
Bringing together stakeholders' interaction and economic modelling: Recent experiences in designing research and agricultural policy

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ABSTRACT

Policies are becoming intensively interrelated while increasing numbers of societal groups and stakeholders are affected. At the same time, current and future challenges require improved capacity in terms of models, their linkages or redesigns to deliver forward-looking insights on policies. Different stakeholder workshops have recently been applied in two projects to support these activities, including stocktaking, inputs for narratives, feedbacks to outcomes, acceptance of analysis and drafting future research agendas. This paper describes approaches applied in both projects, shortly presents their results and findings to finally draw some general conclusions.

Keywords: Stakeholder, Modelling, Agricultural Policies, Climate Change

1 Introduction

Policy assessments in the area of agri-food are often based on simulation results of applied models. Hence, policies are becoming intensively interrelated while increasing numbers of societal groups and stakeholders are affected. At the same time, current and future challenges require improved capacity in terms of models, their linkages or redesigns to deliver forward-looking insights on policies. Different stakeholder workshops have recently been applied to support these activities and to generate political solutions for problems at hand as the example of two recent projects show. In course of the EU-funded project 'Support for Policy Relevant Modelling of Agriculture (SUPREMA)' aiming to identify future directions for agricultural modelling three stakeholder workshops were conducted whereas the first one defined needs and challenges for model development and set priorities, the second focused on the definition of detailed narratives for medium-term EU Common Agricultural Policy (CAP) instruments and long-term climate change mitigation policies to test improved and linked models while the third one captured stakeholders' feedback to the outcomes of the narratives and took stock of future research requirements. Stakeholders invited to the mentioned workshops covered a broad range of societal actors: policy community, businesses in the value chain including farmers, the scientific community, civil society and Non-governmental Organisations (NGO) among others.

In contrast, the second group of stakeholder workshops held within the project 'Scenario study on future directions for the development of Dutch agriculture in 2050' aimed at supporting the discussion of the Dutch 'Climate Table for agriculture and land use'. First of all, all the members of the Climate Table were involved in the definition of several packages of mitigation measures that were formulated in terms of reduction of greenhouse gas emission, ammonia emission, and nitrate- and phosphate-leaching and run-off. In a second stage of the project, they were confronted with the expected economic, social and environmental consequences of the potential implementation of the mitigation packages previously defined. Expert workshops were organised in order to identify and further refine the parameter values that were used to populate the different simulation models utilised in this study.

The paper deals with the question how stakeholders' interaction can generate input for economic modelling. It is based on recent experiences in designing research and agricultural policy mentioned above which are used as case studies to assess this question. The paper is set-up as follows: The second

section after this introduction presents a short description about stakeholder workshops in general as well as advantages and challenges are presented. Subsequently in a third section, the different stakeholder workshops of the two considered projects are summarized while in a third sections findings of these workshops are compiled and assessed. A fourth section summarize the findings and final section provides some conclusion.

2 Stakeholder involvement as tools to generate input in participatory processes

Stakeholder workshops are special forms of stakeholder dialogues in participatory approaches intending to provide information or to consult the public respectively affected population groups (Völker et al., 2018). They may differ according to their participation and overall aim (ibid), namely to provide information, to capture opinions, gain information or assess experiences of the stakeholders, so that, directly or indirectly stakeholders are involved. Plans and solutions can jointly be developed and implemented. Problem-oriented dialogues are usually held in cases of critics or loses of credibility (Leitschuh-Fecht and Bergius, 2007) while strategy-oriented ones are mostly ongoing processes to be able fast future actions (Leitschuh-Fecht and Bergius, 2007). Project-related dialogues often involve various stakeholders along the entire process (Leitschuh-Fecht and Bergius, 2007; Litschel and Schramm, 2010). Stakeholder workshops form involvements which also enable common learning through the thematic discussions and elaborations so that repeated meetings can be used in negotiations processes (Schramm, 2012). Often actors from politics and administration, non-governmental organizations and different types of companies, experts and scientists as well as consumers and citizens are included (Schramm, 2012). Thus, diverting perspectives and needs as well as differentiated knowledge on the problem on hand come together as various stakeholders bring their specific expectations and their individual expertise along contributing in observational, advisory, and decision-supporting ways (Litschel and Schramm, 2010). Organisation and structure of the workshops often follow different routes depending on the questioned regarded and the groups involved.

