

# **Developing science-based policy advice**

**Report - PhD Summer School 2019**

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## **Thünen Working Paper 140**

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## Zusammenfassung

Das Thünen Institut hat eine Sommer Schule zum Thema wissenschaftsbasierten Politikberatung vom 12. bis 16. August 2019 in Braunschweig und Trenthorst organisiert und durchgeführt. Sechzehn Doktoranden\*innen des Bundesamtes für Landwirtschaft und Ernährung (BLE) aus Afrika und dem Iran nahmen daran teil. Im Rahmen der Sommerschule hielten Experten aus dem Bereich der wissenschaftsbasierten Politikberatung mit verschiedenen wissenschaftlichen Vorträgen und die Teilnehmenden führten eine Exkursion zum Thünen Institut für Ökologischen Landbau durch. Darüber hinaus machten die Teilnehmer eine praktische Übung und Rollenspiel zur Vorbereitung und Präsentation zu fiktiven Politikanfragen. Dieses Arbeitspapier fasst alle Vorträge und Ergebnisse zusammen und spiegelt die aus der praktischen Übung gewonnenen Erkenntnisse wider.

## Summary

The Thünen Institute organized and hosted a PhD-Summer school on science based policy advice took place in Braunschweig and Trenthorst from the 12<sup>th</sup> to 16<sup>th</sup> August 2019. During the summer school professionals in the field of giving policy advice based on scientific facts with different scientific backgrounds gave lectures and an excursion to the Thünen Institute of Organic Agriculture was done. Participants were 16 stipends PhD stipends of the Federal Office for Agriculture and Food (BLE) from Africa and Iran. This working paper summarizes all lectures and results, as well as reflections from lessons learned from the practical exercise.

## Acknowledgements

The entire summer school was funded by the Federal Office for Agriculture and Food (BLE). We thank Maja Clausen, Frank Offermann, Kathleen Frühauf, Bernhard Osterburg, Claus Deblitz and Gerold Rahmann for sharing their expertise during lectures and the excursion on science based policy advice. Moreover, we thank Heidi Haavisto-Meier and Birgit Prietzsch for the support in the organisation and handling of the summer school. Ariane Bystry we thank for her advice and participation. Finally, we thank all colleagues, who attended the presentations in the last two days.

## 1 Background

This report reflects the main content as well as the presentations of the summer school 2019 on “Science-based policy advice”, organized by the Thünen Institute where it also took place from the 12<sup>th</sup> to 16<sup>th</sup> August 2019. The participants of the summer school were PhD stipend holders of the Federal Office for Agriculture and Food (BLE) from Africa and Iran. The Summer School 2019 was financed by the BLE.

During the summer school the following questions were examined:

- How does science-based policy advice work?
- How does it work in Germany?
- How can it be done in African countries and the Iran?
- What must be considered when writing science-based policy statements?

Aside, some soft skills were trained such as:

- capacity to work in an interdisciplinary team
- capacity to work under time pressure
- increase intercultural competences
- practice of rhetorical skills

As one of the institutes under the mandate of the German Federal Ministry of Food and Agriculture (BMEL), the Thünen Institute is often requested to provide science-based policy advice for the ministry, for other governmental institutions, international bodies, NGOs, political parties and farmers unions. Since the institute works in rural areas, fishery and forestry, it can provide information on a large range of different topics and crosscutting areas.

The summer school lecturers are professionals in the field of giving policy advice based on scientific facts. They work as scientists in different Thünen departments, the Thünen overarching coordination unit climate and soil, at the National Meteorological Service of the Federal Republic of Germany (DWD) and also at the Federal Ministry of Food and Agriculture (BMEL). During an excursion to the fields and stables of the Thünen Institute of Organic Agriculture, the participants learned how research questions are developed in the field and fed into policy advice to follow changes in the agricultural sector.

In the last days of the summer school program, participants developed their own policy statements based on a fictional policy request and presented them during a concluding simulated session with policy makers.

## Summer School 2019: Research-based Policy Advice, How does it work?

Thünen Institute - Federal Research Institute for  
Rural Areas, Forestry and Fisheries



Bundesallee 50, 38116 Braunschweig, Germany

**12<sup>th</sup> August – 16<sup>th</sup> August 2019**

Summer School location: Forum Thünen Institute

| <b>SUNDAY</b><br>Arrival   |  |                                  |
|----------------------------|--|----------------------------------|
| <b>MONDAY August 12th</b>  |  |                                  |
| 8:30 – 9:00                | Arrival at Summer School and Reimbursement Procedure   | selected participants            |
| 9:00 – 10:30               | Introduction<br>Participants get to know each other  | Aida Gonzalez and Veronika Jorch |
| 10:30 – 12:00              | BMEL's perspective on research-based Policy Advice   | Andrea Rothe and Maja Clausen    |
| 12:00 – 13:00              | Lunch  |                                  |
| 13:00 – 14:30              | Practical example of research-based policy advice: ex-ante market analysis with AGMEMOD                          | Aida Gonzalez                    |
| 14:30 – 16:00              | Some theory and practical lessons from 25 years of model-based policy advice by the Thünen Model Network         | Frank Offermann                  |
| <i>Social Event</i>        | <i>Evening Event for Participants</i>  |                                  |
| <b>TUESDAY August 13th</b> |  |                                  |
| 8:00 – 9:00                | Reimbursement Procedure  | selected participants            |
| 9:00 – 10:30               | Practical example of research-based policy advice: - Greenhouse gases  | Bernhard Osterburg               |
| 10:30 – 12:00              | DWD, INKA Practical example of research-based policy advice: the case of climate impacts                         | Cathleen Frühauf                 |
| 12:00 – 13:00              | Lunch  |                                  |
| 13:00 – 15:00              | Introduction of the Summer School project<br>Participants were divided into groups according to their PhD topics | Aida Gonzalez and Veronika Jorch |
| 15:00 – 17:00              | Summer School project  | All participants                 |

| <b>WEDNESDAY August 14th</b>   |  |  |
|--|--|--|
| 8:00 – 9:00  | Reimbursement Procedure  | selected participants                  |
| 9:00 – 10:30   | How to write policy advisory statements<br>Practical examples                                      | Claus Deblitz                          |
| 10:30 – 11:00  | Presentation of study: “Scientists studying abroad”<br>by the Technical University of Braunschweig | Meike Faflik                           |
| 11:00 - 12:30  | Practical exercise: writing policy advisory<br>statements  | all                                    |
| 12:30 – 13:30  | Lunch  | all                                    |
| 13:30 – 16:00  | Summer School project  | all                                    |
| <i>Social Event</i>  | <i>Group dinner</i>  | all                                    |
| <b>THURSDAY August 15th</b><br><i>Visit to Thünen Institute of Organic Farming in Trenthorst</i> |  |  |
| 8:30 – 11:00   | Travel from Braunschweig to Trenthorst<br><br>Time to work on the Summer School project            | all                                    |
| 11:00 – 12:30  | Developing research questions in the field, feeding<br>into politics – linking back to the field   | Gerold Rahmann                         |
| 12:30 – 13:30  | Lunch  | all                                    |
| 13:30 – 15:30  | Visit to the experimental fields and stables in<br>Trenthorst                                      | Thünen Institute of Organic<br>Farming |
| 15:30 – 19:00  | Travel from Trenthorst to Braunschweig<br>Time to work on the Summer School project                | all                                    |
| <b>FRIDAY August 16th</b>  |  |  |
| 8:00 – 9:00  | Reimbursement Procedure  | selected participants                  |
| 9:00 – 10:30   | Time to work on the Summer School project  | all                                    |
| 10:30 – 11:00  | Coffee break   | all                                    |
| 11:00 – 12:00  | Presentations of Summer School Projects<br>(Part 1)  | all                                    |
| 12:00 – 13:00  | Lunch  | all                                    |
| 13:00 – 15:00  | Presentations of Summer School Projects<br>(Part 2)  | all                                    |
| 15:00 – 15:30  | Wrap-up  | all                                    |
| 15:30 – 16:00  | Concluding remarks of the Summer School  | Aida Gonzalez and Veronika<br>Jorch    |
| <b>SATURDAY</b><br>Departure   |  |  |

## 2 Introducing science-based policy advice - Monday 12<sup>th</sup> August

### 2.1 BMEL's perspective on research-based Policy Advice

Lecturer: Dr. Maja Clausen (BMEL)

The BMEL research policy follows four research clusters:

1. Future of Rural Areas
  - High quality of life, strong economic sectors and efficient fostering
2. Sustainable Agriculture
  - Responsible and resource conserving soil management and animal husbandry
3. Healthy Life
  - Health, good nutrition and safe products
4. Global Responsibility
  - Ensuring global food security and responsible resource management
  - This responsibility has been transferred to federal research institutes

The Thünen Institute, is, as are the Friedrich Löffler Institute (FLI), Julius Kühn Institute (JKI), Max Rubner Institute (MRI) and the Federal Institute for Risk Assessment (BfR), federal research institutes under the mandate of the BMEL. They provide scientific input for the policy decisions, such as consumer protection policies and decisions in ad hoc crisis situations.

Internationally, the BMEL federal research activities contribute to:

- Engagement in scientific exchange and progress
- Creation of enduring international alliances
- Contribution to capacity building

A core topic is the global food security and nutrition.

### 2.2 Some theory and practical lessons from 25 years of model-based policy advice by the Thünen Model Network

Lecturer: Dr. Frank Offermann (Thünen Institute of Farm Economics)

The presentation started with some theory on science based policy advice. There are different ways (or 'models') of how the two subsystems of science and politics interact. Habermas<sup>1</sup> developed the Technocratic, the Decisionistic and the Pragmatic model to describe these interactions.

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<sup>1</sup> Habermas, Jürgen (1971): Toward a Rational Society.



According to the *Technocratic model*, science provides recommendations on political goals and the necessary measures to reach these. This model is often criticized since it undermines democratically legitimized processes of political decisions. Value judgements remain hidden and the responsibility for actual outcome remains unclear. In practice, this approach is often observed when new (technically complex) policy issues arise, or in times of widespread distrust in the political establishment.

The *Decisionistic model* is characterised by stronger power of the decision makers. The policy maker determines the objectives, researchers analyse how these can be reached and the policy makers implement the scientific recommendations. This model is criticized since the division of work between science and policy implicates that facts and value judgements, as well as means and ends, can be clearly separated. However, goals and their potential conflicts and synergies are subject to constant re-evaluation in the light of intended and unintended outcomes, which requires a continuous dialogue between science and politics.

The third model, *the Pragmatic model*, explicitly includes the public as an important actor. The objectives and means are determined by discourse between researchers, policymakers and the public. The role of research is to provide input, but do not determine objectives or means. The pragmatic model has many variants (e.g., „co-production“, „deliberative“, „co-evolutionary“... ).

Edenhofer<sup>2</sup> has developed the "Pragmatic-Enlightened model" to describe science based policy advice. Following this model, goals are set coordinated between science and society. The corresponding policy objectives and their means are evaluated regarding the practical consequences. The policy objectives might need to be reviewed again in a later stage, when new knowledge on secondary effects, side effects or synergies appear<sup>3</sup>. Thus, the process of policy making needs to be adaptive to new situations.

### **Systematic preconditions for science-based policy advice**

For successful science-based policy advice a few preconditions have to be in place. Some indispensable requirements for science-based policy advice between science and society are:

- Objectivity
- Transparency, Public information
- Distance (Independence)
- Plurality

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<sup>2</sup> Edenhofer, O. (2011): Modelle der wissenschaftlichen Politikberatung. Vortrag bei der Veranstaltung, 'Zur gesellschaftlichen Verantwortung von Wissenschaft am Beispiel der Klimawissenschaften', PIK und Humboldt-Universität School of Governance, 16. August 2011.

<sup>3</sup> Edenhofer, O. and Kowarsch, M. (2015): Cartography of pathways: A new model for environmental policy assessments. *Environmental Science and Policy* 51, pp. 56–64. Online: <http://dx.doi.org/10.1016/j.envsci.2015.03.017>

Objectivity is a basis for scientific policy advice. Objectivity in the sciences is above all a result of a meaningfully organized scientific process and less the consequence of the objectivity of the individual scientists<sup>4</sup>.

The transparency of the overall decision-making process is important, so that society can track and trust the arguments for the decisions and policies made<sup>5</sup>. This entails that communication between scientists, policy makers and society during the process needs to be accessible and understandable for all.

Independence or a distance between policy and science is crucial. Lack of independence entails the risk that the advice loses its credibility and trustworthiness. This is a frequently discussed issue since political bodies (such as BMEL in Germany) or companies announce scientific project calls, sometimes with specific topics as background. Moreover, the institutes financed by federal ministries are often questioned about their independency. Institutes and scientists in general have to deal with this situation.

Science-based policy advice needs to be diverse and, thus, plural. This means that the advice needs to be given, depending on the topic, from different perspectives, based on scientific theories, methods and approaches. The plurality of advices from different disciplines and persons increases the confidence in the knowledge needed for decision making.

