The European Commission's science and knowledge service

Joint Research Centre

# Intra-seasonal performance of European Union wheat forecasts during extreme weather impacts

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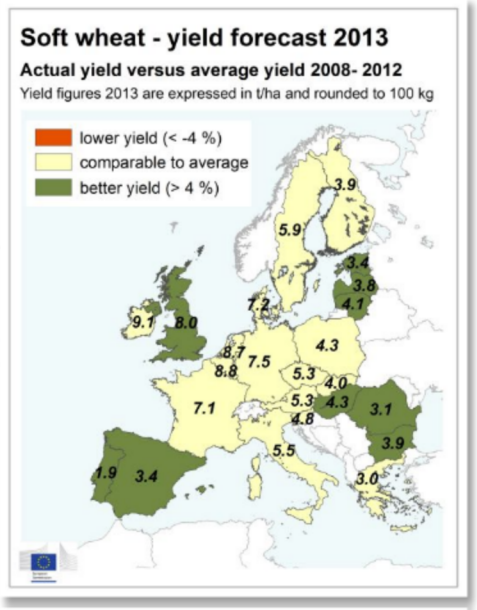
# JRC crop monitoring and yield forecasting

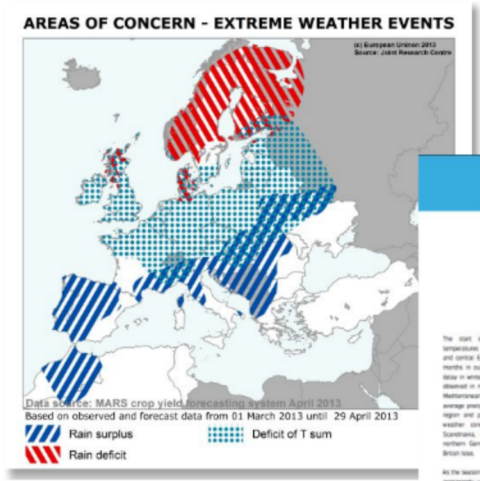
A quantitative yield forecast at national level for all major crops (>10.000 ha)

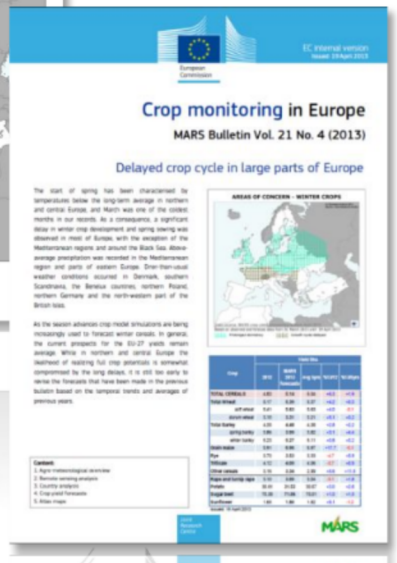

Bulletin of current and future agro-meteo conditions (EU level) and a detailed analysis for major crops (at national level)
Special Issue in AS

| Crop | Yield t/ha | | | | |
|---|---|---|---|---|---|
| | 2012 | MARS 2013 forecasts | Avg 5yrs | %13/12 | %13/5yrs |
| TOTAL CEREALS | 4.83 | **5.14** | 5.04 | +6.3 | +1.9 |
| Total Wheat | 5.17 | **5.39** | 5.37 | +4.2 | +0.3 |
| *soft wheat* | 5.41 | **5.63** | 5.63 | +4.0 | -0.1 |
| *durum wheat* | 3.15 | **3.31** | 3.21 | +5.1 | +3.2 |
| Total Barley | 4.35 | **4.48** | 4.38 | +2.8 | +2.2 |
| *spring barley* | 3.86 | **3.99** | 3.82 | +3.1 | +4.4 |
| *winter barley* | 5.23 | **5.27** | 5.11 | +0.8 | +3.2 |
| Grain maize | 5.91 | **6.96** | 6.97 | +17.7 | -0.1 |
| Rye | 3.70 | **3.53** | 3.33 | -4.7 | +5.9 |
| Triticale | 4.12 | **4.09** | 4.06 | -0.7 | +0.9 |
| Other cereals | 3.16 | **3.34** | 2.99 | +5.6 | +11.5 |
| Rape and turnip rape | 3.10 | **3.09** | 3.04 | -0.1 | +1.8 |
| Potato | 30.61 | **31.53** | 30.67 | +3.0 | +2.8 |
| Sugar beet | 70.35 | **71.06** | 70.01 | +1.0 | +1.5 |
| Sunflower | 1.65 | **1.80** | 1.82 | +9.1 | -1.2 |