In general, stakeholders' involvement may promote acceptance and transparency (Völker, et al. 2018) while exchange on information and results may increase credibility and minimize room for possible criticism (Litschel and Schramm, 2010). In addition, local knowledge and commitment are captured (Völker, et al. 2018). Thereby, potentially different interests and areas of tension may be addressed and empirically assessed in research (Schramm, 2012) and also direct and real reaction of the stakeholders can be observed and included in further project design. Simple transmission of decisions may act counterproductive (Litschel and Schramm, 2010) while stakeholder workshops can be converted into networks of stakeholder groups benefiting all by long-term future collaborations (Schramm, 2012) as well as from "cross-actors" cooperation (ibid). Different groups, actors, economic sectors or scientific disciplines are all affected and, therefore, required to find joint solutions to deal with challenges and divers demands, expectations, and interests.

Also, formal normative processes may be supported by stakeholder involvements workshops. The OECD (2012) advises that „governments should co-operate with stakeholders on reviewing existing and developing new regulations" whereas they should engage all relevant stakeholders in the process maximising effectiveness of information and making all relevant material available according to needs of those affected and cooperate with them in (re)design of regulations. The OECD also states that a "public participation of stakeholders [...] can help governments understand citizens' and other stakeholders' needs and improve trust in government" (ibid). Stakeholder engagement in regulatory processes provides expertise, perspectives, and ideas for alternative actions and helps balancing opposing interests, identifying unintended effects and practical problems, providing a quality check on assessments, identifying and facilitating interactions between different regulations (OECD, 2017). Stakeholder engagement can increase compliance with the regulation as stakeholders may adjust to changes more easily if these are announced with sufficient time and input by stakeholders themselves to overcome challenges. Stakeholder involvement may render a kind of shared ownership of outcomes that may motivate compliance.

Challenges of stakeholder workshops as an active form of participation arise in relation to their complexity and their needed efforts. Compared to surveys, increased resources are often required (Schramm, 2012), both in planning and in implementation to be balanced by worthwhile benefits (Völker et al., 2018). Certain stakeholder groups may assert their particular interests above other interests if only stakeholders with greater influence are given a voice while other interests are suppressed and thus, exerting negative impacts. Public interests in the problems might be limited and, therefore, no useful output is produced (Völker et al., 2018). Another disadvantage may lie in the small number of people invited, their selection process, and in their accessibility, especially in repeated meetings. It may also

happen that stakeholders are affected but have not expressed any interest or are wrongly excluded (Litschel and Schramm, 2010).

With respect to formal regulatory processes one has to ensure that stakeholder engagement is not perceived as replacements of formal procedures in representative democracy. Risks are relatively pronounced to stakeholder involvements are captured by pressure groups pursuing their interest in an unbalanced way and in the difficulty to reach certain stakeholder groups and the wider society. Engagement of stakeholders may be timed too late, namely when the actual decision has already been made and options for further changes are limited. Further risks cover frequent involvements, insufficient information, or very low reflection inputs in the final outcomes (OECD, 2017).

Special challenges prove the involvement of stakeholders in case of controversies in regulations design. Here the involvement of stakeholders may enable balancing trade-offs between different effects and interest groups. Initiatives may apply random selection of participants to ensure representation of larger population groups to avoid disproportional influence of certain interests (OECD, 2020). The OECD also reflects in detail on possible approaches to solve the conflicts like for example “problem-solving (where policies are re-designed in an attempt to accommodate the different values at stake) and deliberation (where stakeholders discuss why certain values are important in an attempt to clarify and potentially resolve value conflicts” (ibid).

