III CGMS Experts meeting and GEOLAND training workshop

Arlon (Belgium), 23-25 October 2006

The B-CGMS project : evaluation after 5 years of monitoring and prediction

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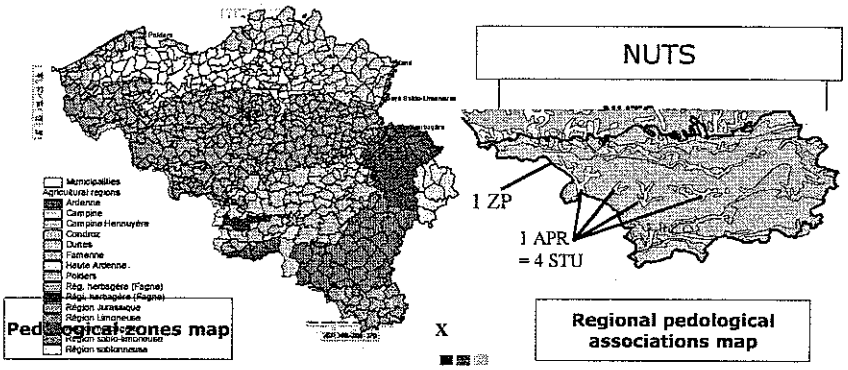
Introduction

- B-CGMS : adaptation of the European Crop Growth Monitoring System (CGMS) to Belgian conditions
- More detailed information/inputs



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Introduction

- Crop Yields predictions
  - Monthly basis
  - Growing season (April to September)
  - 6 crops
    - Winter wheat
    - Winter Barley
    - Maize
    - Sugar beet
    - Potatoes
    - Rapeseed (2006)

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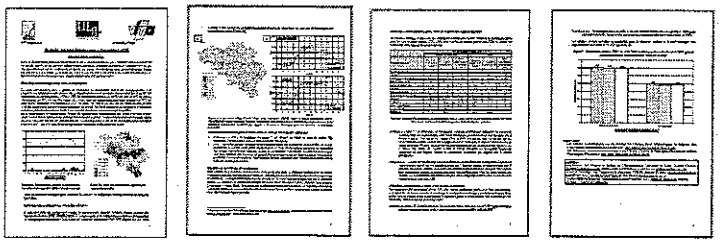
Introduction

- Crop Yields predictions
  - Published in agrometeorological bulletins (French / Flemish) sent by e-mail (since 2002)
    - Analysis of meteorological situation of the month (ULg)
    - RS information on the state of the crops (VITO)
    - Crop yields prediction (CRA-W) at agricultural circumscriptions/regions and national levels (CRA-W)



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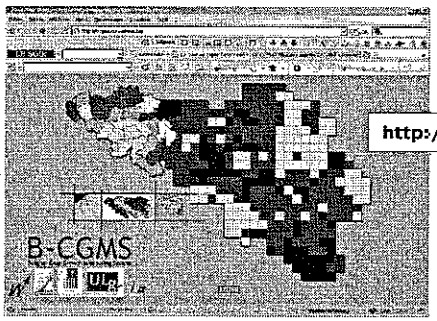
Introduction

- Crop Yields predictions
  - Published in a agrometeorological bulletins (French / Flemish) sent by e-mail (since 2002)
  - Information also available on B-CGMS website (currently modified / updated)



http://b-cgms.cra.wallonie.be

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Introduction

- Crop Yields predictions
  - Combination of linear regression models
  - Including different categories of yield indicators

Official yield= f(trend) + f(B-CGMS) + f(RS) + f(meteo)

PX915	Slope of DMP between decades 9 and 15 (growing phase)
OX915	Intercept of DMP between decades 9 and 15 (growing phase)
MI1618	Number of frost days from 1st December to 31st March
FROST2	Slope of DMP between decades 22 to 26 (decreasing phase)
NDVI(x)	NDVI value for decade x
WLYS	Water-limited yield of storage organs
	...

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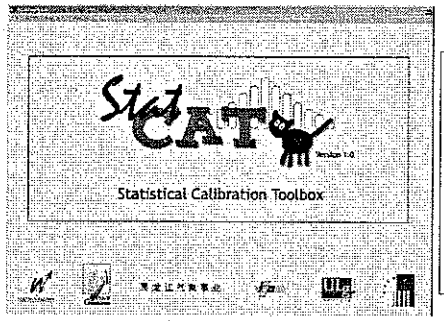
Introduction

- Crop Yields predictions
  - Combination of linear regression models
  - Including different categories of yield indicators
  - Semi-automated procedure (StatCat)



- setting-up of yield indicators (at the selected administrative level)
- Calibration and selection of models
- Validation (production of reports)