issued: 19 April 2013



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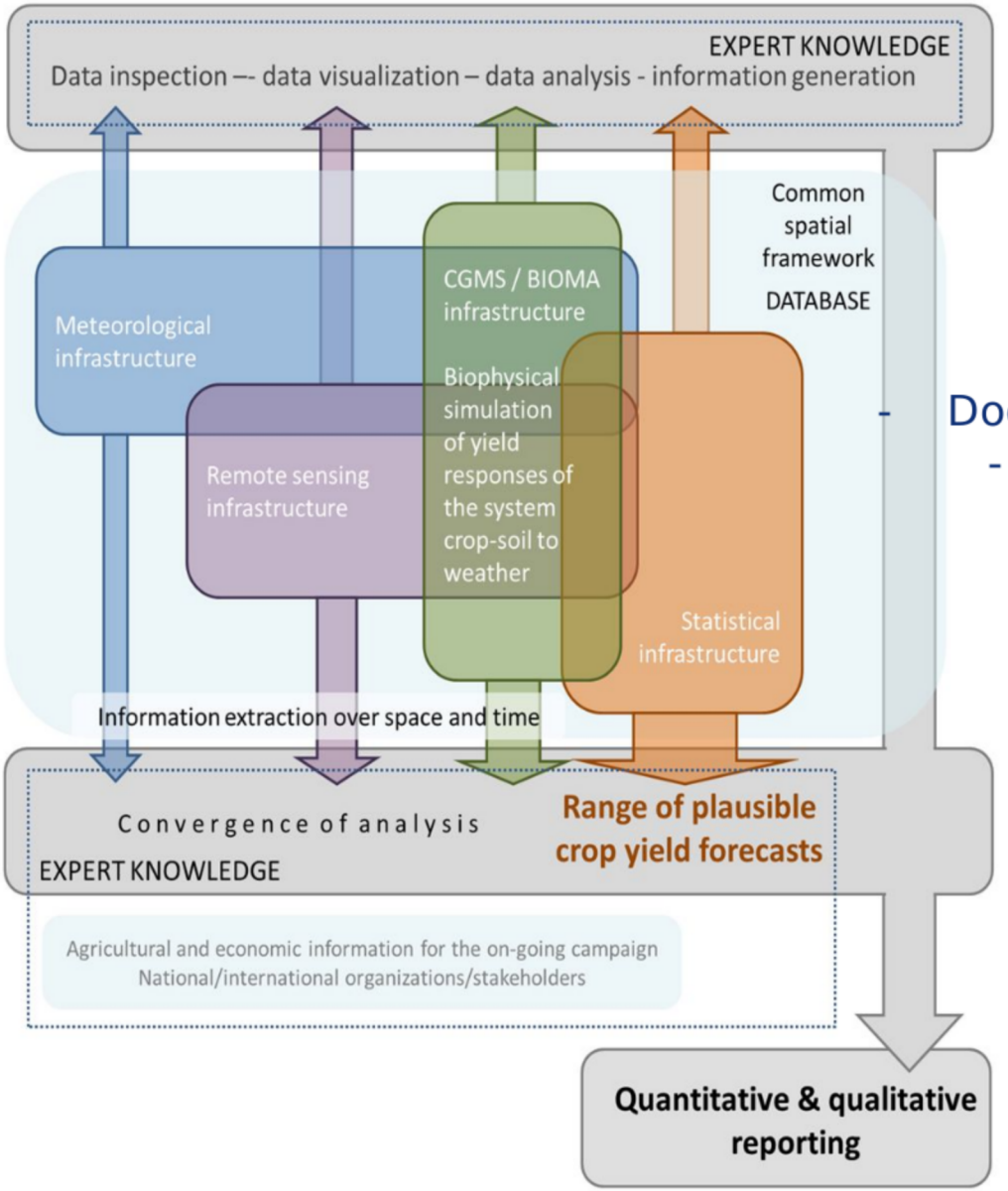
# MARS Crop Yield Forecasting System