3 Recent examples of stakeholders’ interaction in economic modelling

3.1 SUPREMA workshops to capture input and feedback to model scenarios and define needs for future directions for agricultural modelling

The EU-funded project SUPREMA* aimed to improve the capacity of current models, connect or redesign them to deliver empirical evidence on increasing varieties of policy objectives, and also to explore future directions for agricultural modelling in light of future needs. Where possible SUPREMA sought to close the gaps between expectations and the actual capacity of models with current resources to deliver relevant policy analysis and to identify gaps for further research. The SUPREMA model family includes ‘core models’ already used in European impact assessments in agriculture, trade, climate and bioenergy policies. In a number of scenarios, linkages between different models and limited model improvements were to test the current possibilities of the SUPREMA toolbox.

3.1.1 Set-up of SUPREMA workshops

During the project, three stakeholder workshops were conducted to capture the view and input of stakeholders. They participated in identifying challenges and needs of anticipated future policy support and requirement for model-based policy analysis in a first workshop, for details see Salamon et al. (2018a). In a second workshop, they were involved in defining the narratives for the scenarios to test the ability of the SUPREMA toolbox, for details see van Leeuwen et al. (2019a) and finally, in the third workshop, they validated draft outcomes and improvements in order to help phrasing future research prospects beyond the scope of SUPREMA, for details see Salamon et al. (2020a).

In the three workshops, similar stakeholder groups were addressed. Identified stakeholders covered a broad range of societal actors: policy community, businesses in the value chain including farmers, the scientific community, civil society and NGOs among others. Stakeholders were not involved in a regulatory process where they might be directly affected by the decisions or its implementation schemes although policies were discussed during the process. Instead, stakeholders were involved to gain additional insights into different subjects where the stakeholders may have broader knowledge, where they could be involved in preparing of decisions, where they could seek additional knowledge to support their own decisions or where they could be affected by decisions of others.

All workshops took place in Brussels between 2018 and 2020. The first was organised back-to-back with an AGMEMOD workshop on ‘Medium-term development of agri-food markets in EU Member States’ a with a number of European market experts involved. For each stakeholder groups considered lists of likely participants were compiled and invited, whereas in the first workshop a focus was on Brussels based stakeholders and experts from the back-to-back workshop. The invitations and two reminders were issued per mail. Invitations to participate were cancelled with the reasons of timing or limited/unavailable

* Details can be found at the SUPREMA website: <https://www.suprema-project.eu/>

experiences with models and their outcomes. Positive were personal relations and the back to back workshop minimizing travel time. If stakeholders declined participation the respective list was extended. At the second and third workshop additional efforts were invested in a sound regional distribution of participants including reimbursed of travel cost. Between 60 to 120 likely participants were invited while 30 and 35 participated.

The stakeholder workshops were organised in an interactive way and covered most part of a day, in all workshops an introduction explained either the project or draft outcomes and a wrap-up provide some first conclusions. The remaining time workshops consisted of interactive parts with following elements:

- Defining of future challenges and needs for the agri-food systems by writing topics on cards on different flipcharts (1st workshop);
- Three stakeholder group discussions (1st workshop) on challenges, needs, and shortcomings of the current model outcomes on (i) a global perspective covering climate change, sustainable development goals (SDGs) and resource constraints; (ii) market and value chain perspective with international integration, supply chain, societal concerns and ethical issues; and (iii) a farming perspective with adaptation, mitigation and adoption of new technologies;
- Additional inputs in a running world café to identified challenges and needs (1st workshop);
- Prioritising of needs and challenges (1st workshop) by limited points;
- Presentations with discussion in separate groups and cards on flip charts to define the narratives on (i) baselines including alignment of assumptions across models, on (ii) a medium-term CAP related scenario and on (iii) a long-term climate change mitigation scenario (2nd workshop);
- Presentations on selected draft results of baseline and the two scenarios followed by questions of attendees and respective interactive sessions in two parallel groups at flip charts addressing whether relevant questions are covered, what additional improvements would be required, which caveats would be seen and which future needs should be covered.
- Presentation on first insights into conducted model improvement and linkages accompanied by content related questions from the participants;
- World café to provided outcomes to the questions: ‘What is the way ahead? Where are we, what do we need and what is missing?’ on six separate posters:
 - Farmers’ decision and their reactions to a changing environment?
 - Demand side adequately reflected?
 - Supply chain - what is missing?
 - Are SDGs addressed efficiently?
 - Testing on CAP and climate change policies - what are we missing?