### **Lessons from 25 years of model-based policy advice**

The policy areas relevant to agriculture are subject to constant change. This has led to an increased demand from policy makers and scientists to quantify the consequences of policy changes in advance. To do so requires taking into account numerous interactions. Models help to reduce the complexity of the real world to the essential relationships and, thus, contribute to a better understanding.

The Modelling Network of the Thünen Institute uses economic models for different decision levels (e.g., farm, regional or sector). MAGNET simulates developments and policies in the area of world economics in general as well as those of individual countries and regions. The AGMEMOD model deals with the important agricultural markets of the EU Member States as well as interactions between the agricultural and food sectors. RAUMIS presents adjustments of agricultural land use and production at the regional level. FARMIS uses a bottom-up approach to farms and farm groups for its farm modelling and includes a projection of the results at sectoral level.

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<sup>4</sup> Kirchgässner (2013): Zur Rolle der Ökonometrie in der wissenschaftlichen Politikberatung. Perspektiven der Wirtschaftspolitik 14(1–2): 3–30.

<sup>5</sup> Weingart, Peter (2008): Zur Aktualität von Leitlinien für ‚gute Praxis‘ wissenschaftlicher Politikberatung. In: Weingart P, Kielmansegg PG, Hüttl R, et al. Leitlinien Politikberatung. Berlin: Berlin-Brandenburgische Akademie der Wissenschaften. 11-17.

The joint application of the models facilitates the consistent consolidation of the different levels. The results of our model-based policy impact assessments support policy makers in identifying potential need for action, in developing negotiation positions, and in designing policy instruments.

The analysis of a particular question starts with a first consultation of the modelling team with representatives of the Federal Ministry. Here, relevant scenarios (e.g., the abolishment of the milk quota) and central assumptions (e.g., the future development of energy prices) are discussed. Depending on the complexity of the problem and the relevant interactions, it is decided which models are required for the analysis and if and how these need to be developed further. In the subsequent analysis, a coordinated, parallel and/or iterative use of the model follows. This facilitates the consolidation of important assumptions, an exchange of results between model, the mutual monitoring and control of model results. This approach ensures a consistent overall result.

A central element of the work of the Modelling Network of the Thünen Institute is the regular establishment of a so-called "baseline" that is a projection of expected developments in the agricultural sector under the framework of current (agricultural) policy. The Thünen Baseline is developed in close cooperation with experts of the German Ministry of Food and Agriculture; it serves as a reference scenario for policy impact assessments.

### 3 Practical examples of science-based policy advice - Tuesday 13<sup>th</sup> August

Science-based policy advice is done by all kind of different fields of science. In the case of the Thünen Institute, frequently requested by the German government topics focus on questions related to natural resources. The scale can be national or global, depending on the topic. Topics at global level are generally related to international agricultural trade, greenhouse gases (GHG) and its impacts on climate. At the national level, the Coordination Unit Climate at Thünen, working mostly as contact point for questions regarding GHG's and inKA (interdisciplinary contact point Agrarmeteorologie), is the German collection point of three agricultural institutes for climate related topics in agriculture.

One example of a partnership focused on the establishment of a science-based policy advice structure with scientific partners in other countries is given by AGMEMOD. The activities under the umbrella of “AGMEMOD goes Africa” enhance regular training activities in African countries or with African scientists visiting Germany. The training activities focus on the market modelling approach AGMEMOD.

During the second day, three examples of policy advice were presented in three different research areas.

#### 3.1 The case of model-based policy advice with AGMEMOD

Lecturer: Dr. Aída González-Mellado (Thünen Institute of Market Analysis)

Characteristics of scientific policy advice with models:

- Prompt
- Independent
- Science-based
- Long-term and future oriented

Model supported policy consultations have a long tradition in the area of economic policy. They go back to the work of Tinbergen who developed and used a general equilibrium model in 1936 to work out projections for the economic development in the Netherlands, on the basis of which multi-annual business plans were prepared by the government.

Generally, model based policy advice involves three main actors: a research institution, the client and the general public. The research institution (e.g., private or public) is most often represented by a research institute based outside or inside a university, but could also be an in-house branch of the client's institution. The clients can be politicians (e.g., political administration or actual policy makers) as well as stakeholders, whereas the general public stands for all other research outside the research institution. The relationship between these actors might be a one-time project, but could also be established to a continuous institutional basis. Within the phases of the

policy cycle (problem recognition, agenda setting, policy formulation, decision making, policy implementation, policy evaluation), different combinations of these institutions are possible, and thus, influence the interaction and the role that models can play within the process. The interaction between the research institution and the general public is marked by an exchange of scientific information. On the one hand, scientific progress developed by the research institution for the prevailing project diffuses into academia. The scientific progress of academics is, on the other hand, a rich source of knowledge needed for the successful completion of projects.

In the case of AGMEMOD Germany, the model is hosted by the Thünen Institute and is applied to answer questions on price developments for agricultural markets caused by market changes.

(For further information see Annex 1)

### 3.2 The case of climate impacts

Lecturer: Dr. Cathleen Frühauf (National Meteorological Service of the Federal Republic of Germany, inKA)

Farmers and policy makers need to consider various fields of science when trying to grasp the complex nexus of weather - climate impacts on agriculture and forestry. Therefore, in 2018 a central contact point for federal agencies for interdisciplinary questions was founded by the National Meteorological Service of the Federal Republic of Germany (DWD), the Thünen Institute and Julius-Kühn Institute. This interdisciplinary contact point Agrarmeteorology (inKA) is based at the agro-metrological institute of the DWD.

The goal of inKA is to pool the expertise of the institutes, enhance the teamwork, and use synergy effects to avoid the duplication of work.

inKa is following a three-step approach:

1. Collection and storage of relevant data at one place, which permits requests to be answered more quickly.
2. Answering interdisciplinary questions, in research and for policy makers.
3. Identification of interdisciplinary research needs, which are then fed into the political process.

The contact point is, thus, a tool to make interdisciplinary research and the connected policy advice for weather and climate-related agricultural issues faster and more effective.

### 3.3 The case of greenhouse gases

Lecturer: Dipl.-Ing. agr. Bernhard Osterburg (Thünen Institute – Coordination Unit Climate and Soil)

The different departments of the Thünen Institute all work to some extent on topics related to greenhouse gases. The Thünen Institute of Climate-Smart Agriculture even focuses exclusively on measuring, reporting and reducing greenhouse gases in agriculture and land management.

Overall the institute is leading or involved in

- National emission reporting for agriculture and Land-use, Land-use change and forestry (LULUCF)
- Soil monitoring on organic and mineral soils
- Development and evaluation of mitigation measures
- Development and scenarios of future development pathways

Since 2012, the Thünen Institute has established the Coordinating Unit Climate, which is coordinating the policy advice on climate change mitigation, impact and adaptation of the institute. The coordination unit holds regular meetings with different departments which are directly involved in topics related to greenhouse gas. Moreover, it is in direct contact to inKA.

The main client of the coordination unit is the Ministry of Food and Agriculture. The units' main client is the German Ministry of Agriculture and Food. Other clients are the European Commission, the German Ministry of Environment, the Federal Environmental Agency and regional governments. The unit is also participating in governmental meetings and dialogue processes with public institutions and non-governmental organisations.

Based on the results of the different Thünen departments and further results by other institutes which are part of the Thünen network, the coordination unit publishes analyses and proposals on the EU common agricultural policy for the EU commission and for the German ministry. On national level, the unit is directly involved to give advice for the national climate action plan and reduction targets.

## 4 How to write policy advisory statements - Wednesday 14<sup>th</sup> August

Lecturer: Dr. Claus Deblitz (Thünen Institute of Farm Economics)

The main goal of this presentation was to give a broad overview on which kind of policy advice the Thünen Institute provides. The examples come from the Thünen Institute of Farm Economics and might be handled slightly different in other specialised institutes. However, they provide a valid guidance for the process. At the Thünen Institute, there is a straightforward pathway for requests on policy advice from the BMEL.

In the first step, a department from the ministry requests policy advice for a specific case. This request enters the institute via the president (when more than one institute is involved) or director of the specialised institute (when only one institute is involved). It is then decided which specialised institutes and/or staff members are responsible for the specific request. The specific staff member(s) work(s) within the period given to provide the requested policy advice/position statement.

In specific circumstances, the request comes from other customers (e.g., political parties or other ministries). In this case, the request could reach the institute via email, telephone call or via post. The president of the Thünen Institute must be informed about this request.

The most important information for the scientist is the timeline and the required format of the output. Often, policy advice is requested on short notice, thus, scientists giving policy advice need to be prepared to do so rapidly and ad-hoc as required. If no deadline is given in the first request, it can be worth to call the person who has sent the request and ask. The format for the policy advice can vary, written statements are the standard, but some prefer Power Point presentations.

Information on the target group for the policy advice is also relevant for the scientists giving advice. Such information indicates which language needs to be chosen and which previous knowledge is available on the issue within the target audience. Avoiding acronyms, abbreviations and technical terms is always a good choice. When writing a policy statement it is wise to focus on what the target audience does not know and not on what the author knows. The message should be as short and concise as possible. The scientist giving advice should structure his/her statements in a written document, easily understandable and with a brief summary of each chapter. When possible, the advice should articulate different options, not only one single optimal solution. If there are scientific uncertainties, these should be communicated.

Policy advisers have to understand the policy making process. Policy makers will, in most cases, ask several institutions and consultants from other fields for advice. Policy decisions are not only a result of rational scientific results, but also the result of several discussions with different lobby groups.

## 5 Developing research questions on the field, feeding into politics and linking back to the field

The link to farmers, fields and practical farm work is essential in science-based policy advice in agriculture. Policy advice will and should have influence on the farm work, thus, everything advised should be an answer to current or future problems and issues out of real-life agriculture. It should also be proven to be doable. The final target group in agriculture, the farmers, must be a central component for policy advice; therefore, scientists need to know the current and future problems in the agricultural sector with consideration of the farmers' decision-making processes.

The participants drove to Thünen Institute of Organic Agriculture in Trenthorst to get an overview on the applied agricultural research done by this specialised Thünen Institute. In Trenthorst, the Thünen Institute owns 600 hectares of testing fields, managed in five different farming systems. This allows scientists to test innovations in farming under scientifically controlled circumstances directly in the field, meaning it is possible to test whether innovations are feasible and to make them practical, understandable, and tangible. Stakeholders visiting Trenthorst are often taken on a tour on a tractor to experience the real agricultural research. This is proven to be more effective than indoor presentations. Especially organic agricultural farms are a complex system, with different components, such as fields, animal keeping on grasslands, forests etc. These systems are easier to understand for stakeholders if they can visit them. When the focus lies on a single part of the system, the influences can be seen directly.

Some experiences on the field are shown in the following pictures.









## 6 Summer School Project

The participants formed four groups starting from the second day and received a scientific paper for evaluation. A fictional governmental request was handed out connected to each paper. The participants were asked to prepare a policy statement and present this statement on the last day to members of the respective government or ministry. The format of the presentation was led by the creativity of the participants.

The public for the presentations were all participants who were currently not presenting and some interested invited Thünen colleagues simulated to be the respective government or ministry. They were allowed to ask questions and to comment.

Afterwards, presentations were discussed and lessons learned were collected.







## 6.1 "Lessons Learned" from the summer school project

Some lessons learned by the summer school project were collected during the summer school by the participants, others were observed by the organizers.

### **Preparation of the policy advice**

The participants prepared a policy statement over the four days of the summer school. Each day, participants had two hours per day allocated to work on the summer school project. This is a similar situation experienced in reality as scientists from Thünen Institute in most of the cases have to prepare statements and presentations for policy advice often parallel to the regular running research activities. Many policy advice requests are sent to the institutes without previous announcement and also have to be handled in the short term. The participants experienced that the timeframes for policy advice are quite short and tight. In contrast to medium-term research projects, a time extension for the submission of the policy statements can be hardly negotiated. The lack of time as an excuse for handing over a less comprehensive policy advice is not acceptable, since policy makers often need to find quick solutions. Thus, the own time management and group management is essential for good science-based policy advice.

One group received a publication on glyphosate usage for weed control close to water bodies with the request of giving further advisement on this specific study case. Politicians, environmental NGOs, farmers, the industry and the civil society discuss the usage of glyphosate very critically, since there had been studies indicating that herbicides containing glyphosate can cause cancer. The task to prepare the policy statement for this case appeared to be especially difficult, since keeping objectivity can be challenging when topics are hotly discussed. The group decided to present only the clear facts mentioned in the respective publication accompanied by information from other scientific journals. The most important part was to stay focused on the

specific request, which helped them to stay neutral. It was important for the group to understand and to know the exact objective of the requested policy advice as well as the preparation of the meeting to present their findings. This group managed to give a structured, generally understandable and at the same time fact-based presentation. Even though, the team members believed to have one of the most challenging tasks at the beginning of the project.

### **Structure of the written policy advice**

After all the presentations, some basic components to achieve a good policy statement were summarized by all the participants. A brief self-introduction and a short summary of the request is a good start. This is important, as in reality, additional ministry officers from other departments who are not aware of the requested advice, might be also invited or might receive the written policy statement. In the summer school, a similar atmosphere has been simulated, as each group had been working only on their presentation and did not know exactly the details from the other projects. Additionally, colleagues of the Thünen Institute were invited to play the ministry officers. Those colleagues had not read the request and got lost in presentations without a clear introduction.