## MCYFS
## A model and data driven decision support system

- Analyst is key
- System is data demanding
- Does not provide a unique answer
- from input data to model used:
- expert decision

- Outsourced and JRC internal costs in the order of 1.5 Mill Euro per year to cover Europe



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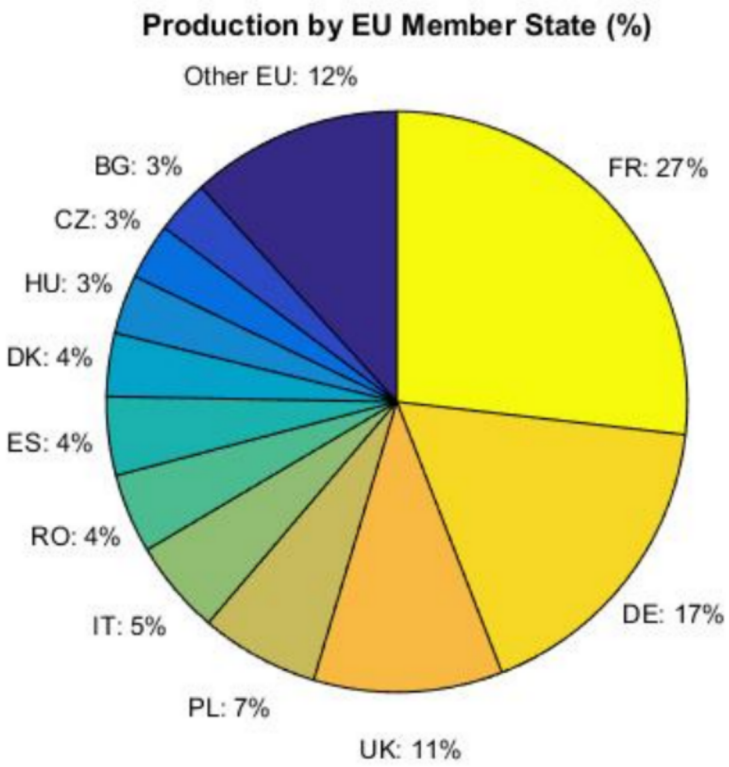
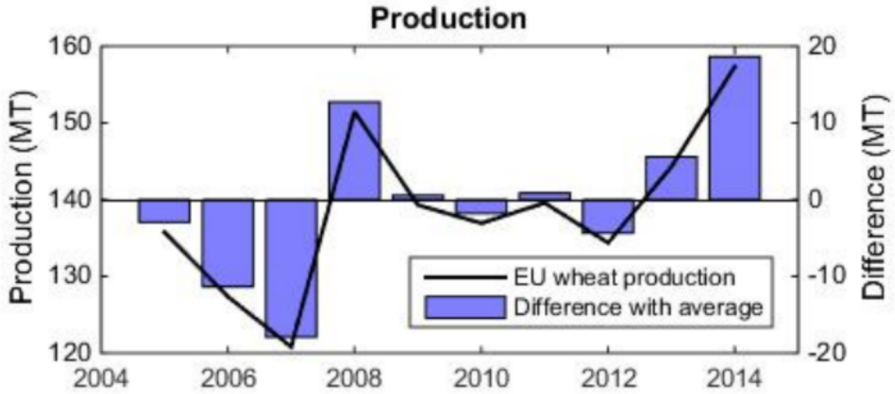
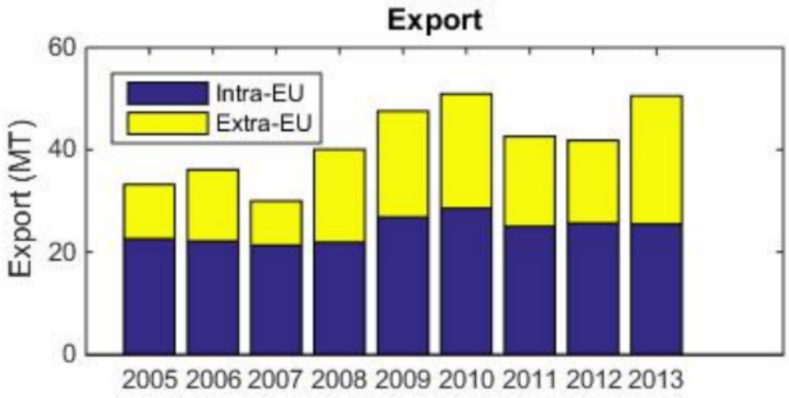
# Why?