Under the Chatham-House rules no recording taken place. Moderator and rapporteurs were allocated for each discussion. Moderators and rapporteurs were given detailed instructions, rapporteurs took notes of the different discussions and prepared overviews All written contributions also were photographed. Notes on oral contributions were compiled.

SUPREMA showed by a number of medium-term and long-term scenario analyses which included linkages between different models and also limited model improvements the current possibilities of the SUPREMA toolbox to analyse policy options and support policy decisions by quantitative analysis. Stakeholders participated in the whole process by identifying challenges and needs in future requirement of model-based policy analysis, by defining the narratives to test the ability of the SUPREMA toolbox and finally, by validating outcomes and improvements in order to help phrasing future research prospects with respect to challenges going beyond the scope of SUPREMA.

3.1.2 Selected Outcomes

Content wise, the outcomes of the different workshop are shortly summarized as follows, details on workshop outcomes can be found in Salamon et al. (2018b), Havlik et al. (2019) and Salamon et al. (2020b). Four general considerations with respect to models could be worked out:

- Data requirements of models are, in general, high while scarcity of information and its quality is apparent. Therefore, modellers have to be flexible in their data use but model linkages require harmonisation and alignment. A joint data strategy is required reflecting new data sources,

availabilities and data access.

- Continuous efforts will have to be put on maintenance of models to keep them up-to-date and ready to use in case of upcoming new policies.
- Model linkages are perceived as strong option to capture interactions between agriculture, trade, climate and related policies and to cover impacts in economic, social and environmental dimensions. Increased complexity requires new linkages with additional types of approaches like biophysical models, mixed-method approaches as well as household models. Harmonisation of outcomes is core and considered as area for further research. Due to limitations in harmonisation processes a better communication of differences is crucial.
- An improved communication between modellers and stakeholders in an easy understandable way is strongly emphasised. Both, definitions and implementations of scenarios as well as outcomes, require careful handling and communication needing efforts and resources.

A number of topics were identified by stakeholders which, from their perspective, require additional efforts in future research:

- Policy measures and implementation schemes are key for model-based policy assessment comprising a wide field of policies from SDGs over trade policies, CAP implementation schemes in the European “Farm to Fork” strategy and the “Green Deal”, from the EU budget and rural policies to climate change policies (Paris Agreement). Additionally, other policies affect the agri-food sector as well. All policies adapt to a changing environment which, in turn, induce required adjustments in modelling. Monitor likely changes is preparatory ex ante impact assessments so that models can be prepared and linked accordingly.
- In most models, individual behaviour of farmers and their adoption of policies together with the farmers’ heterogeneity across the EU is not fully considered in models. Therefore, understanding farmers’ behaviours are important to be reflect uptake of measures, risk management tools or technologies adequately. Additionally, investment decisions, structural changes and diversification should be improved. Links between farming, biodiversity and performance indicators are needed. Bottom-up approaches like agent-based modelling or integration of decision-making units into models may lead to further insights.
- At present, consumers are represented mostly by homogenous behaviour and products. Differentiation of consumer groups may allow to depict health needs and diverting ethical beliefs while differentiation of food qualities would enable to reflect preferences for organic products, requests for higher animal welfare and different types of footprints. A link to health-related consequences may better reflect impacts and an implementation of a food system approach would capture economic, social and environmental impacts simultaneously.
- Coverage of the whole value chain would help to assess impacts across the whole agri-food system from primary production to the final use including residues or waste. Representation of the complex relationships between involved agents and decision processes would connect consumers/citizens with producers. Currently, the value chains are only modelled stylized at aggregated levels. Price transmission, concentration, market power and specialisation in the value chain and the (bargaining) position of farmers will need more research.
- Bio-economy describes the transition of the fossil resource-based economy into a sustainable bio-based economy. Since this process is partly unknown and expected interactions are manifold, research is needed for modelling the transition. For proper representation, data and parameters of material flows for bio-material and bio-energy, waste, and residues as well as fossil-based substitutions is needed to better reflect circularity.
- Sustainability indicators reflect outcomes in economic, environmental and social dimension. Regarding climate change, this requires a good biophysical representation of agriculture, including its interaction with the biosphere. Currently, most efforts to reduce CO₂-equivalent emissions are on primary production; but the coverage of CO₂ or methane footprints along the whole supply chain depict room for improvements. A circularity approaches should model nutrient cycles with reduced fertilizer use, lower feed imports and waned nutrient losses to the environment. Coverage of footprints may be strengthened by a combination with LCA approaches.
- Technologies, innovation processes and adoption play an important role in agriculture GHG mitigation. Improved technology may reduce emissions but they are mostly exogenous in models. Stakeholders requested model adjustments to capture innovations in input use and climate change mitigation and put also an emphasis on new technologies concerning digitalization and automated processes on farms