All participants and organizers pointed out that statements need to be concrete, short and precise. This was experienced as difficult since scientific results often require lots of background information which cannot be summarised in short form. Those groups who managed to leave aside too many background information and focused on the topic, rather than giving additional advice, were perceived as the most successful. Helpful is to avoid slides with a lot of text, it helped more to have graphs and illustrations.

### **When presenting the policy advice**

An important lesson learned was also the way to approach policy makers. It is necessary to talk with the policy makers as colleagues. Even in the cases where the scientist might consider the policy request to be of minor importance or not well thought out. Policy advisors request support because they are not the scientific experts on the related field of science, but they are the ones who have the overview on the wider circumstances. This entails that scientists should behave professionally, know their public and avoid being arrogant. During the policy advisory exercise, it was observed that very small details, such as knowing the names of the ministry officers sitting at the table, are important factors to consider.

A specific challenge for few participants seemed to be not to start being defensive when policy makers asked further questions during the exercise. The scientist has to give objective policy advice, thus, explaining scientific findings, theories, he/she has to contribute to a broader knowledge for policy makers. Defending any personal point of view might affect the credibility of the scientist.

Participants mentioned as well that they have learned that is required to talk openly in some cases. This involves also saying that the scope of knowledge in the specific research field is still not that advanced to answer the question(s). In some cases, there is still some need for research on specific policy request or topic to reduce uncertainties. The scientist can only give advice based on the current state of knowledge. If those are simply too few or too scattered, this should be communicated. Same applies for uncertainties. If possible, the uncertainties should be quantified, such as in the Intergovernmental Panel for Climate Change IPCC summaries for policy makers<sup>6</sup>.

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<sup>6</sup> See also: [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15\\_SPM\\_version\\_report\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf)

## 7 Summary

In August 2019, a five-day-summer school on science-based policy advice was held at the Thünen Institute in Braunschweig. The summer school introduced several theories of science-based policy advice, practical examples for science-based policy advice, as well as an exercise on how to write advisory statements. Additionally, an excursion to the fields and stables of the Thünen Institute of Organic Agriculture in Trenthorst was planned. The summer school had also an active part for the participants with a practical exercise of an advisory presentation of science-based policy advice.

The Thünen Institute, as a Federal Research Institute under the BMEL mandate, is responsible for giving science-based policy advice to the BMEL, but also to other ministries, international bodies, regional governments, NGO's, political parties and farmers unions. The institute provides research and collects data for greenhouse gas accounting in forestry and rural areas, for fishery inventories, agricultural trade, etc., on behalf of the BMEL. Those data are the subject of international negotiations such as the UNFCCC on the EU fish catch quotas, and others.

Policy advice by the Thünen Institute is, when the requests are interdisciplinary such as those on greenhouse gases or climate change, coordinated by the specialized Coordination Unit Climate and Soil or inKA. The Coordination Unit Climate and Soil is based at Thünen Institute, collects the advice predominantly at the Thünen Institute and mainly focuses on greenhouse gases, whereas inKa is based at the Agrometeorological Institute of the DWD, focusing more on adaptation and coordinates advice by several federal research institutes. The advice coordination is required since the ministries often request advice on short notice, within the running political processes. This is especially difficult when the requests are interdisciplinary.

For timely, accurate and successful advice, the communication with the client requesting advice is indispensable. The language chosen and the format depend on the needs and the person sending the request. Thus, it is advisable to know the requesters or simply ask them about their specific needs. Moreover, the mutual trust between advisor and policy makers, same as for the policy makers to the advisor is important. Therefore, the independence of the research and science-based policy advice has to exist. Another point of discussion was the objectivity of advice, which is a central point of science-based policy advice. Even if every person has a position, science-based policy advice needs to be based on evident numbers and clean research practices, which leads into the maximum of objectivity. Further, the policy advisors should communicate uncertainties and different opinions, as far as they exist.

## 8 Annex 1: Presentations

Introduction – Thünen Institute – Germany's major research institution for the rational use of natural resources (Aída González-Mellado)

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**Thünen Institute – Germany's major research institution for the rational use of natural resources**

**Strategic and operational principles**

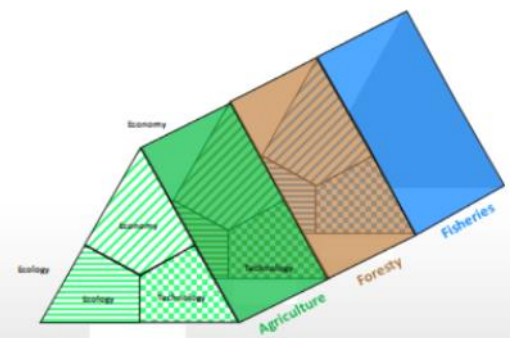





Hermann von Thünen

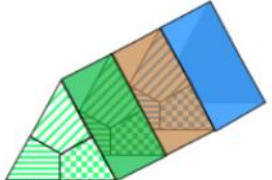
Braunschweig, 12<sup>th</sup> August, 2019

**Profile of Thünen Institute**




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**14 specialized institutes of Thünen Institute**

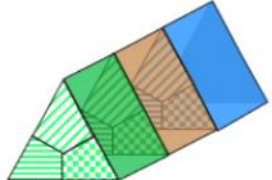


|   |                   |
|---|-------------------|
| Sea Fisheries                               |                   |
| Baltic Sea Fisheries                        | Fisheries Ecology |
| Forest Genetics                             | Forest Ecosystems |
| International Forestry and Forest Economics | Wood Research     |
| Rural Studies                               | Farm Economics    |
| Market Analysis                             |                   |
| Agricultural Technology                     | Biodiversity      |
| Climate Smart Agriculture                   | Organic Farming   |


Our research & policy advice covers all farmed zones and landscape component!

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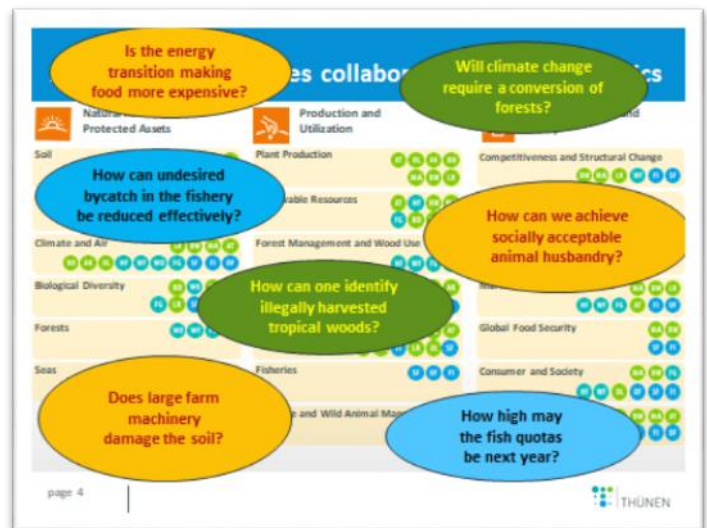
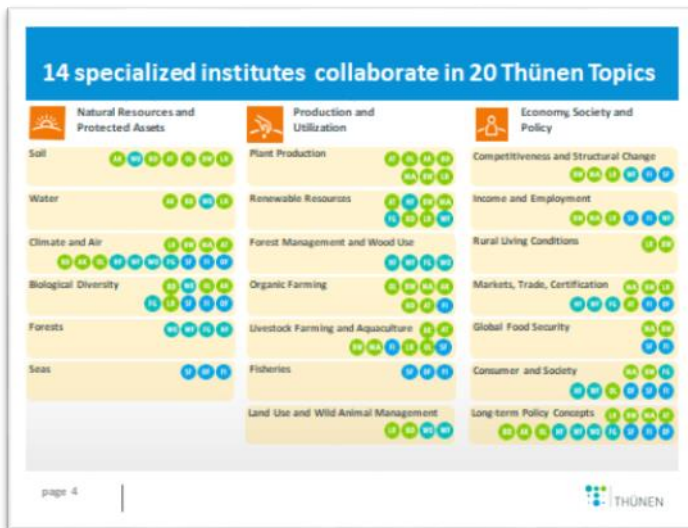
**14 specialized institutes of Thünen Institute**



|   |                   |
|---|-------------------|
| Sea Fisheries                               |                   |
| Baltic Sea Fisheries                        | Fisheries Ecology |
| Forest Genetics                             | Forest Ecosystems |
| International Forestry and Forest Economics | Wood Research     |
| Rural Studies                               | Farm Economics    |
| Market Analysis                             |                   |
| Agricultural Technology                     | Biodiversity      |
| Climate Smart Agriculture                   | Organic Farming   |

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### Three main tasks of Thünen Institute:

- 1. Research and participation in free scientific competition**
  - Research of high societal relevance based on institutional budgets
  - Applying for third-party funds on national and international level
  - Collaborating in national and international research consortia

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### Three main tasks of Thünen Institute:

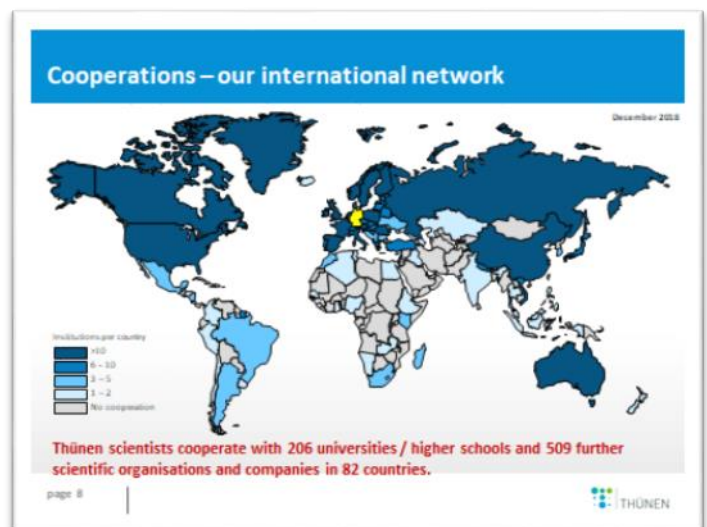
- 1. Research and participation in free scientific competition**
  - Research of high societal relevance based on institutional budgets
  - Applying for third-party funds on national and international level
  - Collaborating in national and international research consortia
- 2. Conducting national long term monitorings**
  - National Forest Inventory, National Soil Surveys, Greenhouse Gas Inventories, Fish stock assessments etc.

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### Three main tasks of Thünen Institute:

- 1. Research and participation in free scientific competition**
  - Research of high societal relevance based on institutional budgets
  - Applying for third-party funds on national and international level
  - Collaborating in national and international research consortia
- 2. Conducting national long term monitorings**
  - National Forest Inventory, National Soil Surveys, Greenhouse Gas Inventories, Fish stock assessments etc.
- 3. Political consulting for German Government, EU etc.**
  - Preparing science-based reports, expert's opinions, options for action
  - Answering rapidly and highly skilled to urgent requests from politics
  - Representing Germany in international science & advisory boards

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## Take-home-message: Five features of Thünen Institute

1. Broad range of **expertise** (economics, ecology, technologies)
2. Scientifically **independent**, close to **politics**
3. Embedded in **networks** (national / international)
4. Sizeable number of highly qualified **researchers**
5. Latest **methods** and first hand **data** to answer key future issues

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## PhD Summer School 2019

### Main objectives and outline

Braunschweig, 12<sup>th</sup> August, 2019

## PhD Summer School 2019 scientific based policy advise

### Why this topic?

New scientific novelties are spreading faster, the world is getting more interconnected. Future policies shall take complex developments into account, but how?

With scientific controversies, post-fact politics and societal challenges to the use of evidence in public policy, evidence-informed policymaking needs advocates and skilled practitioners, both in scientific and policy bodies.

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## PhD Summer School 2019 scientific based policy advise

### Objectives

Train future scientists on how to better integrate scientific evidence into policy-making;

Scientists will learn how to better communicate and visualise their results.

New insights on how 'the other side' operates;

Enlarged network of likeminded professionals, working on agricultural issues

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Let's move!



