

### **FACCE-JPI Knowledge Hub**

SUR

### Modelling European Agriculture with Climate Change for Food Security

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## FACCE Knowledge Hub (summer 2011)

MÁCSUR

- Network of selected research groups from JPI Member countries within a defined area of research (concept: 'Networks of Excellence')
- Instrument developed by FACCE JPI to foster transnational co-operation, collaboration and communication of the research communities in the field of FACCE
- Facilitate networking and information exchange



# Knowledge Hub

- Brings together research groups that already have funding in a thematic area
- Support given can be coordination costs, travel expenses and thematic workshops
- Countries may choose to support research and/or mobility of researchers



## Process

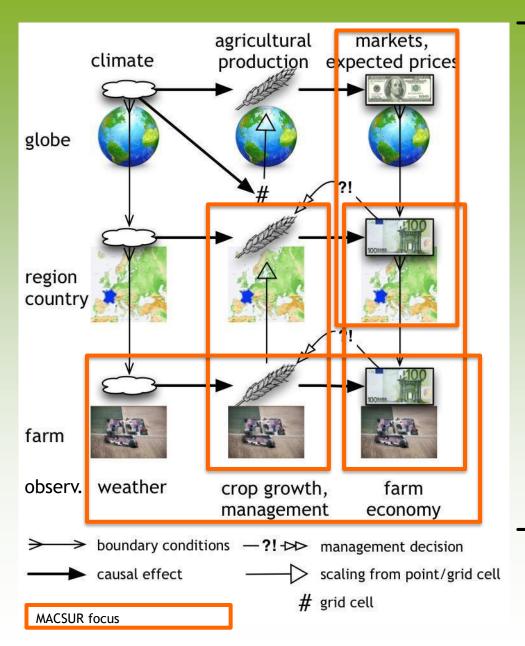
- Letters of intent (96 submitted, September 2011) and 74 are invited, following selection in the participating countries
- FACCE JPI Pilot Action Networking meeting (October 2011), and agree on the leadership of the Knowledge Hub
- Submission of proposal (December 2011)
- Post evaluation meeting (March 2012)
- Launch MACSUR (June 2012)



## Two phases proposed

• MACSUR proposed a two step approach, with a first phase (2012-2015), and anticipating a second phase, which in fact also started in 2015 (2015-2017)





MACSUR's mission: Improving the modelling cascade for interdisciplinary



and multi-scale integration

affordable food



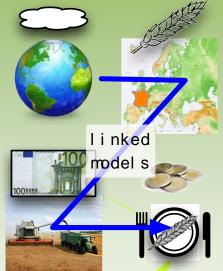
# Key activities in MACSUR

- Good-practice approaches/guidelines
- Model comparison & improvement
  - model description, output comparison, new approaches
- Uncertainty and risk assessments
  - data, assumptions, scaling, model linking, new approaches
- Regional case studies: impacts, adaptation
  - description, output comparison, new approaches
- Capacity building: courses, staff exchange
- Impact assessments for Europe & regions
  - Adaptation and mitigation options, sustainability aspects
- Networking: meetings, new projects, global: AgMIP et al.
- Involvement of stakeholders (EU, national, regional)

### COLOR COLOR

# MACSUR's aims

- improve and integrate models
  - crop and livestock production, farms, and national & international agri-food markets
- improve integration & links
  - of models for selected farming systems and regions



- provide hands-on training
  - to junior and experienced researchers in integrative modeling
- identify risks and consequences of adaptation and mitigation in agriculture for better availability, accessibility & affordability of food



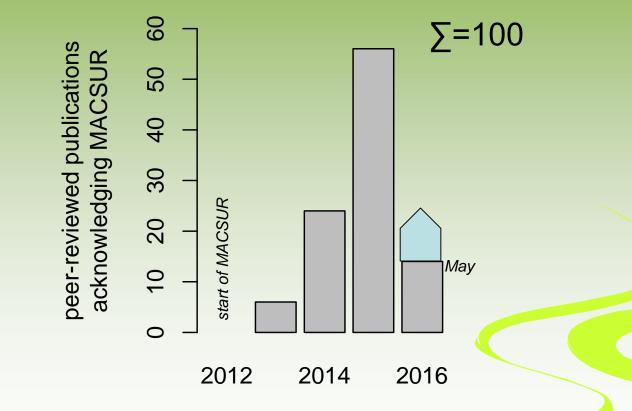
- MACSUR (3 yr) 2012-2015
   17 countries, 0-1M €/cntry
   180 members
- MACSUR2 (2 yr) 2015-2017
   18 countries,
   300 members
- output after 4 years
  - 310 papers/chapters
  - 200 reports
  - 500 presentations
  - 31 workshops/conferences
  - 13 funded new projects
  - 24 PhD/MSc students