and in supply chains.

3.2 Stakeholder and expert involvement in the context of a scenario study on perspectives for Dutch agriculture in 2050

The Dutch example of stakeholder and expert involvement took place in the context of a scenario study on perspectives for Dutch agriculture in 2050 issued by Dutch Ministry of Agriculture, Nature and Food Quality based on the idea of private stakeholder organization to enable it to come with own proposals and solutions to address the longer terms GHG reduction commitments the Dutch government had made (Paris Agreement). The idea was to provide the stakeholders with the opportunity to come with their own solutions in a stakeholder process. The study was needed to get more insight into the consequences of possible future development in Dutch agriculture for achieving those future climate and environmental targets. There were the notion that reasonable and feasible outcomes would be considered in solving the Dutch Climate Table.

3.2.1 Set-up of the Stakeholder Involvement

The stakeholders invited were a selected from a set of societal organizations covering the broad interests ranging from the involved actors in the sector with farmers, food processors and agribusiness to the non-governmental organizations with foci environment, animal welfare and biodiversity. The organizations could change during the process. In general, they were represented by one person and a replacement but also the involved persons could change. In general, about 25 groups were present. Originally, the government indicted groups who should be invited respectively be presented but others groups could be added as well. An emphasis was put on the dialogue and the exchange between those group with diverging interests among each other. Discussions were conducted mostly as round table discussions supported by presentations, notes on white boards, and flip charts.

The meetings were chaired by an independent and well-known former politician appointed by the government but given a mandate. This person had an incentive to come with proposals shared by a wide stakeholder group and fitting the challenging policy objectives. Governmental representatives were not regarded as stakeholders in the process. Although they were joining in the meetings they were only involved as observers and supported the process by secretariat-services.

Additionally, experts were invited at different stages of the process. The NGO initiating the process together with the chair and a small executive committee were taking and executing the final decisions. Hence, stakeholders themselves could also invite additional researchers or present studies to support their positions. Experts and researchers did not take final decisions on values or parameters unknown, but indicated related uncertainties. If experts had to provide scores these were mostly done by rankings.

Basic ideas on different scenarios were derived from the stakeholder process. But the process also depicted that very opposing and conflicting interests of the stakeholders involved limited the possibilities of applicable solutions. During the process, researchers gained a mediator role and the final scenarios were the outcomes of an interactive process involving stakeholders and researchers, where researchers contributed additional knowledge in areas with high complexity, added insights in trade-offs and 'slacks' whereas slacks comprise possibilities to make adjustments to scenarios aiming to keep their original orientation but satisfying stakeholders' interests as much as possible - utilizing all Pareto-improving options the group was able to agree on.

Designing the scenarios was challenging as the stakeholders had conflicting interests, e.g. should the livestock reductions affect all the sectors in a proportional way or should those sectors that pollute more face stronger reductions or should the reductions consider contributions of the sector to the value added. Therefore, stakeholders found it difficult to commit themselves to certain story lines. This conflict was solved by model outcomes that showed transparently which could be the most suitable ('the optimum') livestock reductions which could be implemented complying with the environmental regulation of the Netherlands. Stakeholders were confronted with those outcomes so that they could react on them, validate or reject them if they were not plausible. The uncertainty in the process was perceived as severe and made participants careful in expressing clear opinions.