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## International Research Portfolio of the German Federal Ministry of Food and Agriculture (BMEL) (Maja Clausen)

 Federal Ministry of Food and Agriculture

### International Research Portfolio of the German Federal Ministry of Food and Agriculture (BMEL)

PhD Summer School 2019, Thuenen Institute  
August 12, 2019

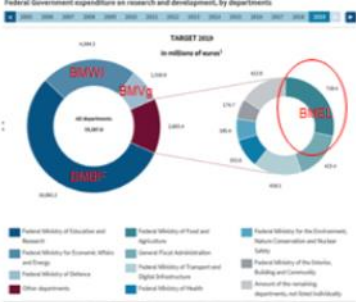
Maja Clausen, Division 121: Research & Innovation (International), Federal Ministry of Food and Agriculture (BMEL)



www.bmel.de

### Federal Government Expenditure Targets 2019 for Research and Development by Department

Federal Government expenditure on research and development, by departments



Target 2019 (in billions of euros)


The 4th largest R&D expenditure will be provided by the Federal Ministry of Food and Agriculture

-> target investment of 738,4 million €

-> 6,5 million € for international research (without EU)

22.08.2019 | Folie 2

### BMEL Research Policy: Four Research Clusters



- Future of Rural Areas**
  - High quality of life, strong economic sectors and efficient fostering -
- Sustainable Agriculture**
  - Responsible and resource conserving soil management and animal husbandry -
- Healthy Life**
  - Health, good nutrition and safe products -
- Global Responsibility**
  - Ensuring global food security and responsible resource management -

22.08.2019 | Slide 3

### Agri-food research landscape in Germany

| Federal Government                       | Länder (federal states)               | Private sector  |
|--|---------------------------------------|---|
| Federal research establishments          | Universities and polytechnics         | Research centres of enterprises                             |
| Total: 38 of which BMEL 5                | Federal state research establishments | Business-related R&D bodies                                 |
| Helmholtz Centres (HGF) (90:10)          |                                       | German Federation of Industrial Research Associations (AIF) |
| Leibniz Association (WGL) (50:50)        |                                       | WGL Total: 95 BMEL co-finances: 6                           |
| Max Planck Society (MPG) (50:50)         |                                       |   |
| Fraunhofer Society (FHG) (90:10)         |                                       |   |
| German Research Foundation (DFG) (58:42) |                                       |   |

22.08.2019 | Slide 4

### Federal Research Institutes within BMEL mandate







- ❖ Friedrich Loeffler Institute (FLI): Animal Health
- ❖ Thünen Institute (TI): Rural Areas, Forestry and Fisheries
- ❖ Julius Kühn Institute (JKI): Cultivated Plants
- ❖ Max Rubner Institute (MRI): Nutrition and Food
- ❖ as well as:
- ❖ Federal Institute for Risk Assessment (BfR)



- ➡ Provide scientific input for policy decisions
- ➡ Contribute to international research projects & collaboration networks

22.08.2019 | Slide 5

### Research Institutes affiliated with BMEL

- ➔ Deutsches Biomasseforschungszentrum gGmbH (DBFZ) 
- ➔ Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) 
- ➔ Leibniz Institute for Farm Animal Biology (FBN) 
- ➔ Leibniz Institute of Vegetable and Ornamental Crops (IGZ) 
- ➔ Leibniz Centre for Agricultural Landscape Research (ZALF) 
- ➔ Leibniz Institute of Agricultural Development in Transition Economies (IAMO) 
- ➔ Leibniz Institute for Food Systems Biology (LSB) 

22.08.2019 | Folie 6

## German Agricultural Research Alliance



Umbrella organisation of German Agri-food research organisations > 60 members



22.08.2019 | Seite 7

## BMEL Mandate & Core Competence in Food, Nutrition and Agricultural Policy (Part 1)

### International and EU:

- Expertise and experience in the spectrum of **agriculture** (incl. fisheries), **rural development**, **food and nutrition**
- Long-term collaboration with **FAO** and its Committee for World Food Security (CFS)
- Involvement in **supranational formats**, including G7/G20, UN, OECD

### Key Milestones & Events:

- ✓ Global Forum for Food and Agriculture, **GFFA** (annually in January, Berlin): international conference & stakeholder forum (GFFA 2020: 16-18 January)
- ✓ High level agri-food activities within **G20 context**: e.g. during GER Presidency 2017: hosting of Meeting of Agricultural Chief Scientists (G20 MACS; Nov. 2017); participation in last MACS in April 2019 hosted by Japan
- ✓ Participation in various **EU initiatives**: 3 Joint Programming Initiatives, 18 ERA-Nets, incl. ERA-Net Co-fund „**LEAP-Agri**“ (EU-Africa Partnership on food and nutrition security and sustainable Agriculture)

22.08.2019 | Seite 8

## BMEL Mandate and Core Competence in Food, Nutrition and Agricultural Policy (Part 2)

### Coordination mechanisms at national level:

- Strategy of the German Federal Government „Internationalization of Education, Science & Research“:
  - **High-level Round Table**; first cycle = focus on Africa; BMEL lead role in WG on Agriculture, Nutrition & Food Production)
- Close dialogue with the German Agricultural Research alliance („**DAFA**“, a network of all relevant German agricultural research institutions)
- Various other **multi-stakeholder formats & platforms** (e.g. on specific topics or with respect to individual countries/regions)

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## Multifaceted role of federal research: bridging science & policy



### Conducting (mostly applied) research

- Expanding **scientific knowledge** for the benefit of the common good / general public
- Providing **research education & training**
- Contributing to & engaging in **national, EU and international research collaboration/ knowledge exchange networks and initiatives** (bi- & multilateral)



### Examination

- Statutory tasks (e.g. Plant Protection Act, Animal Disease Act)

### Providing policy advice

- Developing **scientific guidance** for agri-food and consumer protection policies (current examples: animal welfare, climate change, food labelling, digitalization etc.) and in **ad hoc crisis situations**

22.08.2019 | Seite 10

## BMEL International Research: Aims & Instruments

- Aims:**
- 1) Engagement in scientific exchange and progress
  - 2) Creation of enduring international alliances
  - 3) Contribution to capacity building

### Funding Instruments:

- **Bilateral research collaboration** with selected partner countries.  
E.g. Joint projects with Japan; exchange of scientists with China and New Zealand
- **PhD programme**  
Research partnerships training for PhD students from developing countries and emerging economies at German agri-food research facilities
  - PhD Programme Sub Sahara Africa: 3 years, approx. 0,8 Mio €, 8 PhD students
  - PhD Programme Iran: 3 years, approx. 0,8 Mio €, 8 PhD students
- **Research Cooperation for Global Food Security and Nutrition**  
practice-oriented research projects, conducted in cooperation between German agri-food research facilities and corresponding facilities in selected developing countries and emerging economies

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## Research Cooperation for Global Food Security and Nutrition (main funding instrument)



- 3 calls: 2013, 2016 and 2019 (published in July, still open)
- Since 2013: 20 international consortial projects approved
- Financial volume: approximately 20 Mio €

- **Long-term partnerships**
- Involvement of **relevant partners** for sustainability (e.g. SMEs, NGOs)
- Identifying **local solutions** using competence of Germany's agriculture and nutrition research
- Knowledge and experience sharing for **capacity development**
- Contributing to **Sustainable Development Goals (SDG)**

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**Contact details:** Maja Clausen, Division 121: Research & Innovation  
([Maja.Clausen@bmel.bund.de](mailto:Maja.Clausen@bmel.bund.de))





Some theory - and practical lessons from 25 years of model-based policy advice by the Thünen Model Network (Frank Offermann)

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**Research based policy advice**  
**Some theory - and practical lessons from 25 years of model-based policy advice by the Thünen Model Network**  
 Frank Offermann  
 Thünen-Institute of Farm Economics



PhD Summer School 2019  
 Braunschweig, August 12-16

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“Why don't you do as we say?”

**Varför gör ni inte som vi säger?**

*Academy Gathering on Policy, Science and Social Media,  
 Royal Swedish Academy of Agriculture and Forestry,  
 Stockholm 2011*

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**Outline**


**Science based policy advice**

- Models of science based policy advice
- Basics, preconditions and challenges for successful science based policy advice

**Model based policy advice (The Thünen model network)**

- How can models support policy?
- Specific challenges of model based policy advice
  - Institutional setup
  - Organisation of processes and communication
  - Lessons learned

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**Models of science based policy advice**

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**Models of science based policy advice (Habermas) – Technocratic model**




Source: Based on Scharhölter (2011), Scharhölter and Kowensch, 201

- Science provides recommendations on political goals and the necessary means/measures to reach these


**Criticism:**

- Model undermines democratically legitimized process of political decisions
- Many value judgements remain hidden; often, consensus is just pretended
- Responsibility for actual outcome remains unclear; actual outcome does not influence goal setting

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**Models of science based policy advice (Habermas) – Decisionistic model**




Source: Based on Scharhölter (2011), Scharhölter and Kowensch, 201

- Assumption: Political goals are subject to (always subjective) value judgements, therefore politics has to somehow (decisionistic, subjective) decide on goals
- Science simply explore the means to these ends (goals)

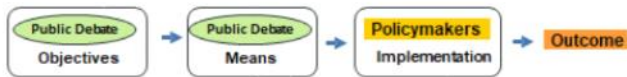
**Criticism:**

- This „division of work“ between science and policy implicates that facts and value judgements, as well as means and ends, can be clearly separated
- Goals, and their potential conflicts and synergies, are however subject to constant re-evaluation in the light of intended and unintended outcomes; this requires a continuous dialogue between science and politics.

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## Models of science based policy advice (Habermas) – Pragmatic model



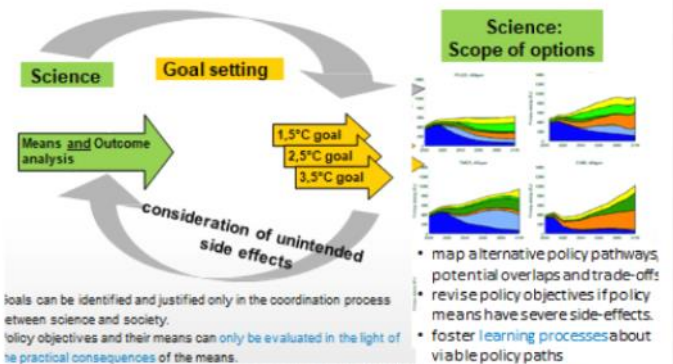
Source: Based on Edenhofer (2011), Edenhofer and Krawinkel, 2015

- Objectives and means are determined by discourse between researchers, policymakers and the public
- Research provide input, but do not determine objectives or means
- Pragmatic model has many variants: „co-production“, „deliberative“, „co-evolutionary“, ...

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## Models of science based policy advice – “pragmatic-enlightened” model (Edenhofer)



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## Preconditions for successful science based policy advice Organisation

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## Requirements (of science/society) for science-base policy advice (selection) (I)

- Objectivity
- Transparency, Public information
- Distance (Independence)
- Plurality

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## Requirements (of science/society) for science-base policy advice (selection) (II)

### Objectivity

- Objectivity in the sciences is above all a result of a meaningfully organized scientific process and less the consequence of the objectivity of the individual scientists. (Kirchglassner, 2013)

### Transparency, Public information

- Transparency of advice and decision-making processes ensures traceability of decisions and confidence and trust in decision-making processes as well as the arguments that inform them. (Weingart, 2008)
- In order for the consultants to have incentives to make correct statements in their opinions, the process of economic policy advice must be organized in an open and transparent manner. (Kirchglassner, 2013)
- Openness secures equal access to all relevant information and is a prerequisite of trust. It refers both to the committees and their advisory processes as well as to the results. (Weingart, 2008)

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## Requirements for science-base policy advice (selection) (III)

### Distance (Independence)

- Distance ensures independence of advice, i.e. the mutual independence of politics and science, so that there is no mixing of individual interests and scientific judgements. If independence of the advice is not maintained, it loses its credibility, its authority and legitimacy. (Weingart, 2008)

### Plurality

- Plurality refers to the form and diversity of advice. Different disciplines and consultants, who are represented in the advisory process according to the topic, ensure the variety of perspectives, scientific theories and methods. Narrowing jeopardizes factual adequacy and confidence in knowledge. (Weingart, 2008)

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## Preconditions for successful science based policy advice

### The researcher

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## What makes agricultural economics research relevant for policy advice?

The key elements for researchers include

- doing high-quality work
- **communicating** effectively with the right audiences,
- and paying attention to **timeliness** and windows of opportunity
- **understanding** the policy-making process

Brink, 2012; Canadian Agricultural Economics Society

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## Demands (of policy / policymakers) to scientific policy advice (selection)

- must be prepared to provide **rapid ad-hoc input**
  - must learn to deliver **short and concise messages**
  - **avoid being arrogant**; do not alienate the policy makers / the public
  - should articulate **multiple policy options** rather than advocating a single „optimal“ solution
  - **communicate scientific uncertainties**
  - needs to have an improved **understanding of how policy making works**
- based on the "Conclusions of the High-Level Trans-Atlantic Science for Policy Workshop"

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## Model based policy advice

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## What is a model?

A model is a **simplified** picture of **complex** reality.