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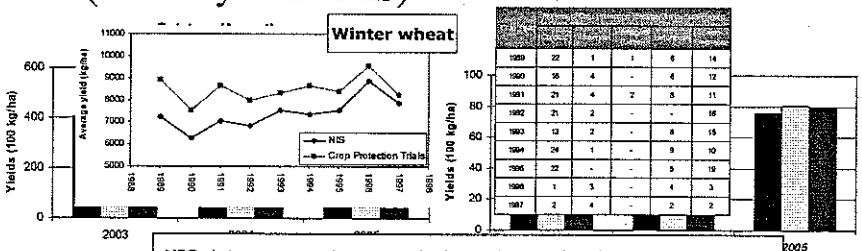
B-CGMS predicted yields vs. MARS predicted yields

- National level
- Necessity : to have a reliable dependant variable (official yields - NIS)



NIS data are consistent with data obtained independently from crop protection trials conducetd on a number of experimental sites (1989-1997 period)

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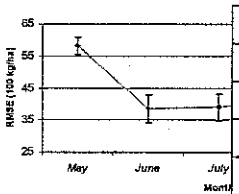
Official yields vs. B-CGMS Predicted yields

- Predictions accuracy (difference between official yields and published values in bulletins) according to the month for which the prediction is made.
  - Agricultural circumscriptions level

Fodder Maize



Crop	R^2 adj
Winter wheat	0.80
Winter Barley	0.78
Fodder maize	0.64
Sugar beet	0.67
Potato	0.57

…m (agricultural …une or July … accuracy in August and

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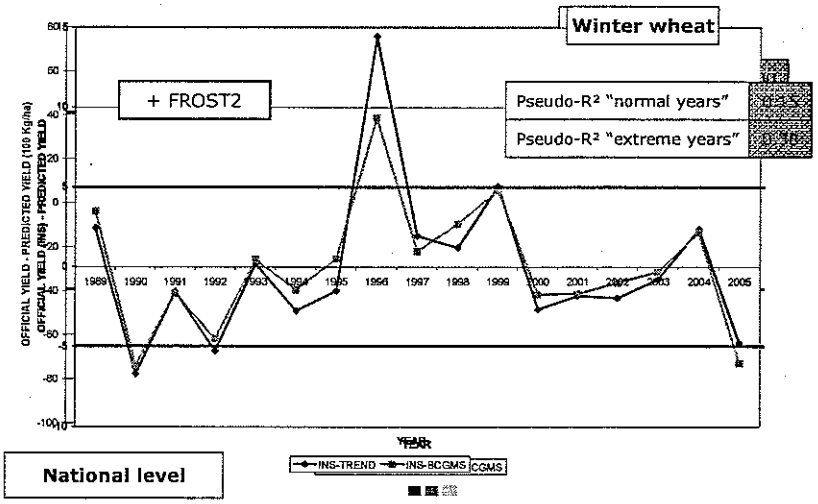
Difference of the quality of prediction according to the yields level range



National level

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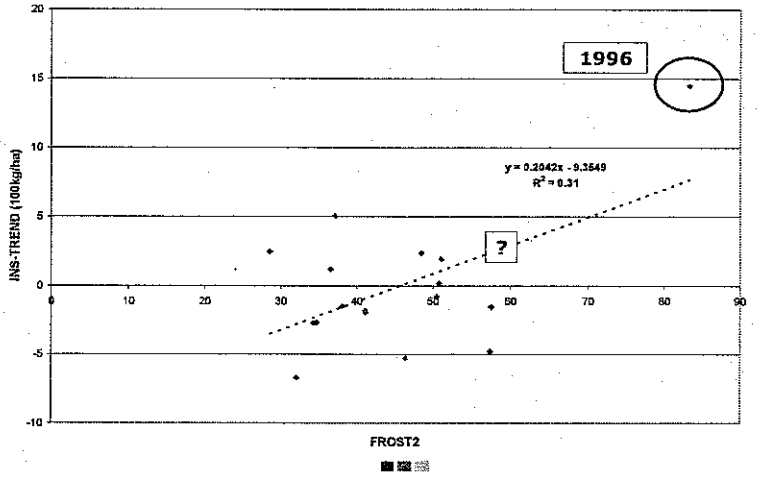
Influence of the yields level range on the quality of prediction



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Conclusions

- The most accurate predictions in Belgium are realised (in average) in June or July.
- Yield predictions are coherent compared with official yields particularly for extreme years
- Agrometeorological model is not efficient for some crops (e.g. winter wheat)
- Adding other yield indicators (e.g. FROST2) can improve the quality of prediction

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Perspectives

- Producing new model outputs in order to comply with end-users expectations (e.g. Potato, Sugar beet)
- Improvement of yield predictions for rapeseed
- Study the possibility to include new relevant meteo indicators
- Adjustment of some parameters as e.g. SPAN value on the basis of field information
- New statistical methods (StatCaT)

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