and Climate Monitoring), and one from the Faculty of Agriculture (PFOS, Fig. 2).

But it was also important to choose competent members of Organizing Committee who have prior experience in organizing seminars and workshops. That is why we have included members of the Croatian Agrometeorological Society (HAgMD), who are also employees of DHMZ and PFOS. The Organizing Committee was composed of 16 members, almost all of whom came from HAgMD, except for one (Fig.3). So far, HAgMD has organized 16 short seminars and three-day workshops, and is already a well-coordinated team in organizing professional and popular lectures.



Fig. 2. Training team: Dr Višnja Vučetić, MSc Ksenija Cindrić Kalin, Jelena Ferina, MSc Dražen Kaučić, Marko Vučetić, Lovro Kalin, Dr Damir Počakal, Petra Sviličić, Prof. Danijel Jug



Fig. 3 The Organizing Committee of the Roving Seminar "Weather, Climate and Farmers" in Osijek, December 5, 2014.

2.3. Selection of participants

As the purpose of the seminar is to educate many direct users to whom agrometeorological information is necessary in agricultural production, along with the goal of encouraging rural development and helping local people to improve the quality of life, the main target stakeholders were (Fig. 4):

- Farmers, wine and fruit growers, cattlemen, beekeepers, etc.
- Agronomists of the Extension Service, as well as other interested agronomists
- Professors and students of agricultural occupations
- Journalists who write or contribute to scientific and popular columns/programmes in newspapers and specialist magazines, or radio and TV
- Policy makers who are responsible for strategic plans in food production

It is only through the diligent efforts of agrometeorological experts, as well as a range of users who will apply the knowledge gained from the seminar in practice, that the desired results will be achieved. Also, an exchange of views between experts and users is of great importance, since it is only through direct communication that experts will get feedback on how agrometeorological products (eg. agrometeorological forecasts, drought monitoring, warnings of sudden natural disasters, warnings of the dangers of wildfires, etc.) are of service to users in practice. Therefore, this kind of seminar should improve the usefulness of agrometeorological information to direct users.



Fig. 4 Distinguished guests: Dr. Vladimir Šišljagić, Prefect of Osijek-Baranja County, Prof. Vlado Guberac, Dean of FPOS, Mr. Siniša Hrgović, Extension Service and Dr. Branka Ivančan-Picek, Head of Research Division DHMZ (left). Participations: farmers, agronomists, professors and students (right).

3. ADMINISTRATIVE ORGANIZATION

3.1. Preparation of terms of reference (ToRs)

Once the practical organizational aspects were defined, the ToRs were developed to guide the achievement of the main purpose of the seminar:

- Context
- Objectives
- Profile of the target audience
- Profile of the rain gauge recipients
- Seminar content
- Seminar program
- Conditions of support for participants

3.2. Official communication

Official letters of invitation were sent to the Ministry of Agriculture, the Faculty of Agriculture in Osijek (FPOS), the Extension Service, the Osijek-Baranja County, the Croatian Chamber of Economy – Osijek County, and the City of Osijek. The Extension Service nominated their people from eastern Croatia (five counties) who were to attend the seminar. They also provided a list of farmers from the nearest two counties. We sent 100 letters of invitation to farmers (a sample invitation can be found in the Appendix). Also, farmers from the launch stations for the needs of hail defense of Remote Sensing Department were invited. Each farmer received a follow-up telephone call, explaining once more the purpose of the seminar and providing further details. About a month was required to prepare and deliver these letters, and to obtain confirmation of attendance from farmers. 80 farmers confirmed their attendance a month before the seminar. We placed another call to all the farmers four days before the seminar; however, a total of 10 farmers did not attend in the end. Email messages (45 emails) and telephone calls were also used to invite local authorities and the local and national media.

3.3. Involvement of the media (national, local)

Objective agrometeorological information is essential for the sustainability and development of rural areas. The local and national media were also involved. The seminar was very well covered by the media: two local television stations, RTL, Croatian Radio and Television (HRT), and Croatian Radio (HR) in *The Country and Agriculture Programme* on December 15, 2014 (Fig. 5). It was also covered online and in the agricultural journal *Agroglas*. Local television stations repeatedly featured their reports for up to two weeks following the seminar. The editor of the *Agroglas* journal attended the entire seminar and wrote an extensive report. Students of PFOS filmed the opening of the workshop and lectures, which can be viewed on You Tube:

<https://www.youtube.com/watch?v=h-l5hDO-c4k>

<https://www.youtube.com/watch?v=n99RgfhCN9E>



Fig. 5 Filming and interview with the media.

4. LOGISTICAL ARRANGEMENTS

4.1. Acquisition of rain gauges

The use of a farmer-tailored rain gauge requires support that ensures conformity with the established standards of the World Meteorological Organization (WMO). We chose a plastic rain gauge made by the German manufacturer TFA Dostmman, which can receive a maximum of 40 mm, and a wooden mast, 1.5 m in length (Fig. 6). A manual has been written on how to properly set up the plastic rain gauge, what to do if the rain gauge is filled before precipitation stops falling, or if it falls in such small amounts that measurements cannot be taken, or when it is snowing. The following is also addressed: when to measure the amount of the precipitation, how to carry out measurements properly, and what the unit of measurement is. At the end of the manual there is a form called "Monthly Precipitation Amounts Overview".



Fig. 6 The plastic rain gauge and the mast

4.2. Support equipment

For the Roving Seminar in Osijek the support equipment consisted of:

- Laptop and pointer
- Projector with white cloth
- Public address system and microphones
- Felt pen markers
- Two cameras and a video camera to record the event
- Roll-up mechanism
- Desk for registration and for trainers during discussion
- Box for questionnaires and floral arrangement
- External disks to store all seminar materials (brochures, guidelines, photos, video records, etc.)



Fig. 7 Part of supporting equipment for the Roving seminar "Weather, Climate and Farmers" in Osijek, December 5, 2014.

4.3. Production and purchase of training materials

The participants of the seminar received the following training materials (Fig. 8):

- Notepad and pen to take down important notes during the seminar
- Seminar program
- Brochures on agrometeorological products and information
- Manual on how to carry out rain measurement with a plastic rain gauge
- Certificate for each farmer
- Questionnaire for farmers
- Blue folder containing all the materials



Fig. 8 Training materials for the farmers.

4.4. The training room

The training room was the *Aula Magna* at the Faculty of Agriculture in Osijek with 300 seats (Fig. 9). It is a modern building, 3 years old, containing equipment that complied with the demands. As a co-organizer, the Faculty of Agriculture provided the hall for the seminar at no charge.



Fig. 9 The *Aula Magna* training room for the Roving Seminar "Weather, Climate and Farmers" at the Faculty of Agriculture in Osijek, December 5, 2014.

4.5. Catering

Refreshments with rolls were available for seminar participants during the coffee break. Lunch included meat, a side dish and salads with soft drinks (Fig. 10).



Fig. 10 Coffee break and lunch at the Faculty of Agriculture in Osijek, December 5, 2014.

4.6. Miscellaneous expenses

Some additional expenses were incurred in ensuring the successful organization of the seminar:

- Transport costs incurred by farmers who received rain gauges (70 farmers)
- Fuel costs and highway toll for the training team (11 persons)
- Accommodation costs and per diem the training team (11 persons) Under Croatian law daily allowance does not include accommodation costs.

4.7. Financial implications

The Meteorological and Hydrological Service covered the costs of printing and photocopying materials and documentation, brochure design, postage, telephone use and car rental. The Faculty of Agriculture provided the conference hall at no charge, and the Extension Service covered the transport costs of agricultural extension agents (20 persons). Thus, we have tried to manage our financial resources as rationally as possible (Fig. 11).



Fig.11 Accommodation at the Millenium Hotel in Osijek and dinner of the DHMZ training team.