Example: **Map**

Required characteristics:

- simple
  - realistic
  - generalizable
- trade-off... "Everything should be made as simple as possible, but no simpler"

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## Model based policy advice

- Models help to **structure** knowledge and **understand** reality
- **Economic theory** alone generally offers **no conclusive answers** to questions about solving economic policy problems, especially in the case of conflicting income and substitution effects → **empirical analyses** are indispensable for the advisory process (Kirchgässner, 2013).
- Models facilitate the **analysis of hypothetical situations** (with/without; ex-post/ex-ante)
  - **Models are a research tool for policy relevant science**
- Experience from OECD and EU Commission (DG Agri): **Models help**
  - to **„depoliticise“** debates
  - to **avoid simplistic answers**
  - to **overcome intra- and/or interministerial barriers**
  - **Models are a communication tool**

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## The Thünen Model Network



## Motivation

### Background:

- Changing (economic) framework/conditions
- Issues in agricultural, energy and trade policies becoming increasingly complex



### Objective:

- Support decision making of policy and society by providing ex-ante assessments of the impacts of potential policy changes

### Approach: (Further) development, linkage, and use of models

- Reduce complexity of reality to essential relationships
- Assessment of the order of magnitude of potential policy impacts
  - for different groups/actors
  - for a broad spectrum of policy-relevant topics

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## The models

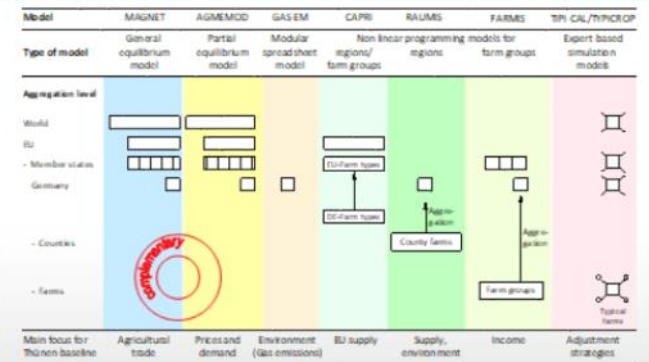
Application of economic models which address different decision making levels (e.g. farm, regional, sector level)

- MAGNET
- AGMEMOD
- CAPRI
- RAUMIS
- FARMIS
- TIPI-CAL und TYPI-CROP

➡ The Thünen Model Network

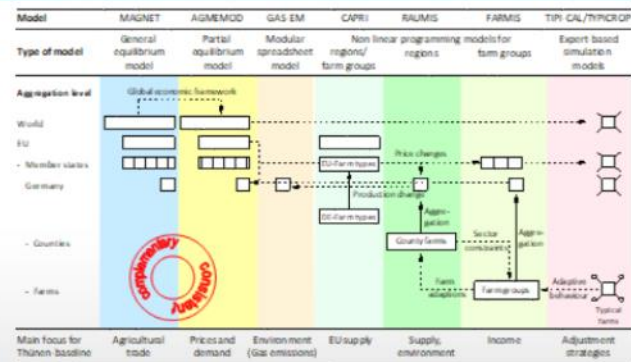
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## Methodology: The Thünen Modelling Network



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## Methodology: The Thünen Modelling Network



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## Examples of research based policy advice by the Thünen Model Network

Contributions to the development of the German negotiating position on the EU agricultural policy

- Model results show to what extent the new options for a national design of direct payments proposed by the EU Commission can lead to competitive distortions between the EU member states

Decision support for the national implementation of new agricultural policies

- For the planned introduction of a national uniform premium in Germany, the extent of changes in farm incomes was estimated in advance and potential cases of hardship were identified.

Identification of need for political action

- Regular projection of the future development of the agricultural sector if current agricultural policy is maintained ("Thünen baseline"). Example: Compliance with the emission targets for ammonia requires further policy measures

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## Selected Studies

|        |  |
|--------|--|
| 2002   | Mid Term Review proposals                        |
| 2003   | Mid Term Review decision                         |
| 2004   | National implementation of the Luxembourg reform |
| 2005   | Sugar market reform                              |
| 2006   | Milk market reform                               |
| 2008   | Cereal market organisation<br>CAP Health-Check   |
| 2009   | WTO negotiations                                 |
| 2010   | Free trade agreements                            |
| 2011   | Sugar market reform                              |
| 2012   | CAP after 2013                                   |
| 2014ff | Free Trade Agreements (Mercosur; CETA; TTIP)     |
| 2017ff | Brexit   |

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## 'Human capital' / institutional setting

### Thünen Institute:

- Established 1995
- **12 researchers on permanent positions involved** (but often with only small share of total working time)
- + changing number of scientists on third-party funds
  - continuity of staff
  - continuous regular long-term maintenance of models
  - broad expertise

### Ministry:

- single contact point (relative high continuity of staff)

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## 'Human capital' / institutional setting as a key factor for successful model based policy advice

### long term, continuous co-operation of model team and political administration

- **mutual trust (confidentiality; publication) build up over the years**
- **mutual understanding**
  - administrative knowledge and communication skills of the modellers (identification of key questions; user-oriented presentation of results)
  - acceptance of model and research constraints
- **joint discussion of 'terms of reference' for new assignments**

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## Joint discussion of 'terms of reference' for new assignments as a key factor for successful model based policy consulting

- **Identification of key questions / results**
  - scientific community: impact on welfare, efficiency
  - policy makers: feasibility of reaching political consensus for potential policy alternatives
    - distributional aspects
    - financial viability (budgetary aspects)
    - implementation (feasibility)
    - negotiating positions of other EU member states
- **Joint discussion of assumptions and scenarios; consistent and accepted baseline scenario**
- **Appropriate and accepted mix of models (including incorporation of 'non-model' based analyses and expertise)**

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## Model based policy advice

### Specific challenges experienced by the Thünen Model Network

- Establishing an accepted Reference Scenario - The Thünen Baseline
- Model linkages and communication of results

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## Model-based policy and technological impact analysis: The concept of the reference scenario



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## The Thünen-Baseline : Why and how do we do it?

- Existing baseline is **precondition for timely response** to requests from ministry
- Accepted baseline scenario is **precondition for effective and efficient policy consulting**
- Establishment and publication of a regular Thünen-Baseline



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## Steps in the process of establishing the Thünen Baseline

- Agreement on assumptions**  
Meeting with representatives from different departments of the Federal Agricultural Ministry to discuss and agree on assumptions for (Agricultural) Policy framework and the development of other exogenous variables (e.g. GDP, population, ...)  
➤ Inclusion of expert information  
➤ Increased acceptance ("co-produced reference scenario")
- Establishment of first results**
  - Model harmonisation
  - Exchange of model results as a basis for other models of the network
  - Contrasting and aligning model results to achieve consistency
- Presentation and discussion of first results**  
Meeting with representatives from different departments of the Federal Agricultural Ministry as well as representatives from the Länder ministries
- Establishment of final Baseline projection**  
Adjustment of models or interpretation of results, final Baseline results



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## The Thünen Baseline

- Agri-Economic projections for Germany**
  - Trade - bilateral
  - Prices – farm gate prices for many products
  - Demand – differentiated by use
  - Production - differentiated for many products, regions, farm groups
  - Land use - differentiated for many crops, regions, farm groups
  - Income – sector and farms; taking into account ownership of production factors
  - Environment – nutrient balances, gaseous emissions
- Medium-term (10-year) projection horizon**
- Business-as-usual-Scenario**
  - continuation of current agricultural policy and specific developments of external variables, e.g. trends)
- Established regularly every two years (2008, 2009, 2011, 2013, 2015, 2017), published with detailed annex**

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## Model based policy advice

### Specific challenges experienced by the Thünen Model Network

- Establishing an accepted Reference Scenario - The Thünen Baseline
- Model linkages and communication of results

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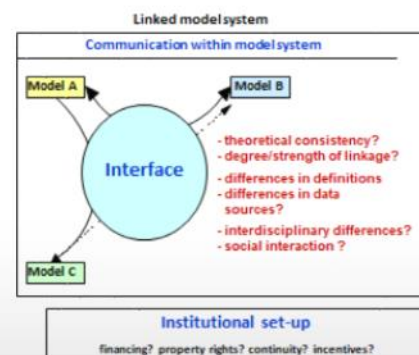
## Model linkage

- strong increase in development and application of linked model systems in agricultural domain
- driven by both demand and supply
  - complex challenges (far reaching policy reforms, climate change, food and/or energy, globalisation)
  - technical progress
- Abandonment of quest for 'single universal model'

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## How to link models ?

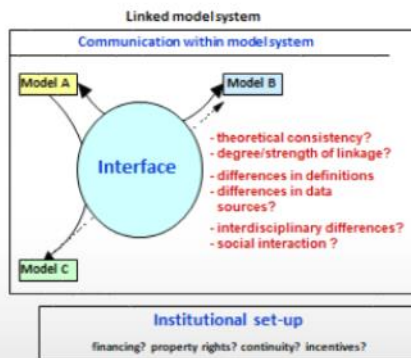


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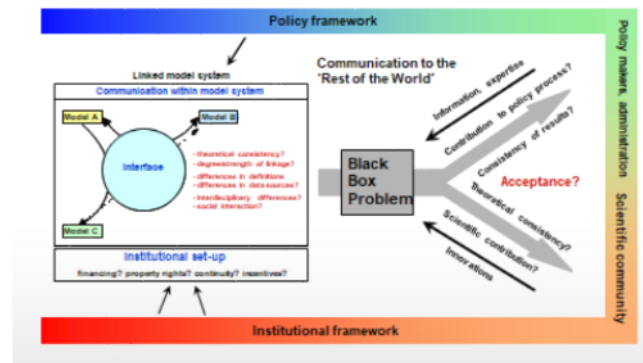




## How to link models ?



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## Communication of model results for policy advice

- Communication of results must be tailored to target group
- results presentation should be results and not model oriented
- explain cause-effect relationships for non-modellers
- embed additional expert-based analyses
- underpin stability of results with sensitivity analyses
- If necessary, talk beforehand about
  - difference between various models and their results
  - developments of data bases and new extensions of models structure
- **Attend carefully to divergent results**

Brockmeyer, Matthies, Offermann

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## Do's and don'ts of presenting results

### Don't

- sequential presentation of divergent results, e.g.,  
"Impacts on beef production:  
Model A: + 5 %  
Model B: + 10 %"
- present divergent results as if their reliability can be clearly ranked, e.g.,  
"... but model A likely underestimates impacts because of ..."

### Do

- decide on comparative advantage of models
- give ranges, e.g.,  
"Beef production rises by 5-10 % ..."
- convey message, e.g.,  
"sensitive area, impacts could be higher; monitoring is required; compensatory policy measure might be needed"

Brockmeyer, Matthies, Offermann

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## Practical example of research-based policy advice: Greenhouse gases (Bernhard Osterburg)

 THÜNEN

### Practical example of research-based policy advice: Greenhouse gases

Bernhard Osterburg  
Johann Heinrich von Thünen-Institute, Braunschweig, Coordination Unit Climate


Summer School 2019: Research-based Policy Advice, How does it work? 13. August 2019, Braunschweig



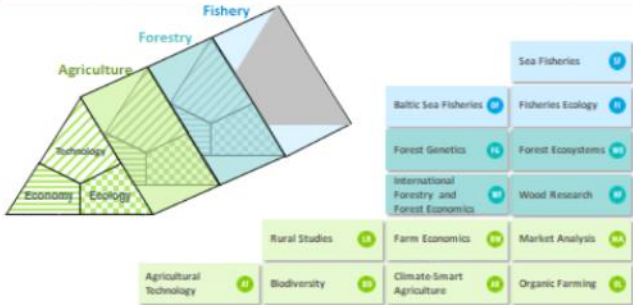
### Structure

1. Our activities in the field of climate change mitigation  
Thünen Institute and the Coordination Unit Climate
2. International Level: Climate negotiations, networking
3. EU level: Effort sharing and LULUCF regulation,  
Common Agricultural Policy
4. National level: Climate Action Plan 2050, mitigation options

Thanks to my colleagues at Thünen Institute, especially to  
Claudia Heidecke and Susanna Hönle

Seite 2 | Bernhard Osterburg  
13.08.2019 | Practical example of research-based policy advice: Greenhouse gases 

### 3 x 3 Structure, 14 Institutes, 1 Guiding Theme



*Solutions for the sustainable use of our natural resources!  
Scientific. Policy-oriented. Independent*

Seite 3 | Bernhard Osterburg  
13.08.2019 | Practical example of research-based policy advice: Greenhouse gases


### Challenge: Interdisciplinary Solutions in 20 Thematic Areas

| Natural Resources    | Production & Utilization            | Economy, Society, Policy              |
|----------------------|-------------------------------------|---------------------------------------|
| Soil                 | Plant Production                    | Competitiveness and Structural Change |
| Water                | Renewable Resources                 | Income and Employment                 |
| Climate and Air      | Forest Management and Wood Use      | Rural Living Conditions               |
| Biological Diversity | Organic Farming                     | Markets, Trade, Certification         |
| Forests              | Livestock Farming and Aquaculture   | Global Food Security                  |
| Seas                 | Fisheries                           | Consumer and Society                  |
|                      | Land Use and Wild Animal Management | Long-term Policy Concepts             |

Seite 4 | Bernhard Osterburg  
13.08.2019 | Practical example of research-based policy advice: Greenhouse gases

### Research activities related to agriculture and climate change mitigation

- National emission reporting for agriculture and LULUCF
- Soil monitoring on organic and mineral soils
- Development and evaluation of mitigation measures
- Development and scenarios of future development pathways
- Organization of conferences and workshops
- Research based policy advice



Organic carbon stock in topsoil in Germany, BZE-LW, 2018

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### The „Coordination Unit Climate“

- Since 2012 (Bernhard Osterburg)
- Directly reporting to the Thünen president
- since 10/2017 with Claudia Heidecke
- Coordination of policy advice on climate change mitigation, impact and adaptation of the Thünen-Institute,
- Contributes to planning of research
- Closed and regular cooperation with specialised institutes (AK, BW, LR, AT, WO, HF, with others less regular)
- Activities at the interface of science, policy advice and support of the German Ministry of Food and Agriculture (esp. unit 521)