- EU internal market & extra-EU market



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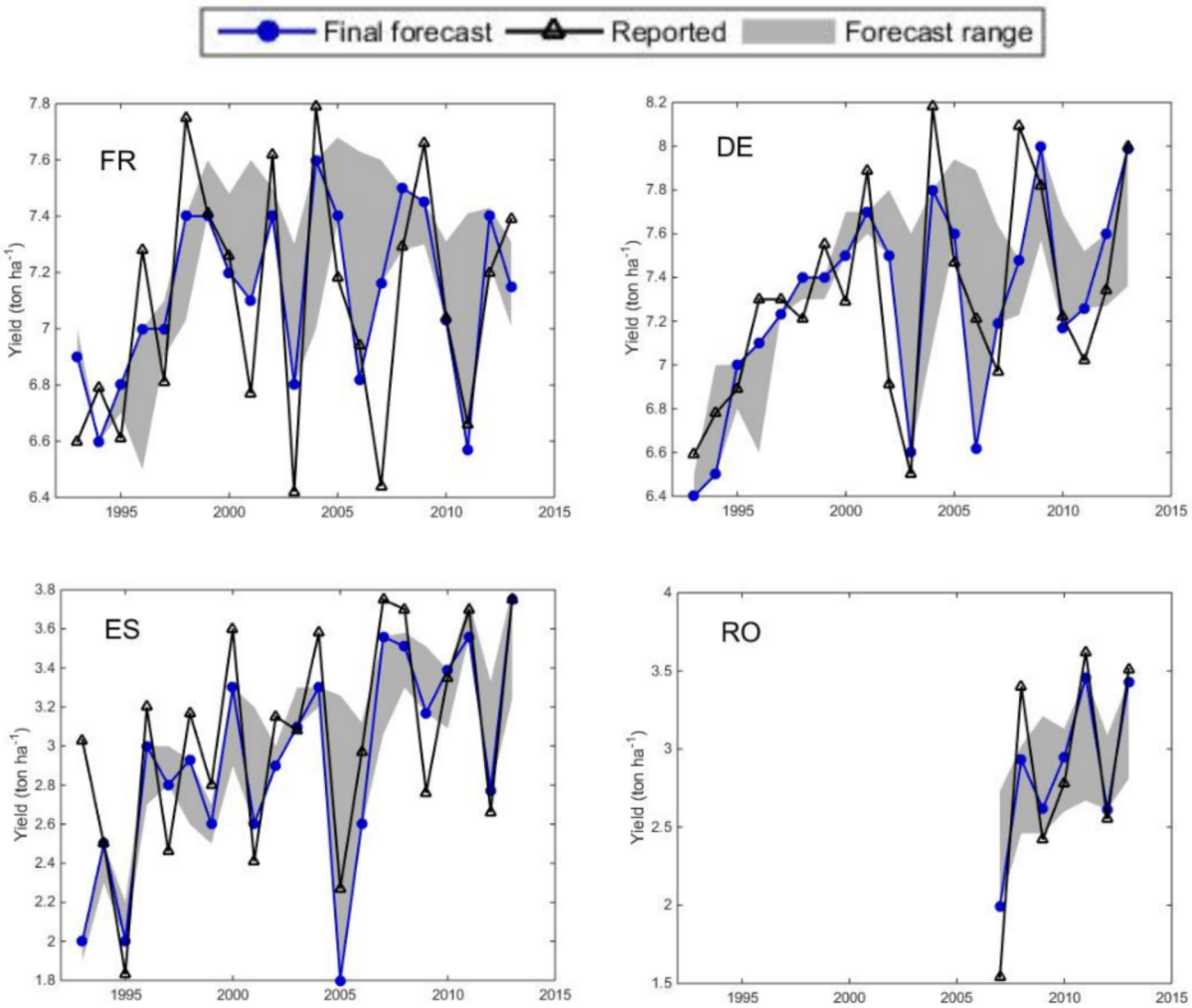
# Accuracy of end-of-campaign forecasts




## Soft wheat

- Trend dominant <2000
- Forecasting range has increased...
- Forecasting range smaller than reported range...
- Forecasting challenge has increased... (?)