5. SEMINAR CONTENT

The purpose of the Roving Seminar “Weather, Climate and Farmers” was to educate as many farmers as possible through lectures on topics to do with the impact of climate change and extreme weather events on agricultural production, so that the farmers can easily adapt to their influence and thus preserve agricultural production in areas with limited management conditions. Also, the aim of the workshop was to have the participants spread the obtained agrometeorological knowledge and information further in their community, to the largest possible number of direct beneficiaries.

The Roving Seminar was divided into two parts. In the first part, agrometeorological experts held nine Power Point presentations on current topics:

- how climate change will affect us in agricultural production
- how agrometeorological measurements, medium-term and long-term forecasts can help modern agriculture
- what happens in case of observed extreme weather events such as hail, increased threat of heat stress in the air and soil, dry or rainy periods, increased evaporation and deficit or surplus water in the soil
- how to implement tillage in extreme weather conditions

After each section there was a discussion. Interactive communication between trainers and users ensures that agrometeorological information is transferred to the users so that it can be applied in practice. Also, the discussions helped the experts to improve and adapt agrometeorological research to the needs of the users. Concluding remarks were adopted at the end of the first part of the seminar.

In the second part of the seminar, farmers were informed how they can measure by themselves, in answer to their needs, the amount of precipitation on their farms, in the fields, orchards or vineyards. Afterwards, they received a simple rain gauge with instructions.

Each farmer who got a rain gauge completed a questionnaire consisting of 24 questions. A detailed analysis of the questionnaire is shown in the Appendix. The questionnaire showed that farmers widely use the Internet and mobile applications, and also that a digital instrument for measuring temperature and relative humidity is more useful to them than classical rain gauges.

6. SEMINAR DELIVERY

On behalf of the Meteorological and Hydrological Service, Dr. Branka Ivančan-Picek, Head of the Meteorological Research and Development Division, delivered the welcome address. The distinguished guests were then addressed by Dr. Vladimir Šišljagić, Prefect of Osijek-Baranja County, Prof. Vlado Guberac, Dean of the Faculty of Agriculture in Osijek, and Mr. Siniša Hrgović on behalf of the Extension Service (Fig.12).

There were a total of 140 participants: 70 farmers from the Osijek-Baranja County and the Vukovar-Srijem County, 20 agronomists from the Extension Service of five counties in eastern Croatia, 20 professors and students from the Faculty of Agriculture in Osijek, as well as participants from family farms, agricultural associations, an insurance company, meteorological and launcher stations and the Radar Centres of DHMZ in Osijek and Gradište, guests, trainers and members of Organizing Committee (Fig. 13). There were also 15 people in attendance from the media (local and national TV, national radio and an agriculture magazine).



Fig. 12 Opening ceremony: Dr. Branka Ivančan-Picek, Dr. Mladimir Šišljagić, Prof. Vlado Guberac and Siniša Hrgović



Fig. 13 Participants of Roving Seminar "Weather, Climate and Farmers" in Osijek, December 5, 2014.



Fig. 14 Discussion after each session of the Roving Seminar "Weather, Climate and Farmers" in Osijek, December 5, 2014.

The Roving Seminar program below lists all the topics which were included, as well as the number of renowned scientists, experts and co-organizers who were involved in the organizing and delivery of the seminar. Lectures lasted 20 to 30 minutes, depending on the topic. Presentations included practical examples and interactive communication between trainers and participants. After each session there was a discussion (Fig. 14) with the aim of exchanging views and allowing the agrometeorological profession to receive feedback from users. Thus, communication between trainers and participants should enable users to apply their knowledge in practice, and experts to improve and adapt agrometeorological research and information to the needs of users. Specific conclusions were given at the end of the seminar, with a view to improving and advancing agrometeorological information for users in agriculture.

PROGRAM OF ROVING SEMINAR

"Weather, Climate and Farmers"

Croatia, Osijek, December 5, 2014

Donor: World Meteorological Organization

Organizer: Meteorological and Hydrological Service

Patron: Ministry of Agriculture

Co-organizers:

Croatian Agrometeorological Society

Faculty of Agriculture in Osijek

Extension Service

Croatian Soil Tillage Research Organization

Informal Advisory Service

Time	Lecture topics	Lecturers	Institution at which the lecturer works
8:00	Registration of participants		
8.30	Opening – Chairperson Ivana Tomašević		
9.00	The impact of climate change on agricultural production	Dr. Višnja Vučetić	Meteorological and Hydrological Service
9.30	Group photo		
9.40	Press conference and coffee break		
10.10	Observed changes in dry and wet spells in Croatia	MSc. Ksenija Cindrić Kalin	Meteorological and Hydrological Service
10.30	Evapotranspiration and soil moisture	Jelena Ferina	Meteorological and Hydrological Service
10.50	Agrometeorological measurements	MSc. Dražen Kaučić	Meteorological and Hydrological Service
11.10	Discussion – Chairperson Dr. Višnja Vučetić		
11.30	Break		
11.50	Short-term agrometeorological forecasts in the media	Marko Vučetić	Meteorological and Hydrological Service
12.10	Seasonal forecast in agriculture	Lovro Kalin	Meteorological and Hydrological Service
12.30	Basic characteristics of hail in Croatia and measures in protection against hail	Dr. Damir Počakal	Meteorological and Hydrological Service
12.50	Climatic variations of extreme soil temperature	Petra Sviličić	Meteorological and Hydrological Service
13.10	Soil tillage in extreme weather conditions	Prof. Danijel Jug	Faculty of Agriculture in Osijek
13.30	Discussion – Chairperson Prof. Danijel Jug		
13.50	Conclusions – Chairperson Dr. Višnja Vučetić and Reporter Petra Sviličić		
14.00	Lunch		
15.00	Guidelines on installation and measurement of precipitation	Marko Vučetić	Meteorological and Hydrological Service
16.00	Distribution of certificates, travel costs and rain gauges to the participants	Dr. Višnja Vučetić Vesna Đuričić Ivana Tomašević Jelena Ferina Petra Sviličić	Meteorological and Hydrological Service
17.00	Group photo with rain gauges and closing		

The Organizing Committee (Fig. 15) held two meetings – one in Zagreb on October 24, 2014, where tasks were assigned to members and one in Osijek on December 4, 2014. The members of Organizing Committee were:

1. Dr. Višnjica Vučetić – president (DHMZ and HAgMD)
2. Vesna Đuričić – vice-president (DHMZ and HAgMD)
3. Marko Vučetić – (DHMZ and HAgMD)
4. MSc. Dražen Kaučić – (DHMZ and HAgMD)
5. Ivana Tomašević – (DHMZ and HAgMD)
6. Petra Sviličić – (DHMZ and HAgMD)
7. Jelena Ferina – (DHMZ and HAgMD)
8. Msc Ksenija Cindrić Kalin – (DHMZ and HAgMD)
9. Sunčica Švaco – (DHMZ)
10. Prof. Danijel Jug – (PFOS and HAgMD)
11. Prof. Irena Jug – (PFOS and HAgMD)
12. Prof. Vesna Vukadinović – (PFOS and HAgMD)
13. Assis. Prof. Boris Đurđević – (PFOS and HAgMD)
14. Dr. Bojana Brozović – (PFOS and HAgMD)
15. Dr. Monika Marković – (PFOS and HAgMD)
16. Marijana Miljas – (Public Institution for the Management of Protected Natural Areas and HAgMD)



Fig. 15 Registration desk (left), the bell used to start the session (centre) and counting of questionnaires (right).

