Agrometeorologists for farmers in hotter, drier, wetter future

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Working group discussion summary

*Prepared by: Keith Lambkin*

*Met Éireann – The Irish Meteorological Service*

*Andreja Sušnik*

*Slovenian Environment Agency*

# **Overview**

The last session of the first day of the workshop was a discussion session. Participants split into two working groups for a two hour session. The first hour was allocated for short presentations by country experts. The second hour was used to discuss five specific topics. These were:

1. Examples of good practice
2. Identify gaps and problems
3. Assistance offered and needed
4. Plans for future
5. Networks already in place

This report attempts to summarize these discussions as well as capture some common themes running through all of the presentations from the two day workshop.

# **Presentations by country experts**

The following organizations presented short summaries:

* **Israel** - *Yiftach Ziv*, Pan to Penman-Monteith, Transition of Irrigation Coefficients in Israel
* **Poland** - *Małgorzata Kępińska-Kasprzak*, Agrometeorological service provided by institute of meteorology and water management - National research Institute
* **Slovakia** - *Lívia Labudová*, Agrometeorological services at Slovak Hydrometeorological Institute
* **Montenegro** - *Mirjana Ivanov*, Applying meteorological data for risk assessment in agriculture
* **Hungary** - *Andrea Kircsi*, Activities in agrometeorology at HMS, country report
* **Italy** – *Arturo Pucillo* (OSMER), ARPA activities
* **Greece** – *Anastasia Papakrivou* (HNMS), Agrometeorological services in Greece
* **Bosnia and Herzegovina**, Republic of Srpska – *Ines Čizmić* (RHMZ), Agrometeorological service in Republic of Srpska
* **Federation Bosnia and Herzegovina** – *Nedžad Voljevica* (FHMZ), Agricultural meteorology – current state, on-going, future activities
* **The former Yugoslav Republic of Macedonia** – *Silvana Stevkova* (HMS), Agrometeorological services provided by HMS
* **Croatia** – *Višnja Vučetić* (DHMZ), Agrometeorology in Croatia
* **Serbia** – *Aleksandra Kržič* (RHMSS), Agrometeorological activities in RHMSS

# **(a) Examples of good practice**

It was universally accepted that it is preferred to follow official international guidelines related to agricultural meteorology. There are already a number of official guidelines in circulation, for example, ‘Guide to Meteorological Practices ([WMO-No 134](http://www.wmo.int/pages/prog/wcp/agm/gamp/gamp_en.php)) and the WMO’s check list for [Agricultural Meteorological Services](https://www.wmo.int/pages/prog/dra/eguides/index.php/en/5-functions/5-9-agricultural-meteorological-services). However a number of the participants didn’t know that these guidelines existed. It was also generally accepted that cross boarder projects such as [DMCSEE](http://www.dmcsee.org/) and [IRMA Irrigation](http://www.irrigation-management.eu/) (plus many more) must be doing something right as they are gaining momentum. So rather than reinvent the wheel it was deemed good practice to examine existing agrometeorology frameworks and structures and either copy, collaborate or try and improve on these. We should aim to build on the existing agrometeorological knowledge and practices through improved knowledge transfer. There is evidence that many in the community do follow best practices.

A number of global agrometeorology networks already exist such as the WMO’s [CAgM](http://www.wmo.int/pages/prog/wcp/agm/cagm/cagm_en.php), [WAMIS](http://www.wamis.org/) and [GlobalFAMS](http://www.globalfams.org/). However both working groups flagged the benefits of not just building on established networks but also consider merging the many pockets of excellence that are already in existence. Case studies in forestry and phenology (COST 725) were highlighted to illustrate that together we can achieve more.

Collaborating with universities was also flagged as an excellent way to further projects for those experiencing resource constraints.

Improving observational networks was also deemed to be a good practice, in particular related to crop observations. Often it is difficult to verify pest/disease models as their visual effects are suppressed through spraying. When crop disease for example is noticed, some farmers are often reluctant to advertise this fact hence frequent and reliable observations (other than control plot experiments) are all too sparse. Commercially sensitive growth records also add to the difficulty. The use of citizen science projects targeting the smaller growers is likely to provide a denser and more frequent crop observations, providing a critical mass of contributors can be achieved.

**Recommendation 1:**

Continue to improve agricultural related observation networks.

Discussions regarding best practice in data handling had to eventually be stopped such was the level of diversity of opinion on this topic. But what was clear is that standardized guidelines around homogenization and data formats related to third party dissemination would be beneficial.

Finally in this category numerous participants expressed the importance of including end users (farmers) in *all* steps of product development from defining the requirement to product service roll out and implementation. It was clear that many agrometeorological products while scientifically impressive were not being used by farmers. In fact it appears many farmers are not even aware that a number of them even exist. Some expressed concern that even if farmers did know about them all, there is every likelihood that they would not know how to practically implement them without training.

**Recommendation 2:**

Include end users (farmers, or representative bodies) in all steps of product development from defining requirements to product roll out, implementation, ongoing feedback and support.

# **(b) Identify gaps and problems**

Perhaps all too common but predictable concerns such as understaffing, lack of financial support and restrictions on travel and training were all flagged. But just because these are common problems, likely to be found across many sectors, does not make them insignificant. Perhaps these constraints can be reduced if policy makers and financial managers can see a return on investment on such costs.

**Recommendation 3:**

Case studies be complied highlighting the economic benefits of specific agrometeorological product & services for common European farming sectors.