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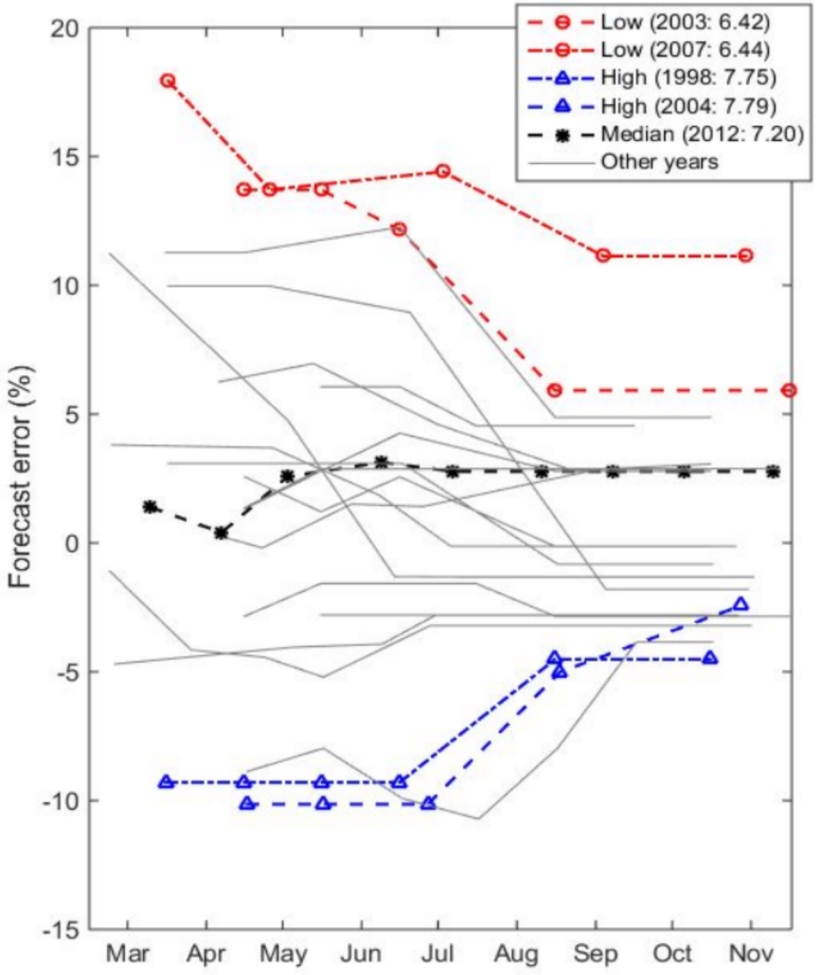
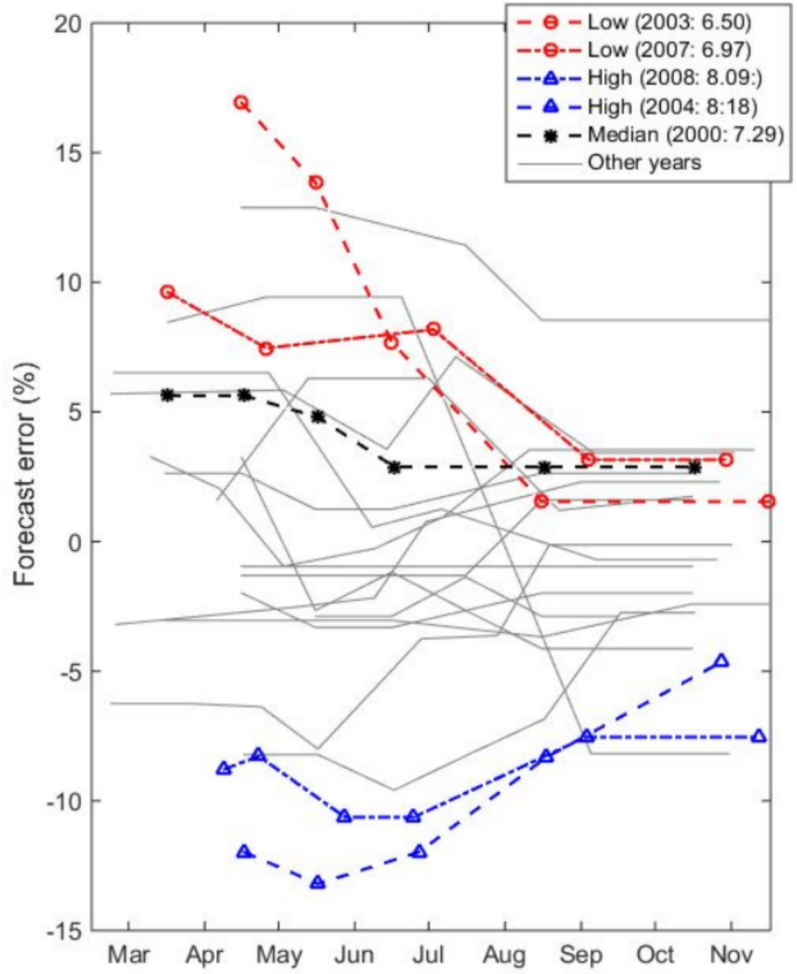
# Intra-seasonal performance – wheat