7. DISTRIBUTION OF RAIN GAUGES

In the second part of the seminar, after the lunch break, there was a Power Point presentation of the manual entitled "Guidelines on the Installation and Measurement of:

- How to choose the appropriate place for setting up the rain gauge,
- How to properly set up the rain gauge,
- What to do in the unpredicted situations,
- How to maintain the rain gauge,
- When to measure the amount of precipitation,
- How to properly read the amount of precipitation,
- What to note in the form "Monthly Precipitation Amounts Overview."

The distribution of certificates, travel costs and rain gauges to the farmers took place at the end of the training session. Each farmer was photographed as they received the certificate, and photos were sent to their home address two weeks after the seminar.



Fig. 16 Presentation: "Guidelines on the Installation and Measurement of Precipitation" (above left) and distribution of certificates, travel costs and rain gauges to the farmers (right and below).



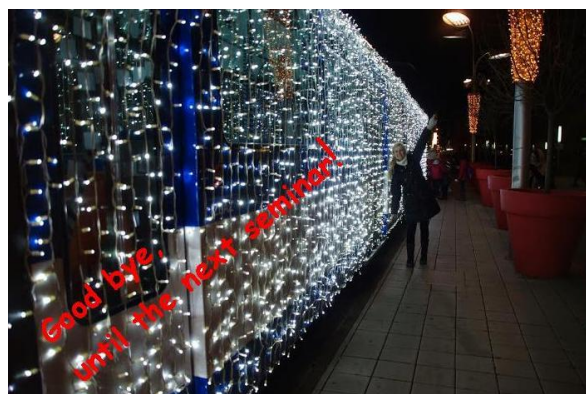
Fig. 17 Group photos with rain gauges and masts.

8. CONCLUSION

In the final remarks, several facts were highlighted:

- it is necessary to improve short-term agrometeorological forecasts in the media with the inclusion of the solar radiation and sunshine duration forecast,
- on the website of the Meteorological and Hydrological Service a more detailed daily weather report should be given, which would show what is expected in the morning, afternoon and during the night so as to allow better planning of agricultural practice,
- it is necessary to help farmers in the selection of agrometeorological instruments, and instruct them on what to measure and how,
- in the adaptation of agriculture to climate change, it is important to actively involve farmers, so that they can point out specific problems which they experience in agricultural production at certain micro-sites,
- the farmers have pointed out severe problems with drainage, which is the responsibility of Croatian Waters,
- it is necessary to better connect agrometeorological scientific experts from the Meteorological and Hydrological Service and the agronomic community from eastern Croatia, because so far this cooperation has been more operational in terms of the exchange of meteorological data.

This seminar showed that there is a great interest of the immediate beneficiaries for agrometeorological information. Therefore, one of the tasks of scientists and experts is to bring agrometeorological research and knowledge closer to the general public. We believe that objective agrometeorological information is essential for the sustainability and development of rural areas. In any case, we consider it a challenge to start something positive for the general welfare of Croatia.





Questionnaire Analysis

Roving Seminar **„Weather, Climate and Farmers“**

Osijek, December 5, 2014.

Organizer: Meteorological and Hydrological Service (DHMZ)
Donor: World Meteorological Organization (WMO)

QUESTIONNAIRE RESPONDENTS

The questionnaire was performed as a part of the Roving Seminar "Weather, Climate and Farmers" at Faculty of Agriculture in Osijek on December 5, 2014. Of the 140 participants, the target group was 80 farmers who were meant to receive rain gauges. From an expected 80 filled out questionnaires, at the end of the workshop, 62 questionnaires have been received. The respondents answered at 27 questions, of which 17 are unambiguous questions, five complex questions and five descriptive questions.