Despite those to be expected problems the experience was perceived as highly positive. The topic of the study was highly sensitive and therefore all interactions helped to engage the stakeholders in the study and the modelling exercise. The process was also very useful from the point of view of gathering expert information and creating joint commitment with the final results.

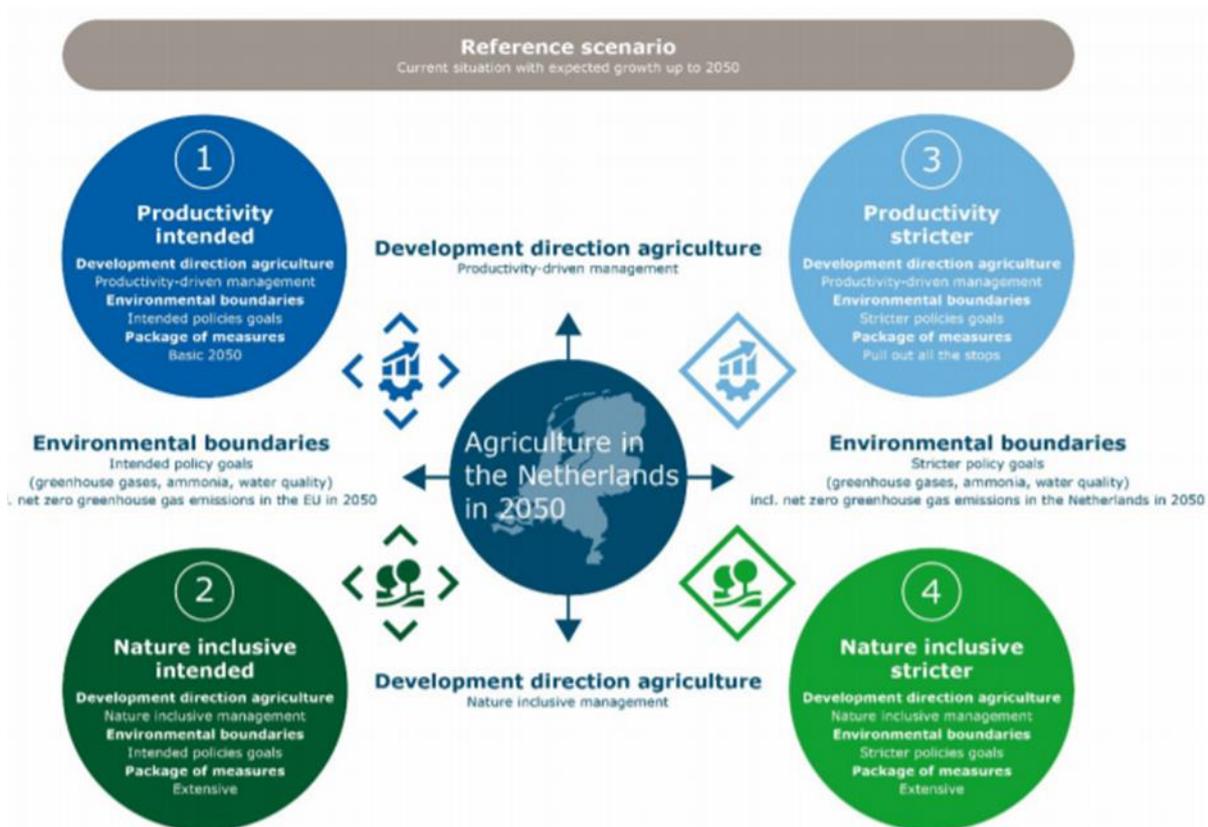
3.2.2 Selected outcomes

Four different scenarios have been developed in interaction stakeholders and with additional input from

experts. Figure 1 provides a quick characterization of the scenarios, which were positioned along two dimensions: i) the environmental operating space; and ii) farm strategy/development.