The remote sensing community was well represented at the workshop and some excellent examples were presented. However it was acknowledged that a significant investment of resources was required to make beneficial operational use of many satellite products. This was proving a barrier to entry for some countries and organizations not already active in the remote sensing community. It was believed that if a collection of freely available agrometeorological satellite products was compiled, along with bitesize basic training, and practical examples of how farmers benefit from these products, then more organizations would make use of existing infrastructures and hence more farmers could potential benefit.

**Recommendation 4:**

Compile bitesize basic training of relevant remote sensing products for farmers and agricultural advisors.

Another problem that was raised was the lack of standardization in presenting uncertainty in agricultural models and forecasts. As many climate and forecast products are highly specialized, targeted to a specific audience, it may be difficult to standardize these ever evolving products and services. Also the standardization of seasonal forecasts was a concern. Many believed that farmers were getting mixed messages of seasonal forecasts from media and national weather services, and at times the lack of an authoritative voice was fueling the problem.

Some participants volunteered that their organization had valuable agricultural observations as paper records going back decades. And while this data would extend data series, assisting in model development, they simply did not know how best to digitize these paper records to best international practice. Guidance on this would be welcomed.

While feedback from farmers is common in places, all agreed that meaningful feedback on economic benefit as well as observations could be greatly improved.

But the number one gap and issue causing farmers the greatest of problems is obtaining consistent, accurate, localized forecasts of the common weather parameters.

**(c) Assistance offered and needed**

There was some discussion around what was the best way someone could ask for assistance. For example is it better for the person (or organization) asking for assistance to approach an individual that they know is an expert in the area, or should they broadcast their need to the many and hope someone has the knowledge, and the time, to reply and offer assistance. This brings up the question of how indeed someone even knows ‘who’ to ask for assistance in the first place.

It was agreed that an online list of what agrometeorological products organizations where providing would be of benefit. While WAMIS goes some way to accomplishing this it is not all encompassing. CAgM collect country progress reports but again this does not capture everything. Perhaps the country reports could encourage organizations via a question or otherwise to start, update or continue to publish products on WAMIS. This would both inform those looking for assistance who is providing what kind of products, while also helping to advertise development within the international agrometeorology community.

It was also acknowledged that global organizations like the WMO and FAO are always willing to assist member countries. However some national and regional organizations might not have the capacity to help, despite the best intentions. It is essential for success that any arrangement between organizations, by beneficial to ‘both’ parties in some way.

There is also the need for guidelines from a global governing body to ensure all parties define realistic expectations. For example before any development begins all parties should be clear as to what exactly is in scope for assistance, the level of resources committed, time bound tasks, training plans, agreement in relations to ongoing support and any financial expectations.

**Recommendation 5:**

Guideline be published regarding best practice of seeking and providing assistance within the agrometeorological sector.

**(d) Plans for the future**

There was many and varied individual opinions regarding the best path forward as a community. An attempt is made here to generally capture comments.

It is essential we bridge the gap between what products farmers find of value (or indeed know about) and what products are available (or are in development).

Most participant organizations plan to modernize their infrastructures to make better use of digital technologies. This includes modernizing observational networks, for example making better use of digital cameras or citizen science projects, and also modernizing dissemination channels by better exploiting digital platforms.

Many plan to continue to make better use of remote sensing and numerical weather forecasting capabilities. This is being made easier by projects such as Copernicus, greater centralization of product delivery and a move towards open data.

It is believed it is essential to continue to invest in targeted research that not only meets national requirements but is in line with international food security strategies.

A number expressed the desire to develop new agrometeorology indices. Care should be taken here. While new indices are welcomed, too many can prove unwieldy. For example the CAgM recommend that every country should produce SPI for a relative comparison and complement with other indices as deemed appropriate.

With greater centralized delivery of products and services becoming the norm it is believed that a multi-sectorial approach is required to achieve maximum benefit from available resources. While the agro meteorological community have always been a leader in overlapping disciplines such as climate change, weather forecasts, water, agricultural and economics, we should continue to make use of new developments in these sectors.

**(e) Networks already in place**

This is a near limitless task to list all existing networks in all countries across all relevant disciplines, so an attempt was made focusing only on those specifically related to agrometeorology. It is acknowledged that large organization with a wider scope such as EUMETCAL and the European Union contribute significantly to agrometeorological activities.

* [CAgM](http://www.wmo.int/pages/prog/wcp/agm/cagm/cagm_en.php) – Commission for Agricultural Meteorology
* [DMCSEE](http://www.dmcsee.org/) – Drought Management Centre for Southeastern Europe
* [FAO](http://www.fao.org/home/en/) – Food and Agricultural Organization of the United Nations
* [WAMIS](http://www.wamis.org/) – World AgroMeteorological Information Service
* [INSAM](http://www.agrometeorology.org/) – International Society for Agricultural Meteorology
* [MARS](https://ec.europa.eu/jrc/en/mars) – Monitoring Agricultural Resources
* [METAGRI](http://www.wmo.int/pages/prog/wcp/agm/roving_seminars/west_africa_en.php) – Roving Seminars
* [AgMP](http://www.wmo.int/pages/prog/wcp/agm/agmp_en.php) – Agricultural Meteorology Programme
* [AGMET](http://agmet.ie/) – Joint Working Group on Applied Agricultural Meteorology
* [IDMP](http://www.droughtmanagement.info/) – Integrated Drought Management Programme
* [GWP](http://www.gwp.org/) – Global Water Partnership
* [GASCA](http://www.fao.org/gacsa/en/) – Global Association for Climate-Smart Agricultural
* [GlobalFAMS](http://www.globalfams.org/) – Global Federation of Agrometeorological Societies
* [IPG](https://www.agrar.hu-berlin.de/en/institut-en/departments/dntw-en/agrarmet-en/phaenologie/ipg) – International Phenology Gardens of Europe