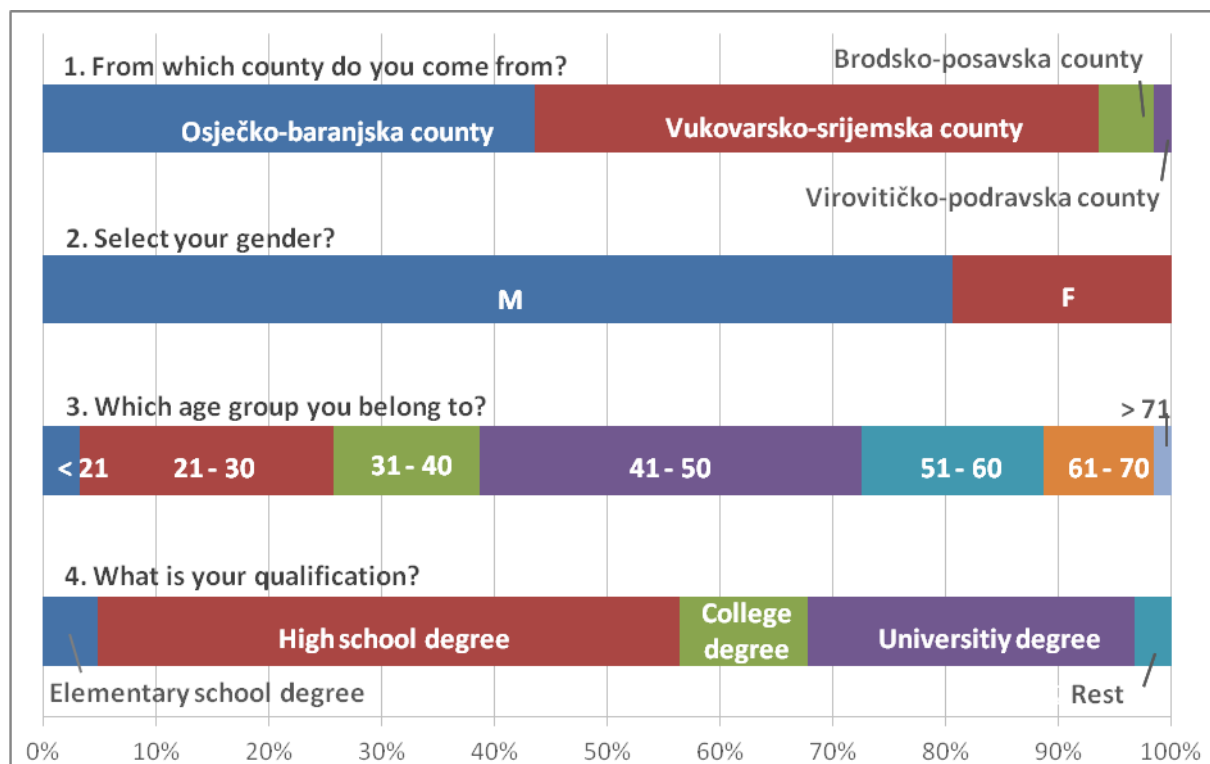
MOST IMPORTANT RESULTS

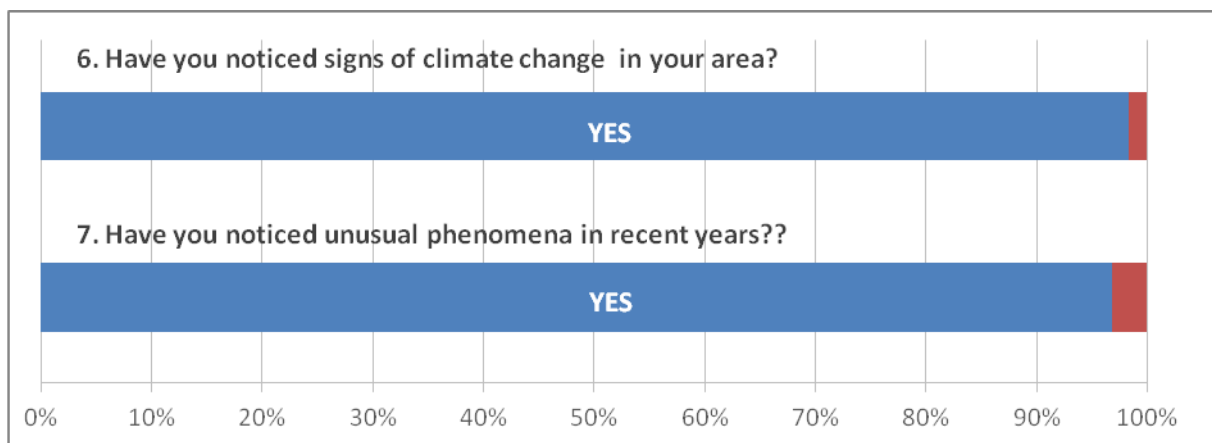
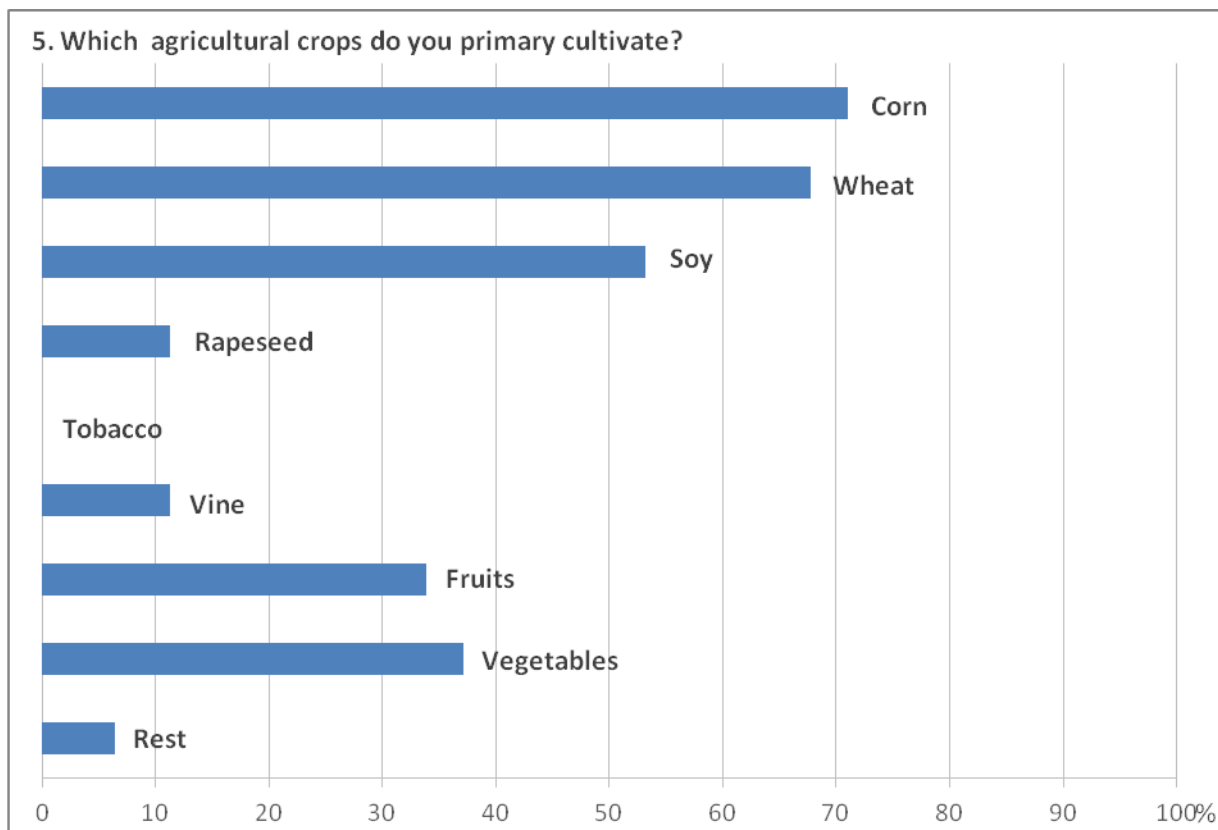
The questionnaire was completed by 50% of the participants from the Vukovar-Sirmium County. The survey included 81% of men, while 34% of the respondents are in the age group between 41 and 50 years, and 52% of secondary school education. The main agricultural crops which the respondents cultivate are corn (71%), wheat (68%) and soybeans (53%). More than 95% of the respondents noted signs of climate change, and unusual occurrences in their area, and also they use weather forecasting for their agricultural needs. In descriptive questions, the respondents indicated that the most damage to their crops / plantations is caused primarily by drought (37/62), hail (26/62) and extreme rain (26/62). The meteorological forecast is most useful to them when planning agricultural work (52%), protection from disease (37%) and in the planning of the harvest (31%). The most useful information for the respondents is the air temperature (44%), the soil temperature (29%) and the humidity (21%). The weather forecast that they often follow for their needs is the one that goes daily on Croatian National Television (HRT) (45%), followed by daily monitoring forecasts on the mobile applications (24%) and at a weekly basis in the show Fruits of the Earth (24%). Access to the internet has 89% of the respondents, and 76% of them are interested in viewing agrometeorological forecasts on the mobile application, while 68% of them are interested to monitor agrometeorological forecasts on the teletext. Although the agrometeorological forecasts in the show Fruits of the Earth are in a high percentage understandable by performance (98%) and graphics (100%), the respondents think that it is highly important to issue weather warnings (35%), show clearer and more detailed maps (26%) and modernize maps (21%). They are very interested to get the advice on how they can take advantage of automatic (74%) or conventional (77%) agrometeorological station for their needs, along with the services of calibration for comparison purposes with DHMZ data. If they were offered one of the instruments, 56% would choose the digital thermometer and hygrometer, while 42% would choose the ordinary rain gauge. Only 40% of the respondents are familiar with the products and services that DHMZ can offer to them, and they are informed mostly through the internet (12/62). They would like to get more information on the Internet (6/62) and the mobile applications (5/62).