Seite 6 | Bernhard Osterburg  
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## Activities of the coordination unit

- Main client: Ministry of Food and Agriculture, further: EU-COM, German Ministry of Environment, Federal Env. Agency, regional governments (Laender)
- Regular exchange with the Ministry unit 521 (each 3 months)
- Participation in governmental meetings and dialogue processes with public institutions and NGOs
- Elaboration of emission projections, assessment and evaluation of mitigation options, evaluation of new instruments (C pricing)
- Presentations at [organisation of] conferences and workshops
- Networking + own research projects as basis for policy advice



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## Climate change mitigation goals



**1,5 degree goal** = global GHG reduction by 40 to 70 %, until 2050 (basis 2010)



EU

... by 40% until 2030 (basis 1990)  
... by 80 to 95% until 2050



Germany

... by 55% until 2030 (basis 1990)  
... by 80 to 95% until 2050  
... **agriculture**: by 31-34% until 2030



### Activities of Thünen-Institut

Analysis of negotiations, development of international networks

Analysis on CAP and GHG mitigation, role of land use,

GHG reporting (agric. + LULUCF), coherent proposals for the German climate policy, impact assessments input to expert report on climate policy of BMEL scientific advisory boards (2016)  
-> new research topics

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## Paris Agreement on Climate, December 2015 (COP 21)



- International binding agreement, 1,5° goal
- Replaces the Kyoto-Protocol and includes both industrialised and developing countries and emerging economies
- NDCs: Nationally determined contributions to GHG mitigation
- National reports to UNFCCC (Katowice Rulebook, COP 24)
- Global stocktake and raise of ambition every 5 years
- **What does that mean für agriculture?**
- „Koronivia“ joint work on agriculture, decision 4/CP.23

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## International networking

- Cooperation in the Global Research Alliance on Greenhouse Gas Emissions from Agriculture (GRA), CLIFF-GRADS Scholarship
- International Conference on Agricultural GHG Emissions and Food Security, September 2018, Berlin, with 300 participants



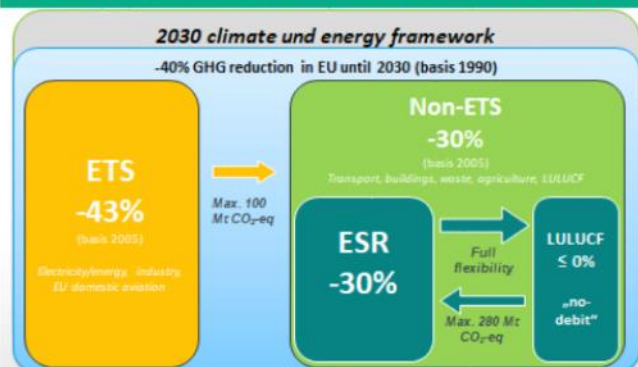
- FAO Knowledge Hub: CL (land climate) hub – advice & ideas
- ICOS: European Integrated Carbon Observation System Research Infrastructure (GHG fluxes), Thünen-AK coordinates ICOS-DE



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## Analysing proposals of the EU Commission, e.g. for the integration of LULUCF into EU climate policy



Seite 11 | Source: Wehrheim, P., 2016. Proposal on Land Use, Land-Use Change and Forestry (LULUCF Regulation), European Parliament, DG Climate, Presentation 29.09.2016.



## Own analysis and proposals on the EU Common Agricultural Policy

... for the EU Commission,

.... and for the German Ministry



Seite 12 | Bernhard Osterburg  
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## The national level: Climate Action Plan 2050 – reduction targets for 2030

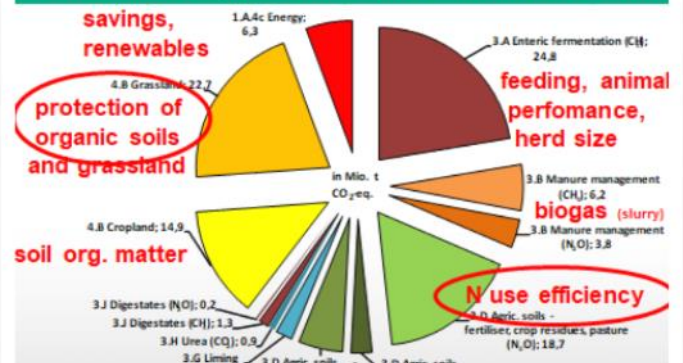
- Introduction of a 'sectoral' reduction target for agriculture
- Reduction by 11 - 14 Mt CO<sub>2</sub>-eq. p.a. by 2030 compared to 2014
- LULUCF sector is currently a net sink, which shall be safeguarded

| Area of action     | Reduction target until 2030 (basis: 1990) | State of reduction in 2014 (basis: 1990) |
|--------------------|---|--|
| Energy sector      | 61-62%                                    | 23%                                      |
| Buildings          | 66-67%                                    | 43%                                      |
| Transport          | 40-42%                                    | 2%                                       |
| Industry           | 49-51%                                    | 36%                                      |
| <b>Agriculture</b> | <b>31-34%</b>                             | <b>18%</b>                               |
| <b>Total</b>       | <b>55%</b>                                | <b>28%</b>                               |

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Practical example of research-based policy advice: Greenhouse gases



## GHG emissions of the German farm sector (ca. 111 Mio. t CO<sub>2</sub>-eq. p.a. = 12,5 % of total GHG; NIR 2017 for 2015)



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## Report on mitigation options (2013), report of scientific advisory boards (2016), impact assessment (2019)



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Practical example of research-based policy advice: Greenhouse gases



## Reduction of N surplus in agriculture = increasing N use efficiency

**EU**

Effort sharing  
Renewable Energy Directive  
Air pollution (NEC-RL)  
Water protection (WFD, Nitrates Dir.)

**Germany**

Climate action plan 2050  
German Sustainability strategy  
Immission control  
Regulation of fertilisation  
Biodiversity strategy

**Activities of Thünen-Institute**

EU-Projects NUTRI2CYCLE (N/P/C-cycling), FAIRWAY (water quality)  
Joint project on GHG emissions from oil seed rape production  
GülleBest – Reduction of NH<sub>3</sub>- and GHG emissions from slurry  
Optimised climate farm II - project component on GHG  
AGRUM DE: Analysis on agricultural water protection  
Evaluation of the fertilisation ordinance, report on farm gate balance, measures on NH<sub>3</sub> reduction

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Practical example of research-based policy advice: Greenhouse gases



## Reports on fertiliser policies Fertilisation ordinance and Farm Gate Balance



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Practical example of research-based policy advice: Greenhouse gases



## Protection of organic soils and reduction of turf use

**EU**

Integration of LULUCF into EU climate policy

**Germany**

Climate action plan 2050:  
Bund-Länder-agreement protection of organic soils  
Coalition contract 2018:  
Strategie for protection of bogs and mires, reduction of turf use

**Aktivitäten des Thünen-Instituts**

Joint project organic soils in emission reporting  
Protection of organic soils in DE  
Grassland on org. soils (SWAMPS)  
Climate Smart Agriculture on Organic Soils (CAOS)  
Monitoring of farmed organic soils (BEWAMO)  
Cultivation of sphagnum moss  
Reduction of turf use: LCA and economic analysis  
Support to Bund-Länder-agreement

Seite 18 | 13.08.2019 | Bernhard Osterburg  
Practical example of research-based policy advice: Greenhouse gases







DWD, inKA Practical Example of research-based policy advice: The case of climate impacts (Cathleen Frühauf)



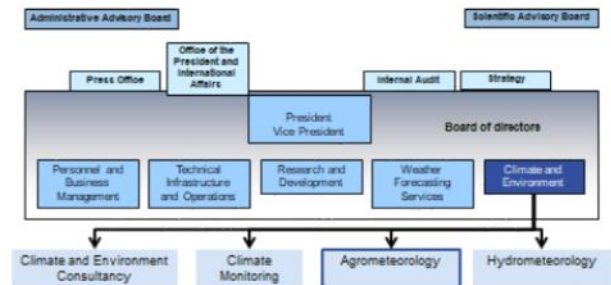
**Deutscher Wetterdienst**  
National Meteorological Service of the  
Federal Republic of Germany

1

DWD

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### Organisation Chart



2

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### Who are the customers of German agrometeorological service?

- agricultural administrations in the Federal States and the Federal Government
- Farmers' association
- farmer and agricultural business for plant and animal production
- gardening, viniculture, orcharding and production of vegetable
- agricultural counselor
- factories for agricultural engines
- agricultural schools and agricultural areas in universities



3

### What are the main tasks?

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

#### Department Agrometeorology

- advisory service for the agriculture
- secure quality and quantity of crops
- "agriculture, according to the rules of a sustainable farming"
- focus on cultivation of grain, root crop, grassland and special crops such as vine, fruits and vegetables



4

## What do the customers want?

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### information about:

- weather forecast (precipitation, temperature, ...)
- water balance, evapotranspiration, soil moisture
- nutrient budget
- soil and canopy climate (crops without and under plastic cover)
- other risks in agriculture and forestry (erosion, forest fire, ...)
- yield optimising (corn moisture, ...)
- development of plant diseases and pests,
- planning the work



5

## Agrometeorology

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### weather dependent information service:

- about 250 parameters from agrometeorological models and procedures

### improvement of agricultural works

- canopy and soil climate
- yield (quality and quantity)
- plant diseases and pest management
- warning for forest and grassland fire
- phenological predictions
- irrigation control



6

## Data source

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### soil

soil type  
soil stratification  
field capacity  
wilting point  
grading traction  
albedo

### plant

plant species  
LAI  
height  
root penetration depth  
stage of development  
albedo

### air

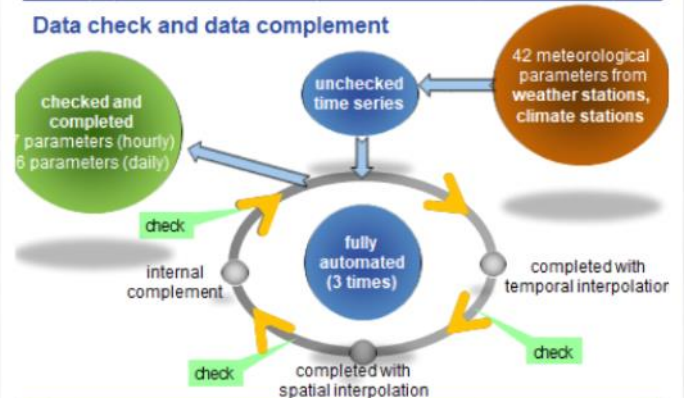
temperature  
dewpoint  
global radiation  
long-wave downward radiation  
wind speed  
precipitation  
cloud amount  
snow depth



7

## Data check and data complement

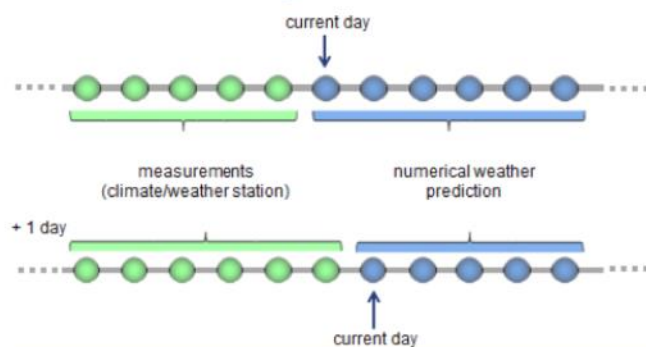
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## Data source for advisory service for farmer

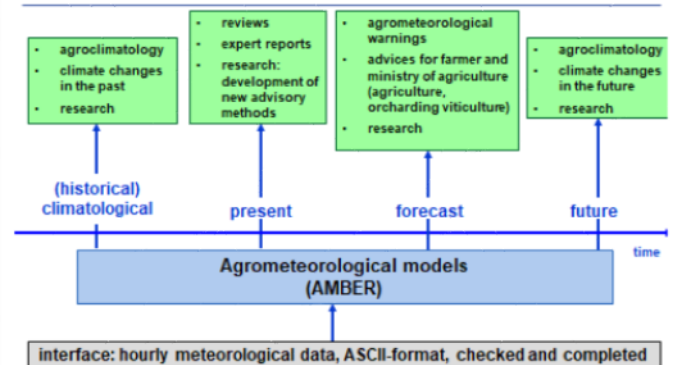
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Wetter und Klima aus einer Hand