## France




## Germany



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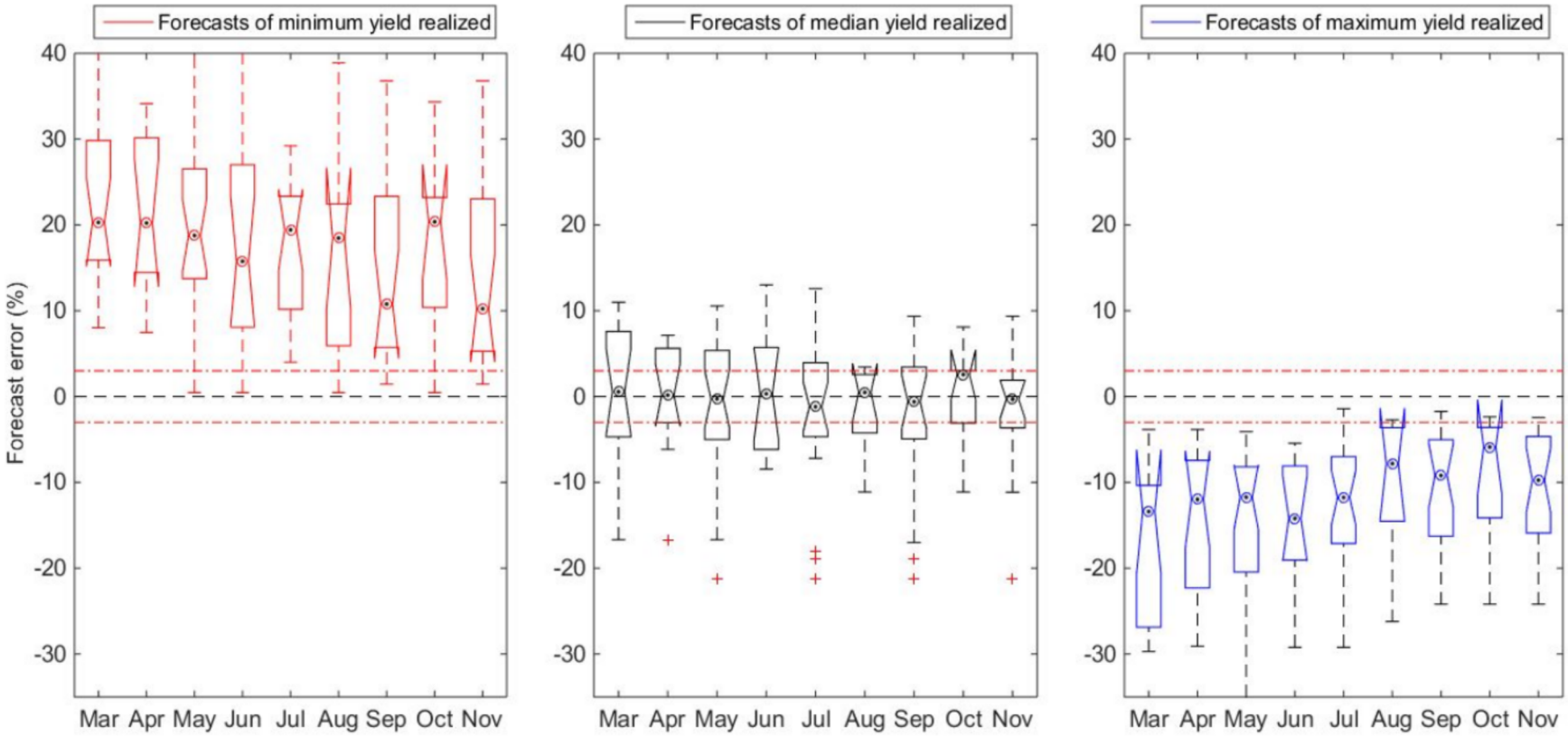
# Performance during extreme years