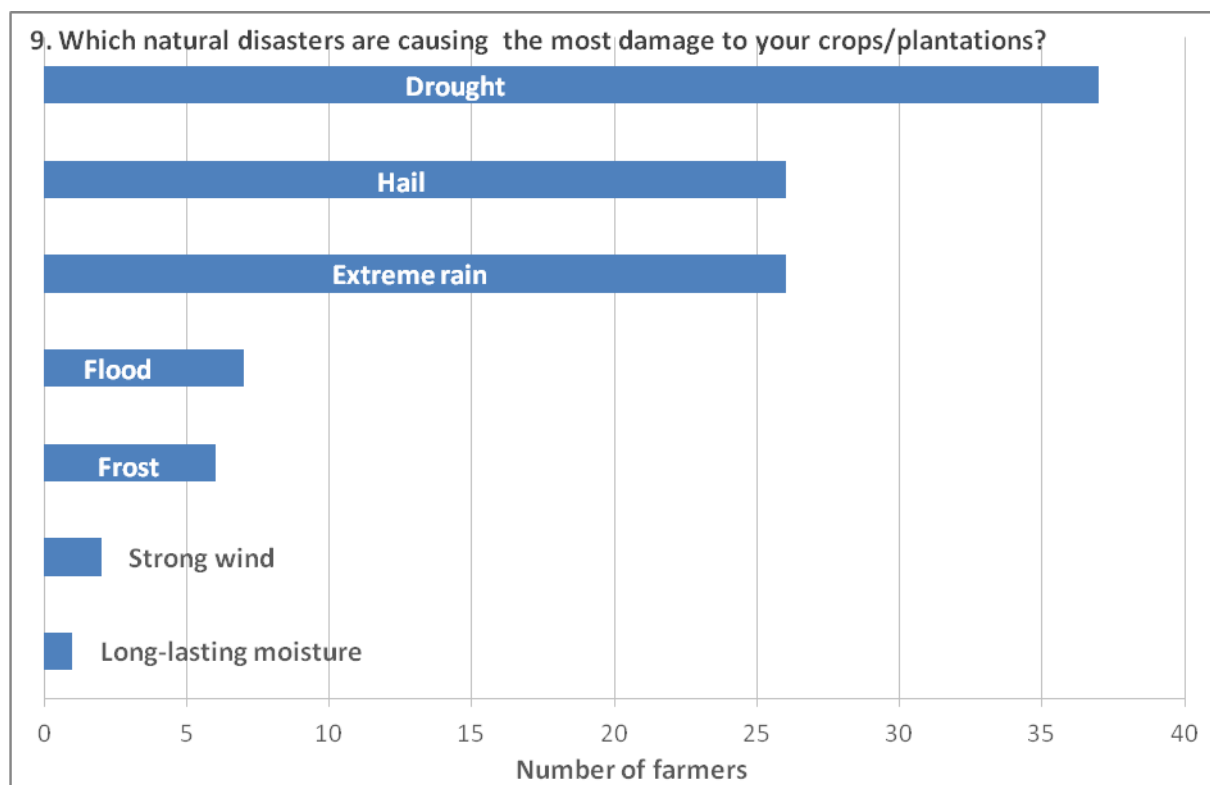
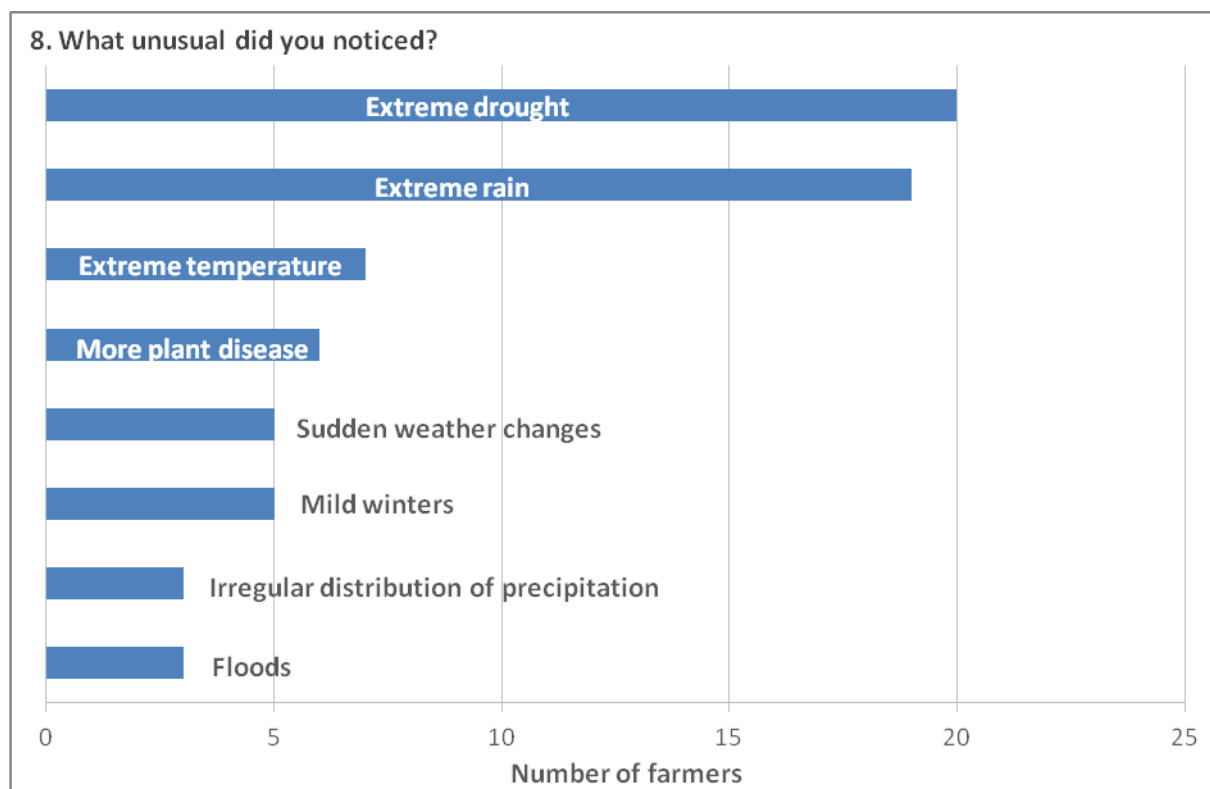
CONCLUSION

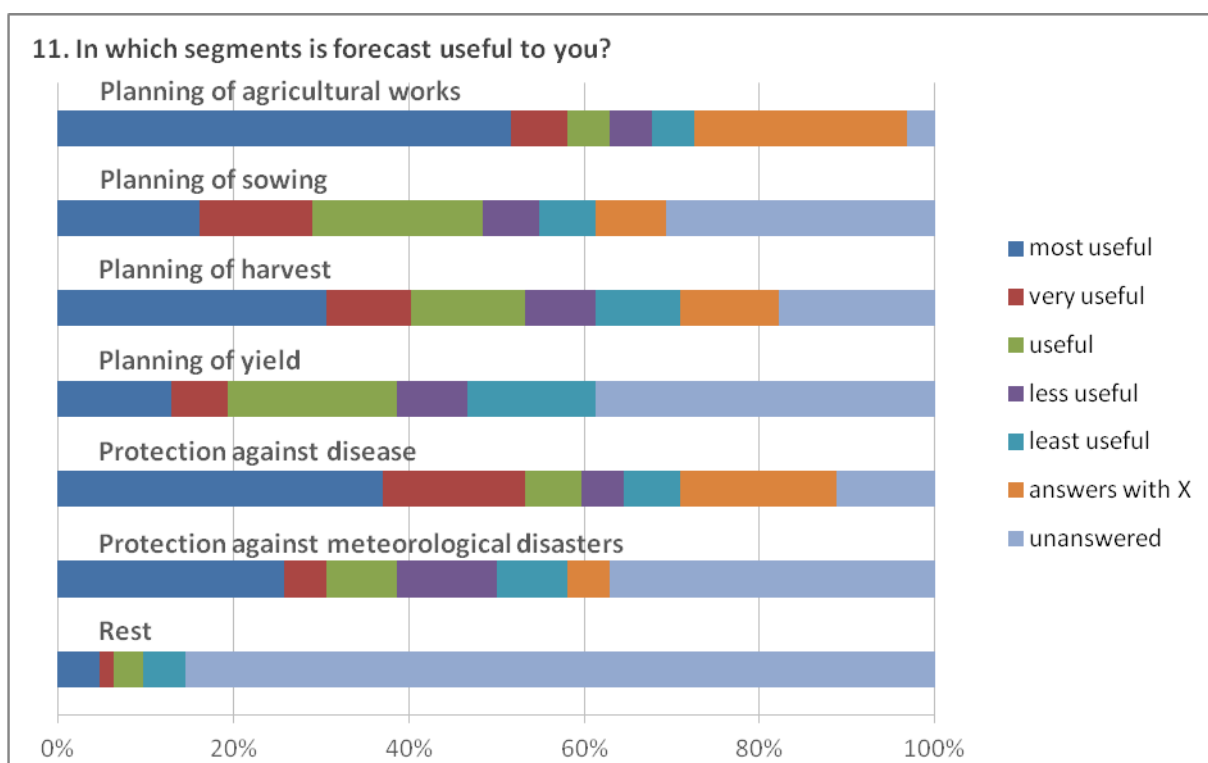
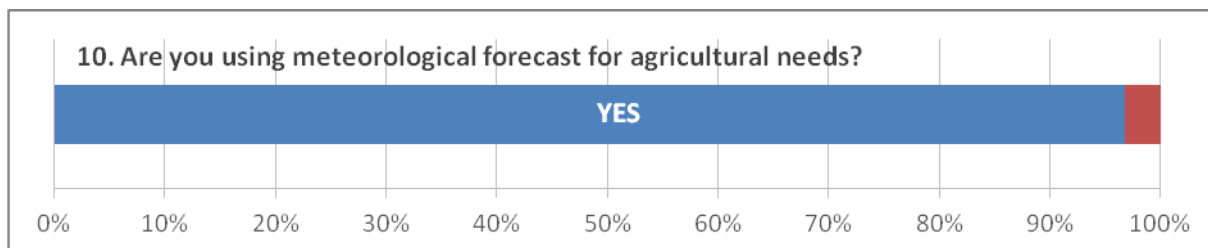
Farmers of Eastern Croatia are aware of climate change in their region. In order to plan their daily work, the meteorological forecast is of great importance to them. Given the high percentage of the respondents that use the Internet services and the mobile applications, they keep pace with time and thus challenge us on how to provide them with timely and adequate information, which are essential to them.