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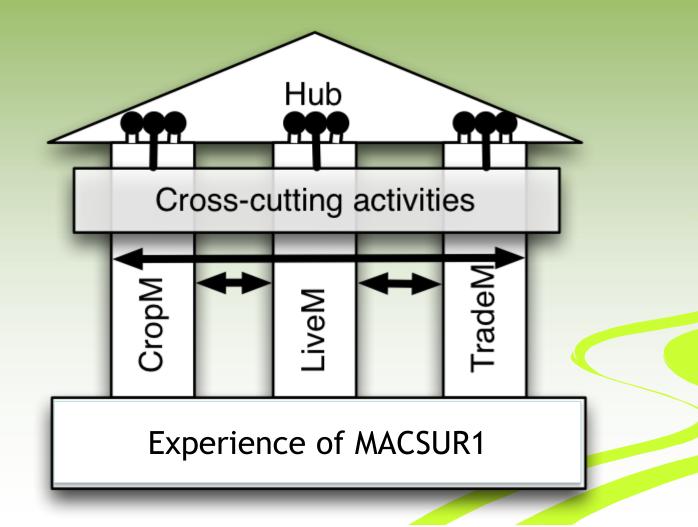
## Quality and impact take time



Peer reviewed articles (reviews and original research) acknowledging MACSUR, based on Web of Science and additional information and as of May 2016.