## All countries > analysts' feedback




- Improvements not obvious (but see next slide)
- No problem predicting the median yield! ;)
- Improvements but
- Underestimations



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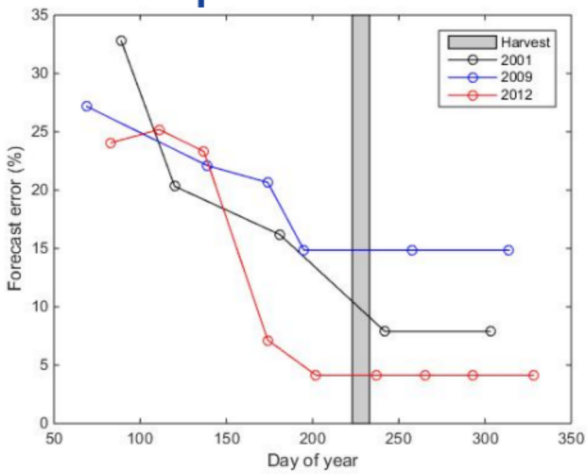
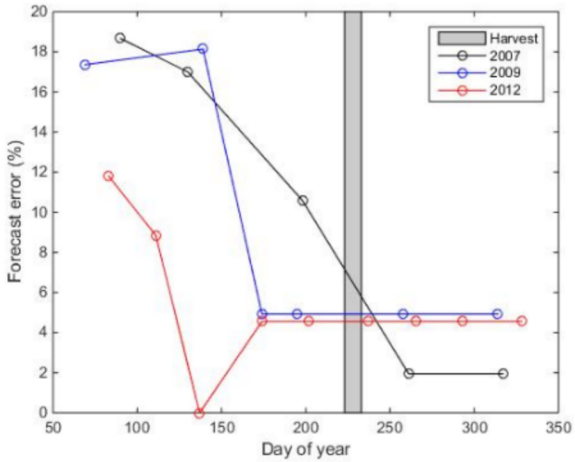
# Lead time in water-limited countries