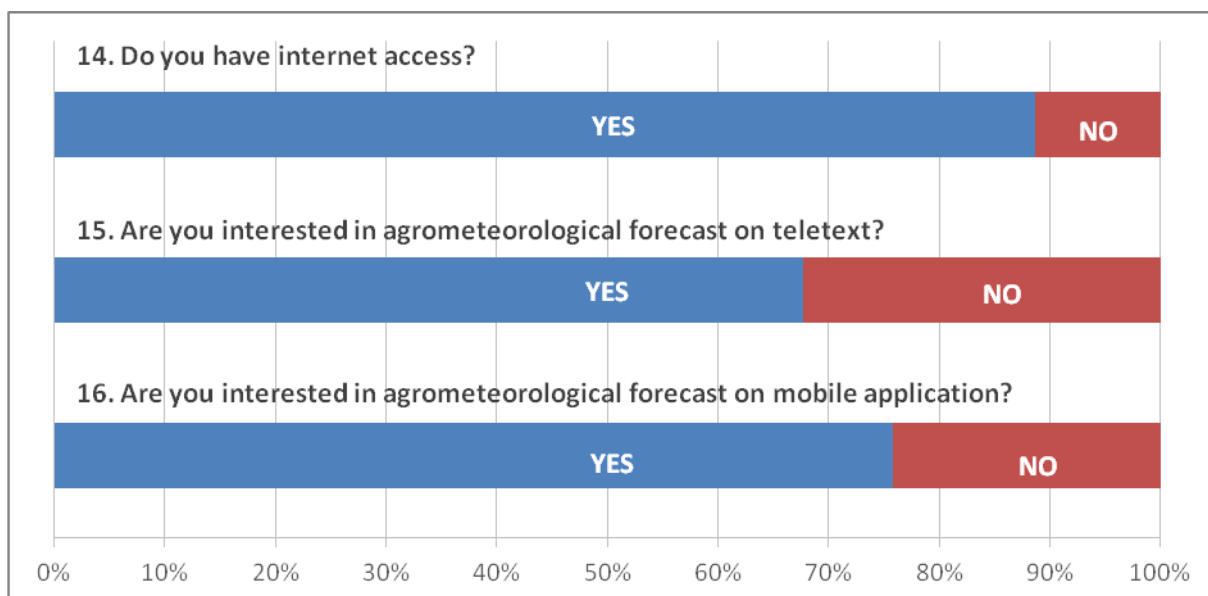
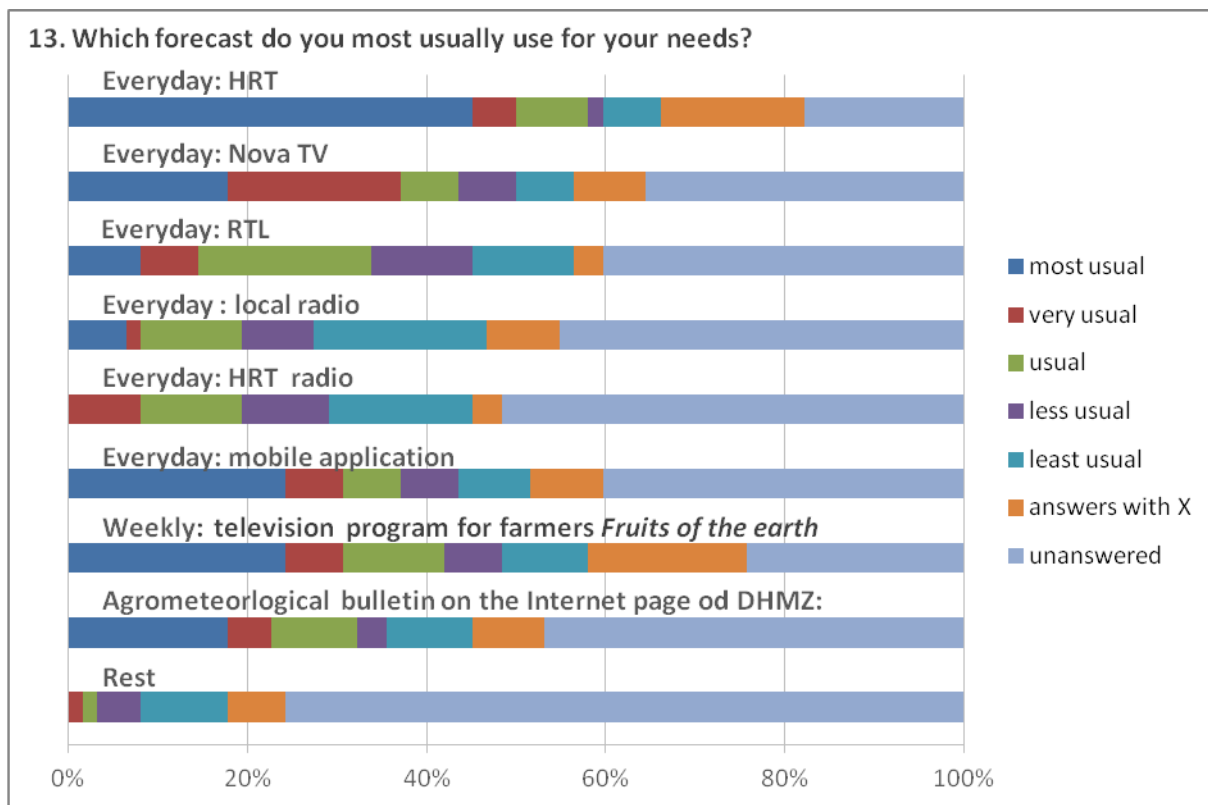
GRAPHICAL REPRESENTATION OF THE RESULTS