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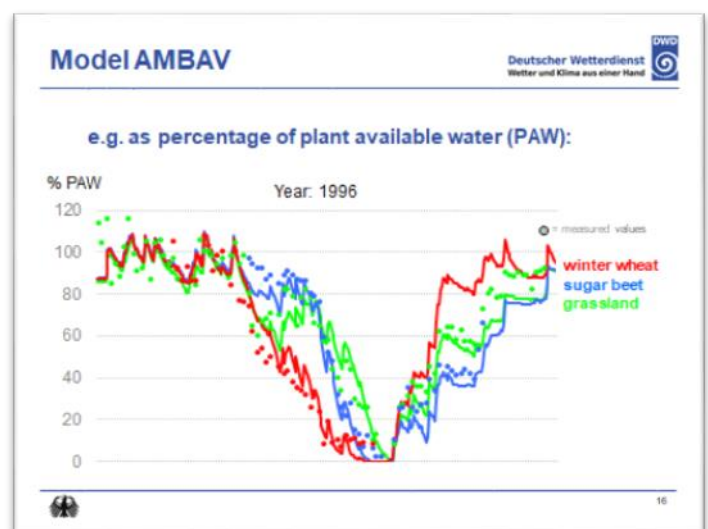
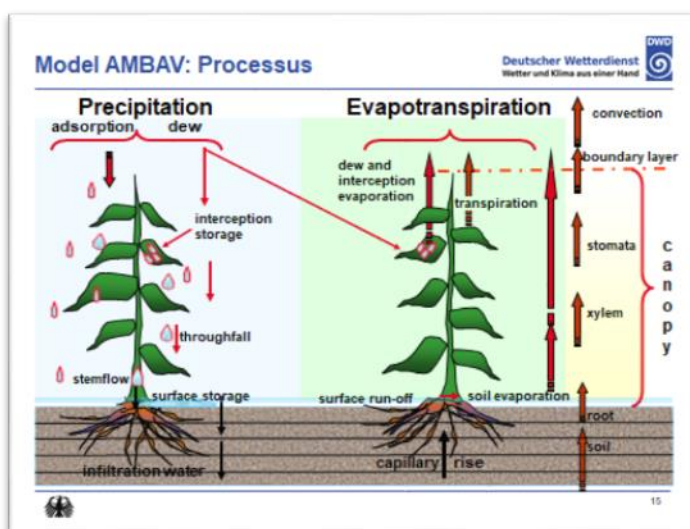
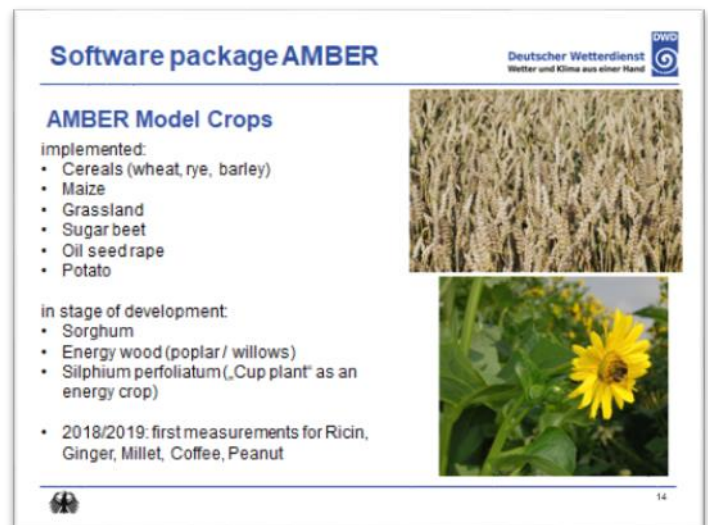
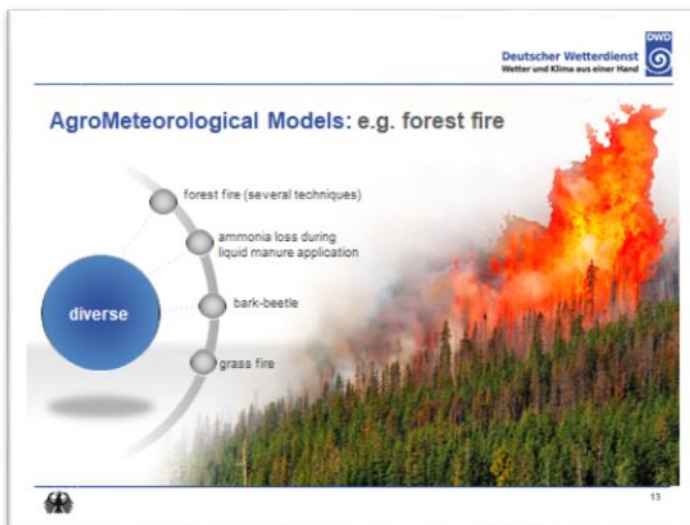
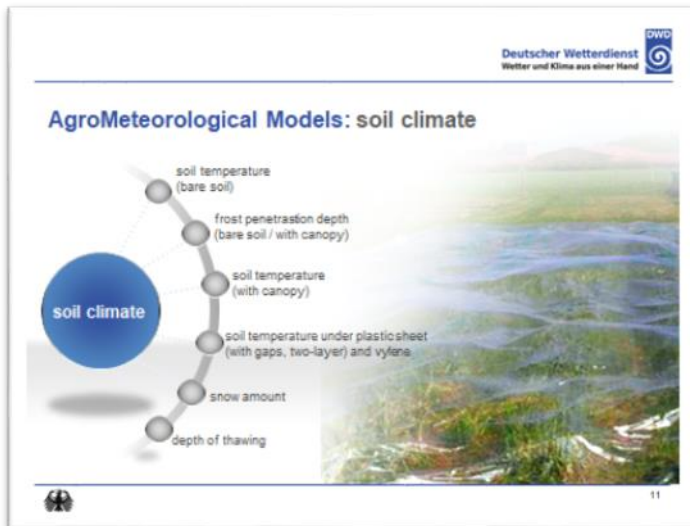
## Method of agrometeorological production

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Wetter und Klima aus einer Hand



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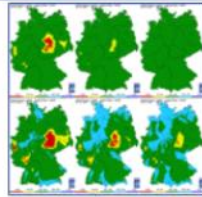


## Use of AMBAV in Germany

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### routine operation:

- plant available water
- irrigation control
- soil trafficability
- Ministry of Agriculture: information about extreme drought and oversaturated soils



### on demand/research:

- analysis of water budget of agricultural crops
- identification of possible cultivation areas

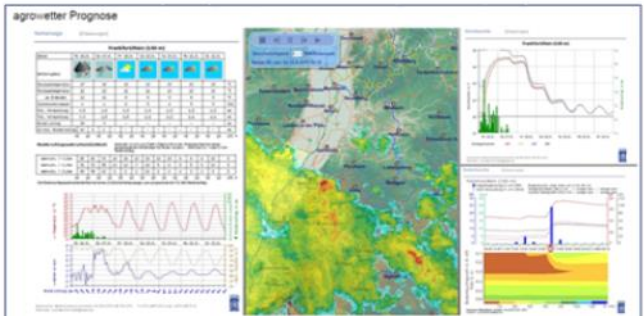


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## Use of AMBAV in Germany

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

[https://www.dwd.de/DE/leistungen/agrowetter\\_prognose/agroprog.html](https://www.dwd.de/DE/leistungen/agrowetter_prognose/agroprog.html)  
(screen view, example)



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## Use of AMBAV in Germany

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

### AMBAV as Impact Model

German adaptation strategy on climate change (DAS):

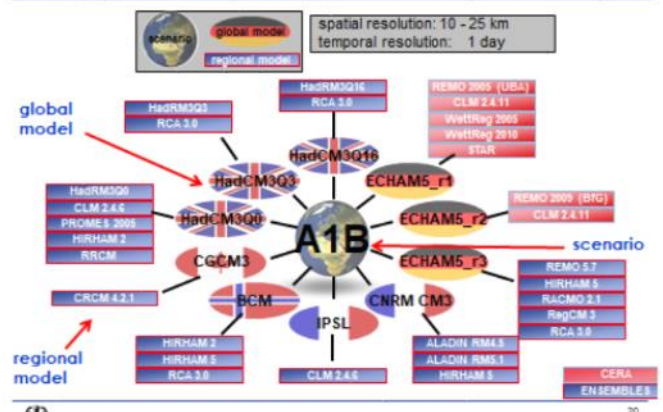
- with climate projections – future water needs of crops
- studies about extreme weather events for agriculture in the past and future
- German Climate Atlas ([www.deutscher-klimaatlas.de](http://www.deutscher-klimaatlas.de))
- Indicator for vulnerability: soil moisture



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## AMBER and climate projections

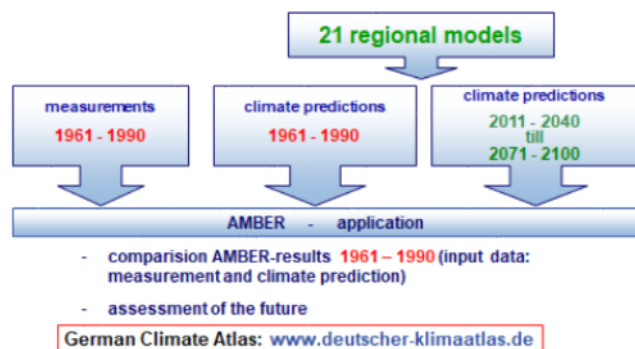
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## AMBER and climate projections

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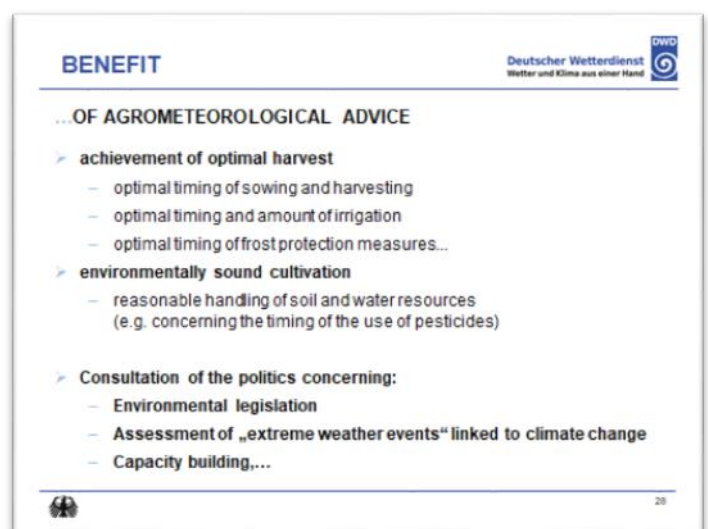
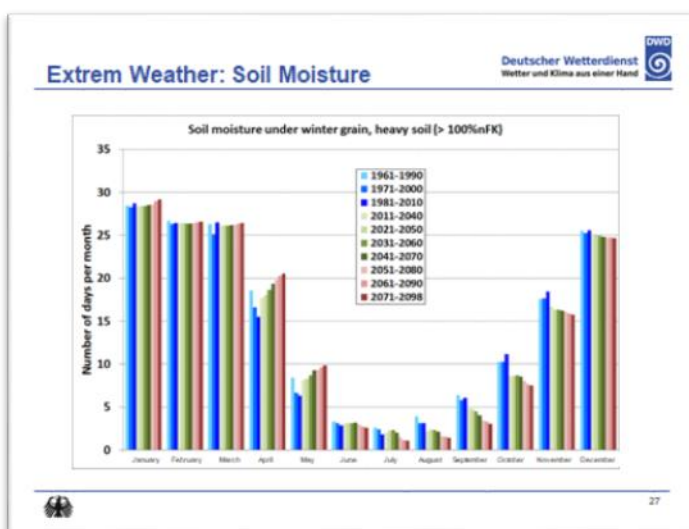
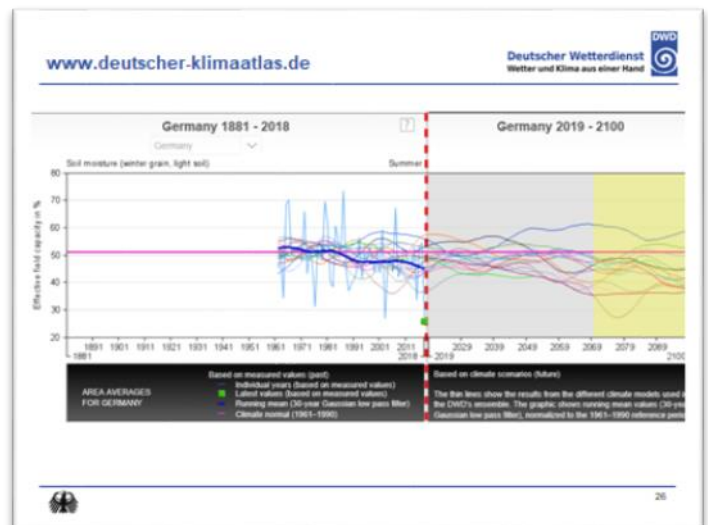
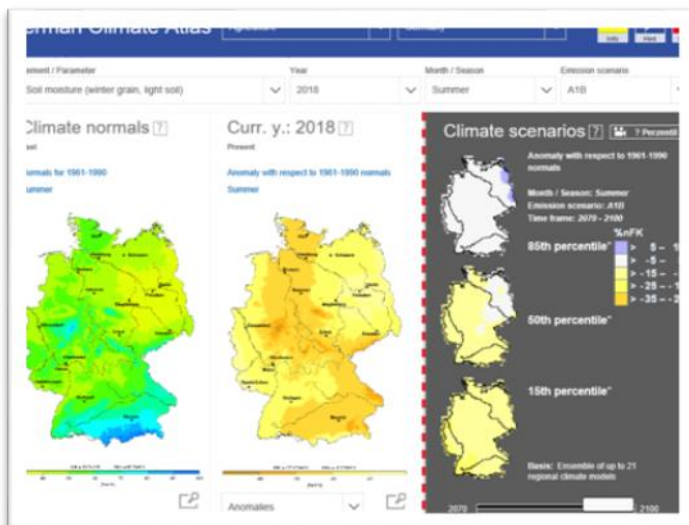
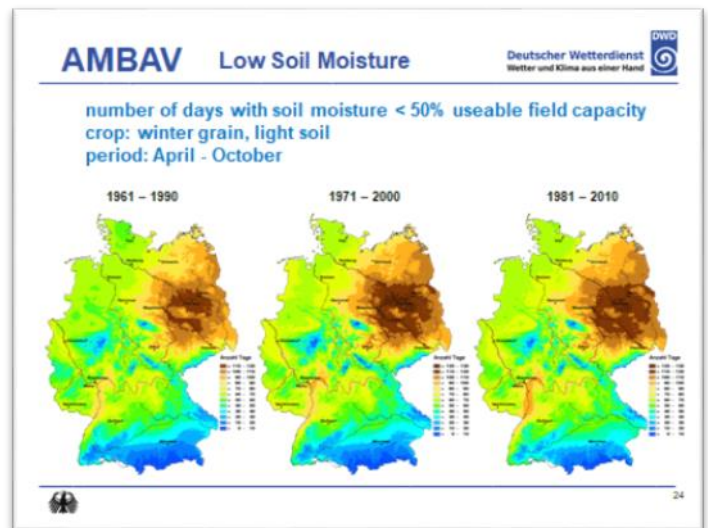
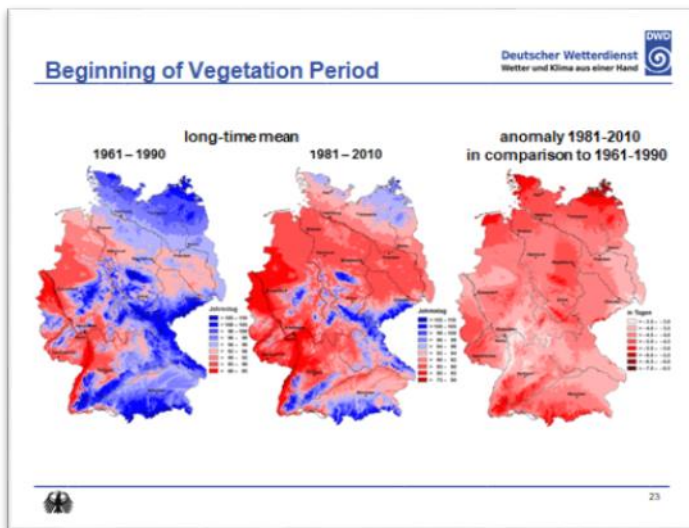
## German Climate Atlas