## Low yields during dry years

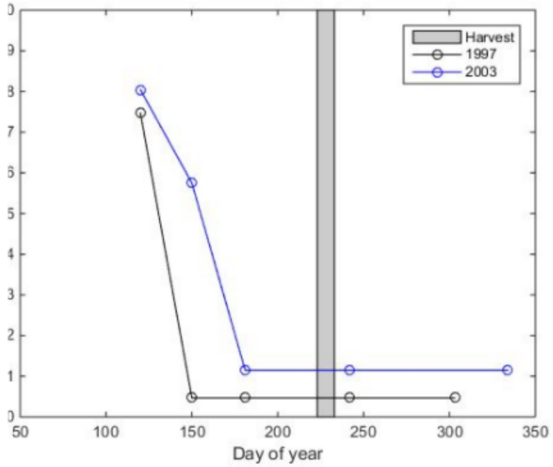
Spain




Hungary




Italy




Crop model captures water stress…



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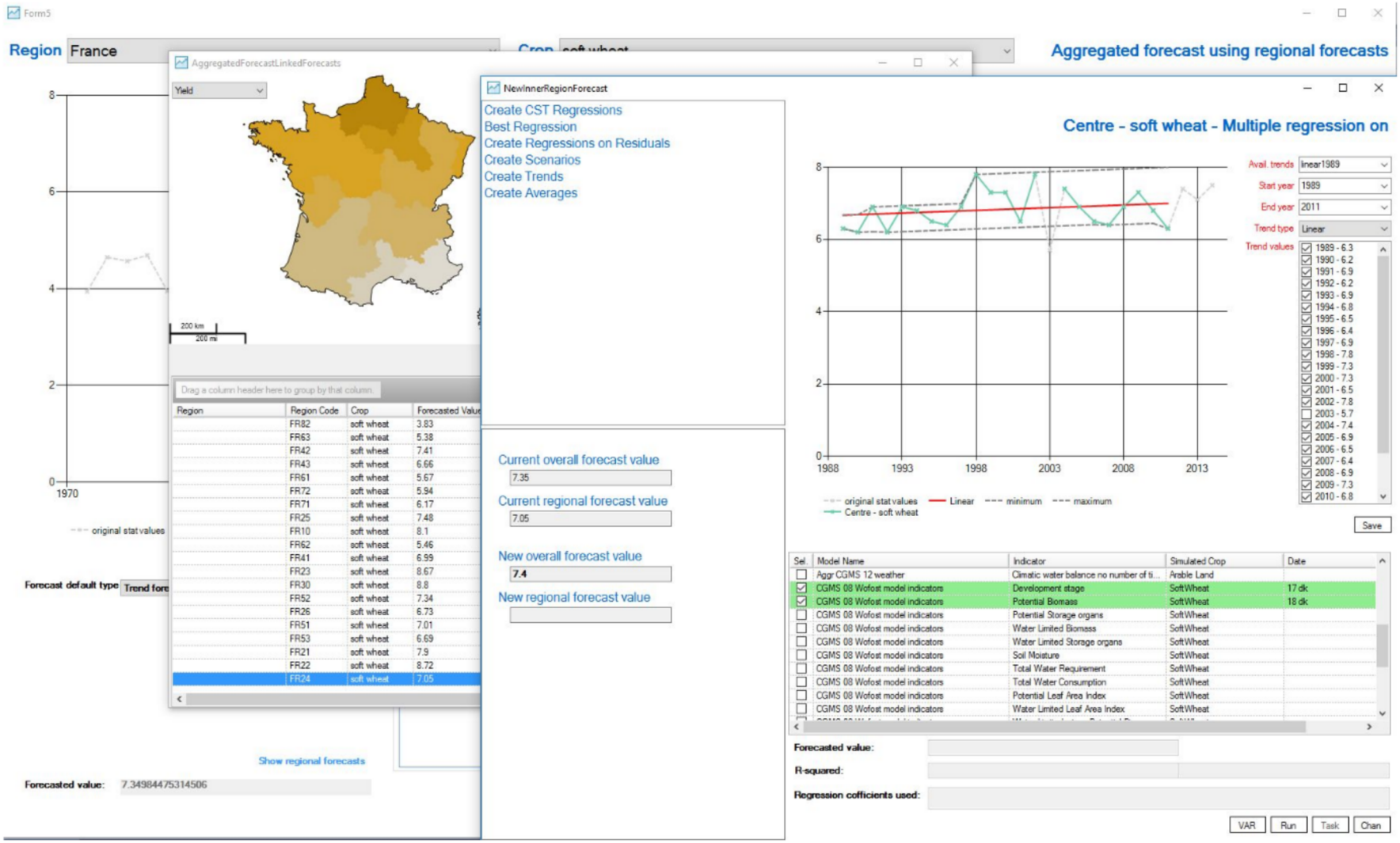
# Way forward - smart regional approaches




Not time consuming - automated



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# Talking points

- Mechanisms to translate research into operational crop yield forecasting
- Research activities that contribute to improve forecasts
  - Understand better the relationship of current predictors with past yield variability
  - Identify complementary predictors (e.g. new predictors)
  - Improve current components (e.g. improve the crop model simulations)
  - Improve statistical techniques (e.g. regression techniques)
- Explore new forecasting approaches (e.g. social media based, regional level)
- New ways needed to think about unprecedented extreme impacts (e.g. France 2016)
- Use Copernicus Sentinels (yield but also crop area mapping) in combination with new data sources (e.g. increasingly available LPIS farmers' declarations)
- Role of the analyst – analyst independent forecasts (e.g. see Canadian Crop Yield Forecaster)

# Stay in touch

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