## MACSUR2: Work in XC Activities







### FACCE MACSUR Modelling European Agriculture with Climate Change for Food Security - a FACCE-JPI knowledge hub -Project Steering Committee Project Leadership Team (PLT): M. Banse, F. Brouwer, Ch. Foyer, R. Rötter, N. Scollan F. Ewert, A. Bannink, F. Sinabell | Management: M. Köchy XC (Crosscutting) TradeM • F. Brouwer, F. Sinabell LiveM • N. Scollan, A. Bannink CropM • F. Ewert, R. Rötter Activities T1: Model comparison and improvement L1: Grassland and farm-scale modelling C1: Model comparison and improvement XC5: Interaction with stakeholders G. Bellocchi C. Kersebaum, M. Bindi · PLT, M. Köchy E Sinabell C1.1: Model response to variable site conditions on crop prode C1.2: Data management, analysis and presentation • M. Tinka T1.1: Contributions to XC1 • F. Brouwer L1.1: Modelling grassland vulnerability to climate change • G. Bellocchi roduction and ecosystem services • C. Kersebaur T1.2: XC16.1 Stakeholder-centered expectations • F. Brouwer T1.2: XC16.2 Developing a general framework for RAPs • A. Blewald T1.2: XC16.4 Specifying the scenarios for the case studies • M. Schör L1.2: Modelling grassland quality under climate change • P. Virkajärvi L1.3: Bringing together grassland and farm-scale modelling • M. Höglind L1.4: Reusing and linking models in livestock farming • N. Hüchings XC1: Model comparison and improvement C1.3: Long termeffects of management and cropping systems on crop production and e C1.4: Extend crop model assessment to more cropping systems • M. Bindi G. Bellocchi T1.3: Interaction with International networks • E Brouwer T1.4: Dissemination activities • E Brouwer C1.5: Incorporation of diseases and pests in crop models • S. Savary C1.6: XC1.1 Survey on model improvement needs • M. Bindi XC16: Overall scenario development • A. Biewald, C1.7: XC1.3 Establishing links to other r esearch activities ... • E. Haas L2: Livestock productivity H. Lotze-Campen N. Lacetera \_ L2.1: Impacts of climate change on animal health, disease and productivity • N. Lacetera L2.2: Impacts of Impaired health, disease and productivity change on GHG emissions • **5**. Octain L2.3: Modelling adaptation to climate change • **K**. Topp L2.4: Modelling integrat climate change in the time scale • J. van Middelkoop, A. Wilson C12: Earm-scale risk assessment C2: Data management, analysis and presentation T2: Scientific advancements supporting integrated assessment approaches · J. Olesen, M. Trnka • in C3, L1, T2 • Ø. Hoveid C2.1: Data compilation, management and presentation • S. Janssen C2.2: Climate change scenarios • M. Semenov C2.3: Quantify gaps for crop modelling • J. Olesen T2.4: XC9.2 Explaining yield gaps in Europe • A. Zimmermann XC14: Impacts on ecosystem services and rural T2.4: XC9.3 Sustainable options to reduce yield gaps • H. Lehtonen T2.5: Farm-scale risk assessment • NN L3: XC activity tasks led by LiveM C2.4: Observed adaptation options and their efficacy • M. Tinka C2.5: Empirical analyses of crop responses to climatic variation • J. Olese development • K. Helming T2.6: XC14.1 Analytical framework and indicators for ecosy ment • K. Helmin \_ T2.6: XC14.2 Mapping of model outputs from the European Assessment and from the regional case studies • M. Schönhart I31 XC12 General framework for model evaluation and companion \* G Belocch I22 XC4 I Development of Integrated training strategy - + E Benham I23 XC42 Companion of Care sublice Integrating development of Caretia of companion 1. Delpared I33 XC22 Companion Care sublice Integrating development of Caretia of companion 1. Delpared I34 XC21 Providing encembles of CE - valid global companion rates of granoward global charges - 4. Reinfel I35 XC10 Companion discretisticated development of the company I35 XC10 Company discretisticated development I35 XC10 Company discretisticated I35 XC10 Company I35 XC10 Comp T2.6: XC143 Definition of gaps in ecosystem service assessment • M. Schönhart (C11: The animal feed story (feed quality, feed utilisation and protein availability) . B. Ammon, A. Bannink C3: Methods of scaling and model linking • E Ewert S Janssen XC8: Understanding the impacts of extreme C3.1: Review progress in scaling methods and supervision of activities in WP C3 • F. Ewert C3.2: Development of a joint data sharing mechanism for scaling exer clses • S. Janssen events . R. Tiffin T3: Cross-cutting issues in hot-spot areas C.4.2: Development of a junt axia sharing mechanism for sound save cross • 5. Januar C.3.3: Comparison of scaling methods of 6. Event C.3.4: Evaluation of scaling methods for other or ops, regions and impact variables • F. Event C.3.5: Application of scaling methods for integrated assessment of clinicat charge integration in Except • F. Event C.3.6: XC2.1: Inventory of scaling methods across crosp. farm and economic models • F. Event, C. Hoftmann • G Dono T3.1: XC6.1 Integrated a nt modelling at the regional case study scale • K. Mittenzwei, P.P. Roggero (C10: Contributions of new technologies to 12.2 XCI 1/16 Common baselines for integrated EU-vide impact assessment • A. Zimmenman, In Theodelin T3.2 XCI 1/16 Common baselines for integrated EU-vide impact assessment • A. Zimmenman, Bitz T3.2 XCI 5 Departing of the BU-vide impact assessment of ensemble runs • A. Zimmenman, Bitz T3.2 XCI 5 Departing of the BU-vide implicit shared assessment of ensemble runs • A. Zimmenman, Bitz T3.2 XCI 5 Departing of the BU-vide impact shared assessment of ensemble runs • A. Zimmenman, Bitz T3.2 XCI 5 Departing of the BU-vide impact shared assessment of ensemble runs • A. Zimmenman, Bitz adaptation and mitigation (T3.3) • NN XC13: Impact of consumer behaviour (T3.6) T3.3: Contributions of new technologies • TBA T3.6: Impact of consumer behaviour • A. Milford A. Milford C4: Uncertainty and risk assessment · R. Rötter, M. Semenov, D. Wallach C4.1: Comprehensive framework for assessment of error and uncertainty in grop model predictions • D. Wallach, D. Cammarano XC2: Scaling C4.2: Best practices for building and analyzing the results of multi-model ensembles • **D. Walach** C4.3: Analyzing model ensembles • **D. Walach** C4.3: Analyzing model ensembles • **D. Walach** • E Ewert C4.4: Probabilistic ensemble-based assessment of region-specific adaptation options + M. Ruiz-Ramos C4.5: Crop ideotyping for future conditions using single/multiple crop models + M. Semenov T4: Capacity building in integrated modelling and policy assessment C4: Capacity building · E. Schmid C4.6: Model uncertainty quantification · E. Haas · E. Saetnan T4.1: XC4.3 Course on agricultural production and environmental modeling • E. Schmid T4.2: XC4.4: Co-operation in capacity building activities with inter national partners • E. Schmid of to uncertainty • E Haas T C4.8: XC3.2 Establishing links to other research activities in the field of uncertainty assessment and quantification • E. Haas XC3: Uncertainty and risk assessment E. Haas C5: Capacity building The MACSUR community consists of c. 300 MACSUR aims at I.R. Porter XC6: Regional case studies C5.1: Continuation of provision of PhD courses for interested students and post-docs • J.R. Poter C5.2: XC 4.2 Development of a multidisciplinary e-lear ning course almed at MSc and PhD students researchers in 18 countries. collaboration across scientific disciplines, · P. Roggero, G. Dono, T. Dalgaard ints • J.R. Porter • interacting with decisionmakers, farmers, and agrifood chain Impact assessment for Europe MACSUR started in June 2012 and is capacity building of junior and senior scientists · A. Zimmermann, Th. Heckelei, F. Ewert, S. Rolinski applying methods in regional case studies currently funded till May 2017. C6: Cross-cutting issues · P.P. Roggero, R.B. Matthews providing a pan-European assessment of CC impacts on agric. XC9: Identifying sustainable opportunities to close yield C6.1: XC6.3 Synopsis of case studies from a Europeen perspective and comparison with results by XC7 • P.P. Roggero, T. Dalgaard gaps in Europe • M. van Ittersum, R. Schils C6.2: XC7.2 Providing ensembles of EU-y ant sets of cr op yield changes • E Ewert C6.3: XC9.1 Quantifying yield gaps • M. van Ittersum, R. Schils C6.4: XCI51 Overview on studies and research activities relevent for GH tion • E. Haas C6.4: XCI5 I CURVENUES AND A CONTRACT OF A C C15: GHG mitigation from agriculture • F Haas Coordination: M. Banse/M. Köchy Management: F. Brouwer/F. Sinabell Management: R. Kipling Management: K. Brüser



