FACCE-MACSUR

WP3 C3.2 Inventory of data and data sharing mechanism for model linking and scaling exercises

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Abstract/Executive summary

This deliverable lays out the work as done as part of MACSUR CropM on 'Inventory of data and data sharing mechanism for model linking and scaling exercises'. In summary not much work was done, as it was found that there was not real demand for the activity in this task. The task in itself was servicing the other work as part of MACSUR, and as the service was not in demand, it was decided to take a low profile and wait for specific requests by partners for data in relation to model linking and upscaling.

Background

The task was originally conceived as an activity to service other parts of CropM (and potentially LiveM and TradeM) with finding good data sets available for model linking and scaling exercises. After its conception, it turned out as an impractical way of working, for a number of reasons:

1. Model linking was occurring in regional studies for a number of locations, where the regional partners quite independently brought in the relevant data;
2. Tasks on upscaling or uncertainty analysis as part of CropM had a good understanding of the data available for their work, and did not require additional suggestions for data sets;
3. In the first phase of MACSUR there were not that many assessments across disciplines that required cross disciplinary data to be available, or being suggested to the researchers.

All these reasons contributed to a decision as part of the WP3 leadership not too invest heavily on the task, and instead wait for any requests being made to the task by partners or activities in MACSUR that needed help in identifying suitable data sets.

This does not mean that it could not be of relevance to other tasks, mainly for :

- **Task C3.3: Comparison of scaling methods (Task leader: F. Ewert (P115),** partners involved: Challinor/ Foyer (P22), Vereecken (P159), van Ittersum/Janssen (P195), Höglind/Persson (P128), Olesen (P189), Rötter/ Salo (P92), Ruget (P196), Makowski (P167), Kersebaum (P147), Müller (P83), Eckersten/Arneth (P 94/163), Basso (P62), Kiese (101), Topp/Rees (P47), Tychon/François/Djaby (P51)), **Duration:** Month 7 – 32 In this task scaling methods will be compared and evaluated for different purposes. Different scaling exercises have been identified referring to specific regions and scaling problems (e.g. changing the scale of model application, scaling impact variable, etc.). The activities in this task refer each to one scaling case study. All case studies follow the same structure with the steps (i) define scaling purpose including the definition of the regions and the impact variable (e.g. productivity, GHG emission), (ii) specify scaling methods to be evaluated, (iii) evaluate model and scaling method and (iv) determine uncertainty of scaling methods. The following activities are proposed but further activities can been added in the course of the project.
- **Task C4.3: Development of climate scenarios and assess uncertainties in climate projections (Task leader: M. Semenov (P25),** partners involved: Carter/Fronzek (P92), Challinor/Foyer (P22), Pasqui/Tomozeiu/Bindi/ Orlandini/Deligios (P62), Huard (P175), Bergez (P206), Frühauf (P99), Ruiz-Ramos/Minguez (P24) Eckersten/Arneth (P163/94)), **Duration:** Months: 1-32. Climate projections are now available in the form of multi-model ensembles from global and/or regional climate models. Ensembles of projections emphasize the uncertainty in our understanding of the evolution of climate resulting from model structural differences as well as uncertainty in model parameters. Direct use of climate projections from multi-model ensembles in conjunction with process-based impact models is often inadvisable, because projections are available only at a coarse spatial resolution (relative to the scale of farm-level crop production) and often have a bias. Yet, non-linear process-based models depend on local-scale weather as one of their main inputs. RRes will extend the ELPIS dataset of climate scenarios (Semenov et al., 2010) to incorporate the EU-ENSEMBLES set of regional climate model

outputs, as well as CMIP5 ensembles of global climate model outputs. Climate scenarios will be delivered in two forms: (see, Deliverables). Statistical downscaling methods will also be used to produce climate change scenario data at local scale (stations or grid points) of mean and extreme values of temperature and precipitation. Moreover, available high resolution numerical downscaled climate scenario data will be utilized to analyse future variability at daily time scale over Europe and the Mediterranean basin, and, when it is possible, at temporal scale as required by different impact models.

There are also relevant data sources available that could be useful for upscaling and model linking exercises, for example:

1. A Integrated data base on European Agricultural Systems: Janssen, S., Andersen, E., Athanasiadis, I. N., & Van Ittersum, M. K. (2009). A database for integrated assessment of European agricultural systems. Environmental Science & Policy, 12(5), 573-587. doi: 10.1016/j.envsci.2009.01.007
2. Weather data underlying the MARS-OP yield forecasting service: JRC. (2008). Meteorological data Source JRC/AGRIFISH Data Base - EC - JRC. Retrieved 15 February, 2008, from http://agrifish.jrc.it/marsstat/datadistribution/
3. Farm Accountancy Data Network: EC. (2008). Farm Accountancy Data Network (FADN) Source: EU-FADN-DG AGRI-G3. Retrieved 15 February, 2008, from http://ec.europa.eu/agriculture/rica/
4. European Soil Map: ESBN. (2008). European Soil Database. Retrieved 15 February, 2008, from http://eusoils.jrc.it/esbn/Esbn_overview.html
5. Corine Land use and Land cover map
6. Zonations and statistical resources maintained by international organizations, such as:
    a. FAO STAT
    b. UNEP
    c. FAO Agro-ecological Zoning
    d. World Resource Institute
    e. GTAP data base
    f. ISRIC soil database
    g. CGIAR AgTrials on experimental data
7. Remote sensing sources:
    a. LANDSAT
    b. MODIS
    c. In the future, Copernicus with Sentinels

Next to these sources with a coverage of a large extent and resolution, there are also many relevant data sets at regional or country level that are available to the research institutes part of MACSUR and used in the regional studies.