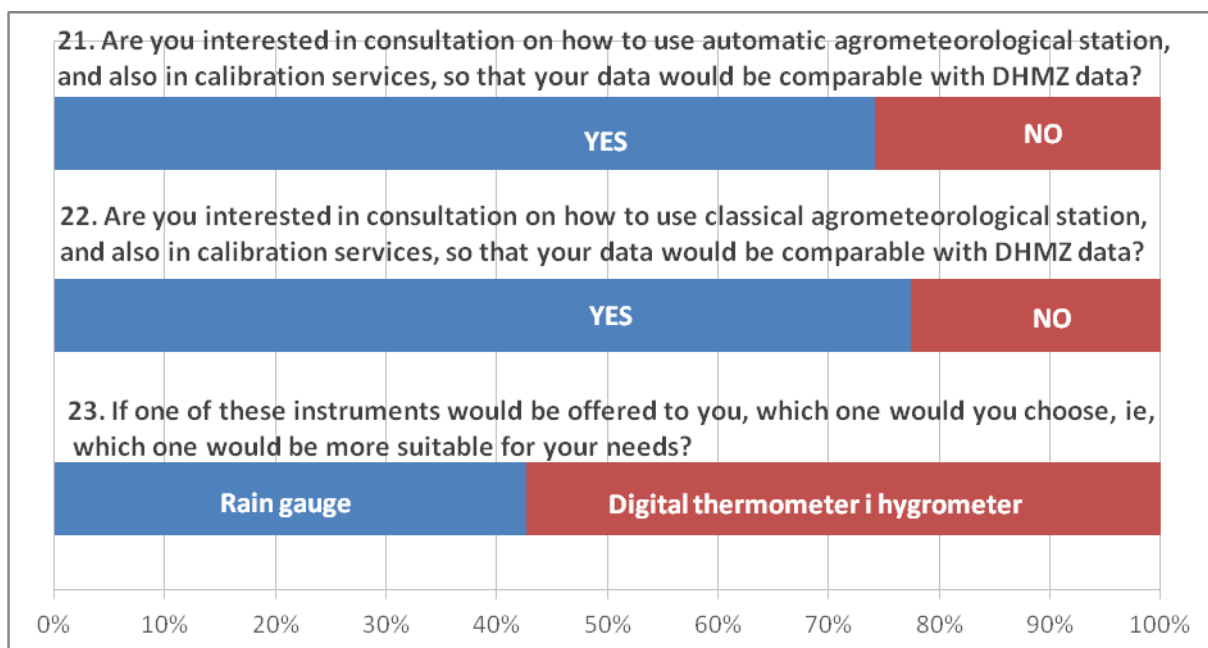
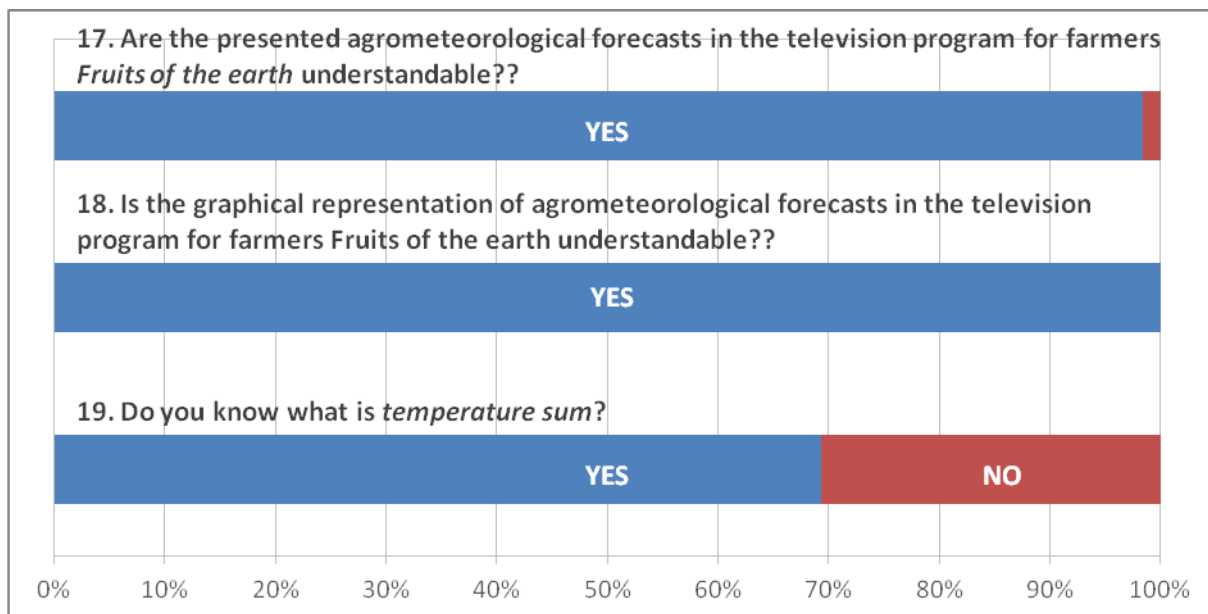


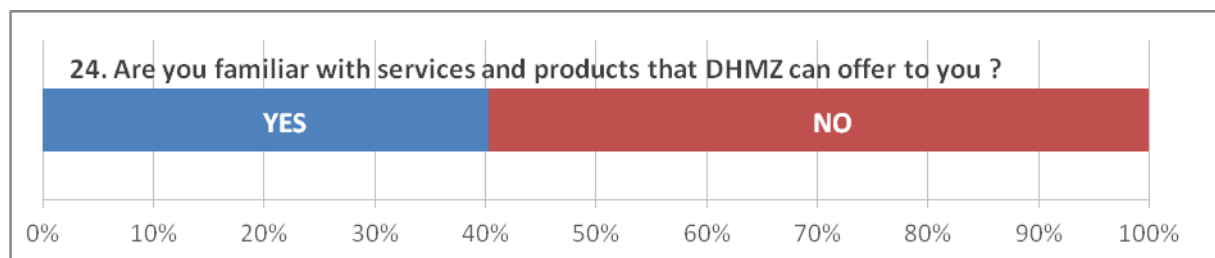
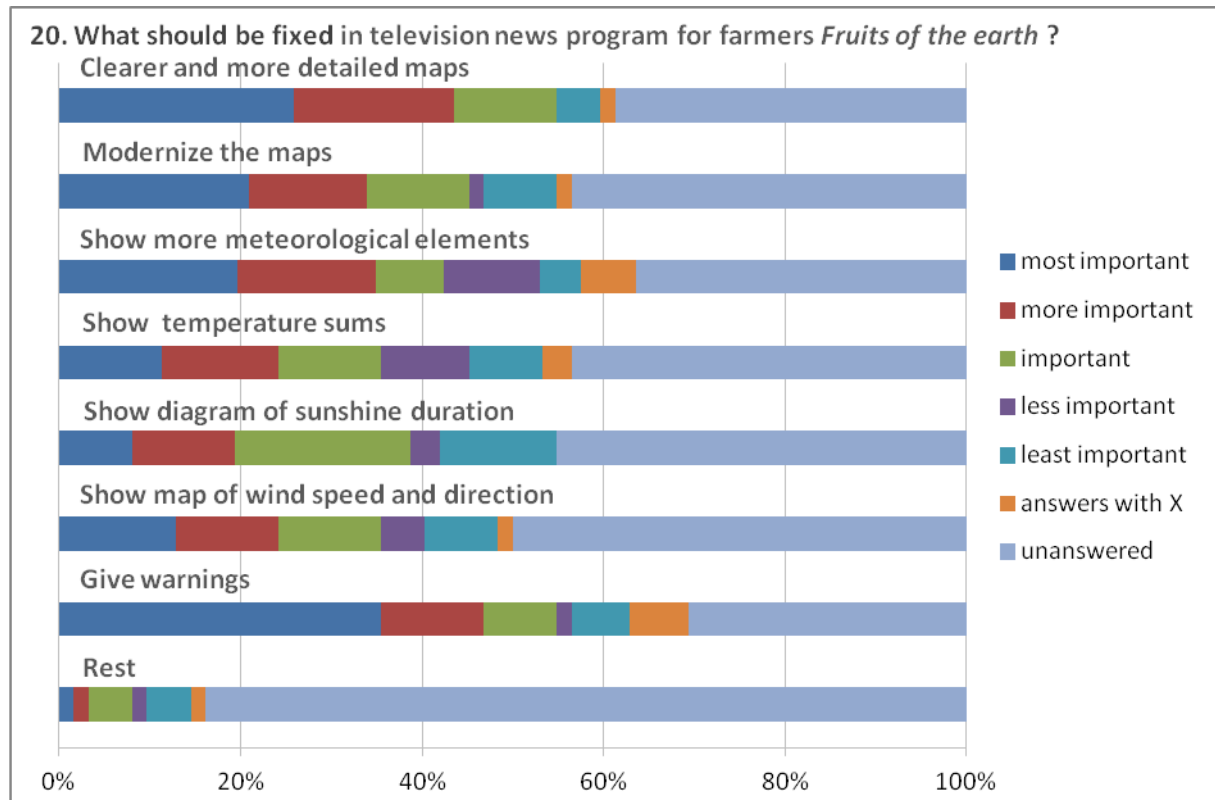