## Organisation

- Project Steering Committee (3 × 2 + 2)
   □→ Project Leadership Team (3 × 1 + 2)
- Theme Leaders
  - WP leaders
    - Task leaders  $\Rightarrow$  Cross-cutting activities
      - Collaborators



### How to strengthen modelling capacity?

- A detailed comparison of models that are available in the three Themes
- Clarify the strengths and weaknesses of individual models, indicate uncertainty of results as well as the needs for further model improvements



## Knowledge Hub: Strengths

- Multidisciplinary topics
- Interaction with other disciplines

   exchange of knowledge, views, approaches
- Enhanced visibility, global collaboration; interaction with external stakeholders (food chain, decision makers)
- Greater pool for new collaboration
- Resource for capacity building



# Knowledge Hub: Weakness

### Heterogeneity in funding

- 0-1 M€/country in MACSUR1, for different purposes
- Funding contracts delayed, with different dates
- National rules on reporting and admin

### In-kind funding

- requires bottom-up planning, limits coherence of work
- limits identification with project and attribution
- limits available time and staff
- Slow reaction to changes in stakeholder demands
- Few staff for management/coordination



## Knowledge Hub: Opportunities

- Major societal issue (food-water-climate)
- Funding for an interdisciplinary topic
- Input from stakeholders, which adds to the impact
- Collaboration on emerging topics by subgroups



## Knowledge Hub: Threats

- Greater attractiveness and precedence of global initiatives
- Variable support of national governments
- Great and many expectations low input
- Incoherence of external and internal goals, uncertain future



## Conclusions

- Partners need a clear vision of the benefits they will gain through collaboration
- Regular scientific events are essential to make a vision explicit
- Balance bottom-up driven decisions with topdown directions (e.g. external contacts, reporting requirements, intellectual property rights)



### Lessons from Knowledge Hub

- Balance in-kind versus fresh funding among partner countries; be prepared for the time needed to manage a knowledge hub
- New research is funded by fresh money
- Equal eligibility rules for knowledge hub members to participate in meetings
- Priority to a clear scientific focus
- Limit reporting to national funding agencies