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand



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**inKA**

**interdisciplinary contact point Agrarmeteorology (inKA)**

- central contact point for federal agencies for interdisciplinary questions about weather and climate impacts on agriculture and forestry
- important contribution for research-based policy advice of the 3 institutions Thuenen Institut, Julius-Kuehn Institut and DWD
- founded 2018



Prof. Dr. P. Becker (DWD)    Prof. Dr. G. Backhaus (JKI)    Prof. Dr. F. Isenmeyer (Thünen Institut)

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**inKA**

**Goal**

- Pooling of expertise of the institutes
- Enhancement of teamwork
- use of synergy effects
- Avoidance of duplication of work
- Reduction of costs and manpower requirements

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**inKA**


**3-stufiger Ansatz**

1. Daten vorhalten  
Auflistung der vorhandenen Daten → schnelle Beantwortung möglich
2. interdisziplinäre Fragestellungen beantworten
3. gemeinsamen Forschungsbedarf identifizieren und interdisziplinäre Forschungsvorhaben anregen und wichtige Forschungsfragen in den politischen Prozess bringen.



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**Agrarmeteorological research and modelling**




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**AMBAV – soil moisture**

**agrarmeteorological modelling:  
z.B. soil moisture in %nFK (1995)**

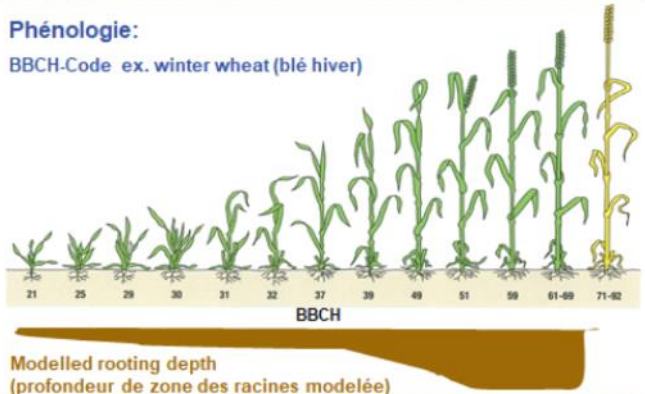
über 20 Jahre kontinuierliche Verifikation der Modellergebnisse



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**AMBAV: new crops**

**Phénologie:**  
BBCH-Code ex. winter wheat (blé hiver)



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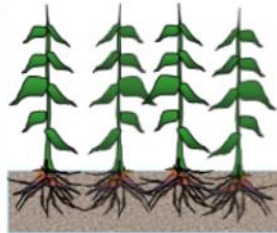
## Canopy Height and Root Depth

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Wetter und Klima aus einer Hand

during the vegetation period

**Canopy height:** information for aerodynamic resistance  $r_a$  and to estimate LAI

**Root depth:** information from with soil layers the crops can extract water



35

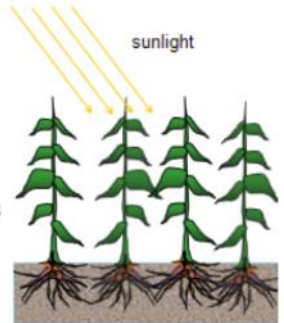
## Leaf Area Index (LAI)

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

Leaf area in  $\text{m}^2$  per  $1 \text{ m}^2$  soil surface

LAI determined:

- Transmission of sunlight through the canopy
- Interception of water
- Reduction of precipitation, which is reaching the soil surface → influence on soil moisture

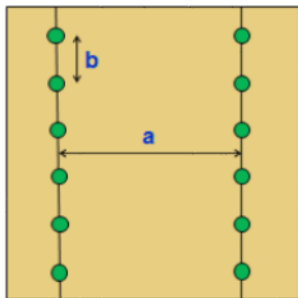


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## Canopy Characteristics (First Step)

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

Distance between Rows (a) and Plants (b):



Information about:

- number of plants per  $1 \text{ m}^2$  or  $1 \text{ ha}$
- during the development of the crops (e.g. weekly)
- canopy height
- photos



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## „AMBAV global“ / main model characteristics

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

Penman-Monteith evapotranspiration relationship

$$\lambda E_c = \frac{\frac{\partial q_{sat}}{\partial T} \Big|_{T_a} (R_n - G)_c - \rho_a c_p \frac{q_a - q_{sat}(T_a)}{r_a}}{\frac{c_p}{\lambda} \left( 1 + \frac{r_c}{r_a} \right) + \frac{\partial q_{sat}}{\partial T} \Big|_{T_a}}$$

Aerodynamic resistance  $r_a = f[vv, h_a, z_0=f(h_c)]$

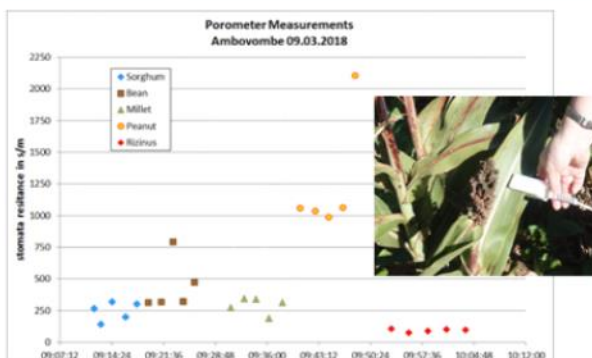
Bulk canopy resistance  $r_c = f[r_a, r_v=f(r_{st}, LAI), r_s]$



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## Stomata Resistance

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand



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## Objectives of the Cooperation in Madagascar

Deutscher Wetterdienst  
Wetter und Klima aus einer Hand

- Start of a cooperation between DGM and DWD in the agricultural sector
- Capacity building for national stakeholders in order to:
  - Produce a more realistic forecast about the water availability and water need of agricultural crops
  - Which could enhance the agrometeorological information products in Madagascar



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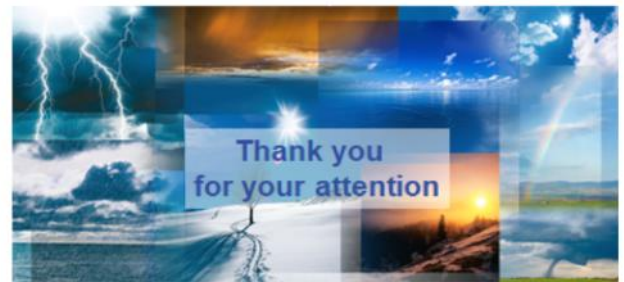
## Key results of the Mission



- There are technical and human capacities to run the model AMBAV
- High motivation of the technical experts involved
- We are optimistic based on the first impression, that AMBAV can be adapted and be used in Madagascar
- Constraints encountered:
  - Data transmission and storage
  - Phenological observations
- The agrometeorological products could benefit from the outputs of AMBAV



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## Writing Policy Advisory Statements – Examples (Claus Deblitz)

THÜNEN

## Writing policy advisory statements - examples

Claus Deblitz  
Thünen Institute of Farm Economics



Braunschweig 14.08.2019 PHD Summer School Germany, 2019



## Which forms of policy advice exist?



**Telephone / oral**



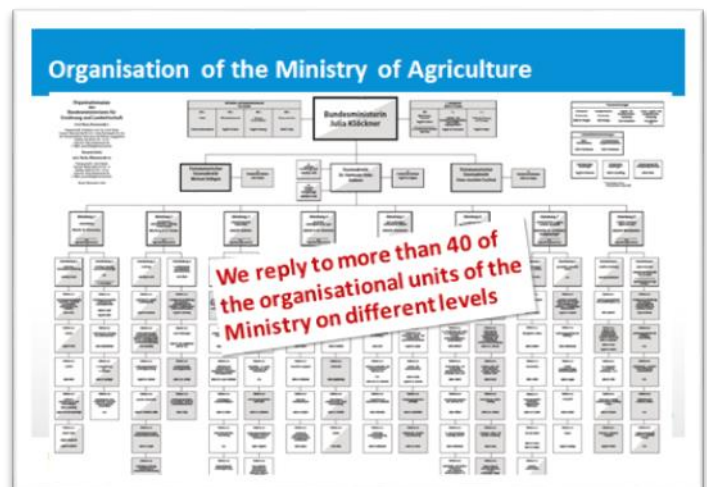
**Meetings  
Secondments**



**Written**  
(sometimes PPT)

- Short Email statements / assessments (< ½ day)
- Formal written statements reflecting on or more specific questions (> ½ day)
- Reports with substantial length and involvement of many colleagues (example Baseline)
- Concept or strategy papers
- Commentaries / reviews of third party papers (for example OECD)

Page 3 14.08.2019 Claus Deblitz Writing policy advisory statements agri benchmark THÜNEN



## How many days of policy advice are we doing p.a.? (number of days per year for advice to the Ministry)

| Institute                        | Type of advise                     |                           | Subtotal | Secondments | Total |
|----------------------------------|------------------------------------|---------------------------|----------|-------------|-------|
|                                  | Written (Statements, Reports etc.) | Participation in meetings |          |             |       |
| Institute of Rural Studies (LR)  | 748                                | 221                       | 968      | 21          | 990   |
| Institute of Farm Economics (BW) | 861                                | 109                       | 969      | 32          | 1001  |
| Institut of Market Analysis (MA) | 340                                | 107                       | 447      |             | 447   |

Source: Thünen Jahresbericht 2018

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## Examples for results and their further use



Thünen Working Paper 110



Pig Network

Page 6 14.08.2019 Claus Deblitz Writing policy advisory statements agri benchmark THÜNEN



## Other issues

- ▶ **No abbreviations** (only after introduction)  
... carcass weight (CW)
- ▶ **No scientific units:** **USD 10 kg CW<sup>-1</sup>**
- ▶ **Write text instead of units**  
„USD 10 per kg carcass weight“ instead of „USD 10 / kg CW“
- ▶ **Make conclusions after each chapter\* and try to make a transition to the next chapter. Example:**

*„The analysis has shown that the boar fattening and the immunocastration with Improvac can improve animal performance. In contrast, the surgical measures with anaesthesia regularly lead to a reduction of performance. In the next chapter, we analyse their effects on the costs and the profitability.“*

\* If properly done you can copy-paste them as a basis for your summary

## Hope to see you again



Dr. Claus Deblitz

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