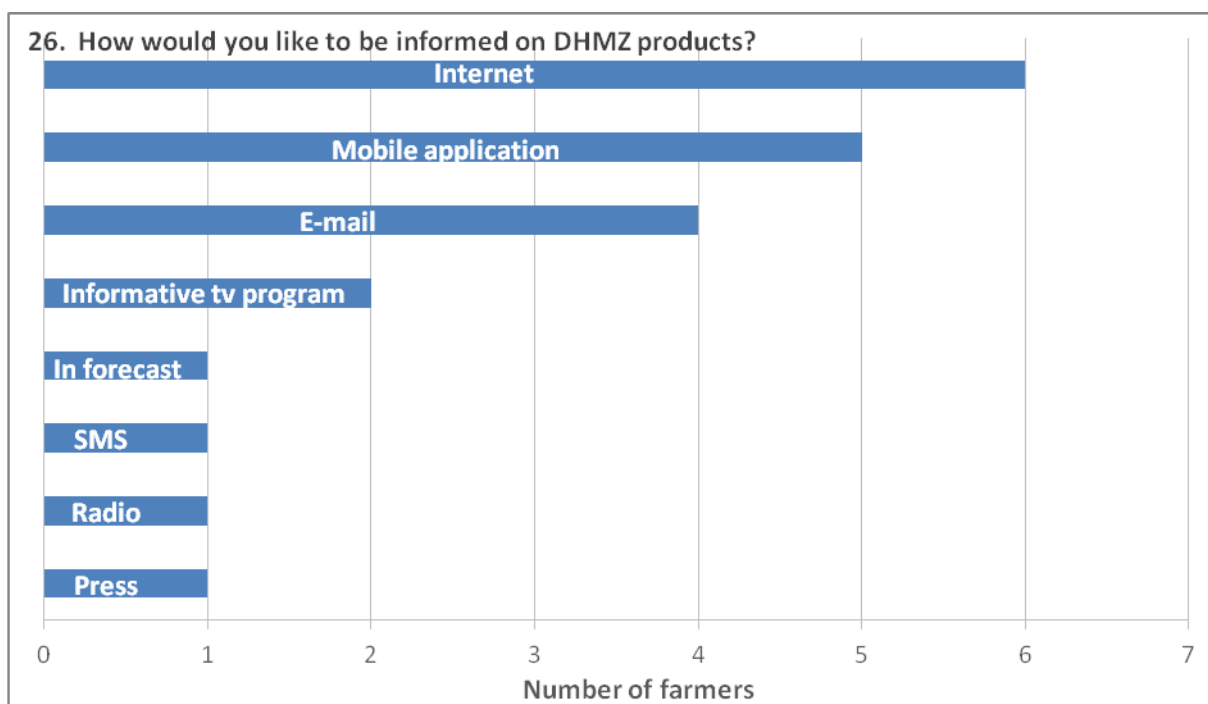
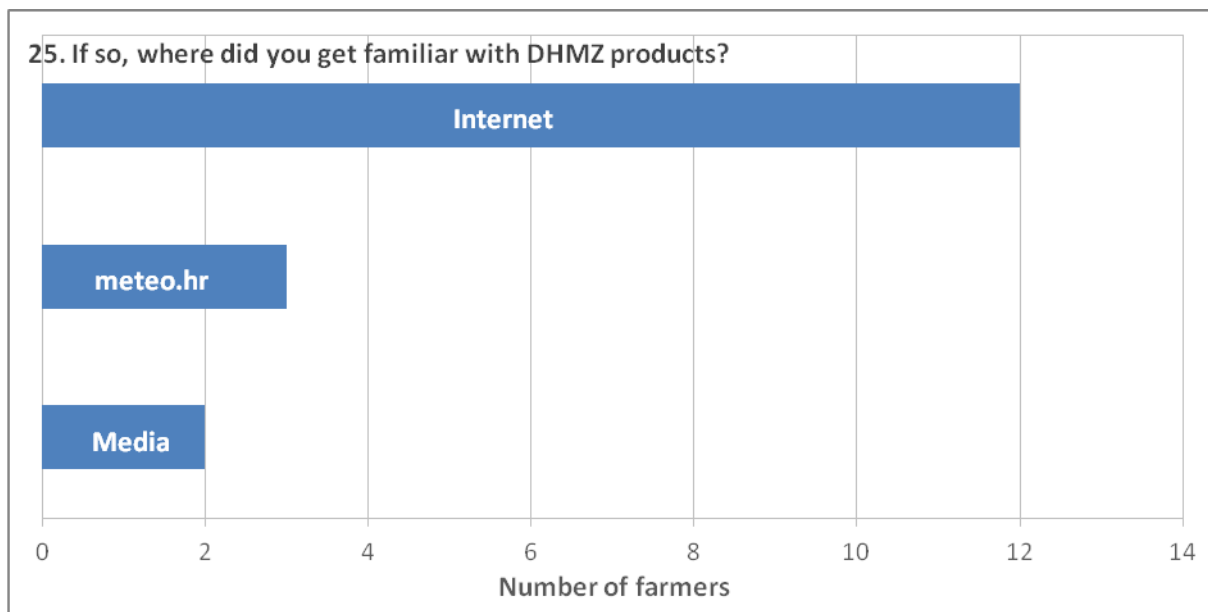












APPENDIX: LIST OF DESCRIPTIVE ANSWERS

8. What have you noticed unusually?

Answers	Number of respondents
Extreme drought	20
Extreme rainfall	19
Extreme temperatures	7
More and more diseases	6
Sudden changes in weather	5
Mild winters	5
Floods	3
Irregular precipitation	3
Cold spring	2
Yield reduction due to drought for 50%	2
The small difference between the seasons	2
Hail	2
Extreme humidity	2
Great climate change	
Extreme changes	
The mud rain	
The acid rain	
Land spout	
Wind direction change	
Seasons	
Earlier spring	
Everything has shifted in the processing of agricultural land for 10-15 days	
Earlier sowing	
Earlier harvest	
Flowering fruit trees in late autumn	
Extension of vegetation	
Shortened growing season	
The burns on the fruits	
Elongation of peak buds on apple in October	
The lack of the ripening of individual cultures in rainy years	
Earlier stages of decay in photosynthesis	
Earlier diseases on cereals	
Earlier occurrence of pests	

27. Do you have any suggestions?

- Setting weather station in the north-eastern area of Baranja (Topolje)
- We are free to contact and cooperation: OPG Jurković Luka, Belišće, 091 3689010
- Direct and active medium (Web site) to communicate on a daily basis, for specific periods of sowing, harvest, and time of plant development
- Develop: rain gauge, hygrometer, soil thermometer and the suspension air thermometer
- Measure the weather at several micro locations in order to get better and more precise information at the level of the municipality
- Give more professional consulting on adaptation of agriculture to the climate conditions, because climate cannot adapt to us
- Enable availability of agrometeorological background to farmers for establishing long term plantations
- Just continue like this
- Create a web application connecting all automatic stations that would measure: air temperature, humidity, moisture at the leaf, wind and rainfall, and duration of the same
- Speak in simpler language in giving forecasts without using words relatively and where-where so that ordinary viewers can understand what it is about
- Detailed reporting on forecasts
- Warnings
- During the sowing and reaping give more detailed forecasts for Slavonia. Thank you!