Developing this study (Gonzalez-Martinez et al., forthcoming) raised several issues, of which one was related to the determination of future environmental emission coefficients. The 2050 horizon-imposed difficulties in that one has to form oneself a good judgement about the available emission reduction and abatement technologies. Part of these are already known, but for several others knowledge was very limited, since certain technical measures farmers can take are still at an embryonal stage of development. There were also futuristic technologies, directions that could offer potential, but were not really developed yet. The uncertainty was not only coming from the availability of emission reducing technologies, but also about the potential degree and speed of farmer adoption of such measures. An issue here was that the changed policy context (more strict future emission standards) could affect the implicit incentives to adopt new measures), whereas also side policies (e.g. subsidies from the future CAP) could influence the economic incentives associated with farmer technology adoption.

The economic dimension was not only of interest because of the impacts it could have on farmer technology adoption, and for that reason on the reduction of environmental emissions by the adoption of technical measures. There was also a direct interest in the farm income consequences. On the one hand the Ministry of Agriculture and stakeholder groups, e.g. farmer unions, wanted to have insight into the income consequences for farmers, but on the other hand it was also felt that financially viable farms



would be needed in order to have them making the required future investments.

Source: Lesschen et al (2020)

Figure 1. Four scenarios, characterizing potential pathways for the development of Dutch agriculture

In the modelling exercise market impacts in terms of product revenues and agricultural inputs of which feed is the most important one could be assessed, but no cost of measures and associated investments were considered. In order to make an estimate of costs and benefits a group of farming and sector experts was employed. This took place in two rounds:

- In a first round, experts were introduced to the setting and types of measures discussed. This yielded insights into the different aspects of the potential new but still largely unknown measures. The interaction between researchers and experts helped to get a better view on potential cost and revenues. In the first, round table discussion potential analogies between potential 'new measures'

and already existing ones were discussed. It became clear that it would be impossible to make reliable quantitative estimates.

- In a second round, experts were provided with score sheets and asked to score a set of potential new measures in a qualitative way. Based hereon 'average scores' of the measures were calculated. Additionally, the expert got the opportunity to react and to comment on the outcomes.

The outcomes for the dairy and arable sector are presented in tables 1 and 2. The qualitative scores indicate expected cost and revenue changes relative to the reference scenario at primary production level of two farm types (dairy and arable). Several cost entries were depicted: land price, cost associated with manure disposal, direct cost, cost associated with buildings, labour and contractor cost. With respect to the farmers' revenues, the experts were asked about market impacts (price changes), the potential to sell products at a premium (green label), the revenues farmers could obtain from providing other services, e.g. green services, biodiversity outputs.

The estimates were 'composite estimates' in that experts tried to make estimates for the different scenarios, in which farmers were assumed to adopt scenario-specific sets of measures (see details in Lesschen et al., 2020). A + indicates an increase relative to the reference scenario. In case of a stronger effect the exports could use ++, or even +++. Note that for a cost a + indicated a higher cost, which will then have a negative impact on farm income.

Table 1. Qualitative evaluation of the differences between different mitigation scenarios in costs and returns for dairy farms (relative to the reference scenario)

Sector: dairy	Expected differences in costs item:					Expected differences in development of farmer revenues because of:		
	Mitigation scenario:	Land	Manure disposal	Direct costs*	Buildings	Labour, contractors, machines	Price changes (supply/demand)	Premium value form markets
Business as usual	0	+	+	++	+	0	+	0
Nature inclusive – EU challenge	++	-	+	+	+	0	+	+
Productivity driven – NL challenge	+	++	++	+++	+	0	+	0
Nature inclusive – NL challenge	++	-	+	+	+	0	+	+

*) Costs for resources (energy, feed, seed, plant protection, fertilizers) and animal-related costs (e.g. veterinary services)

Source: Lesschen et al. (2020); Gonzalez-Martinez et al. (forthcoming)

Table 2. Qualitative evaluation of the differences between different mitigation scenarios in costs and returns for arable farms (relative to the reference scenario)

Sector: arable	Expected differences in costs item:					Expected differences in development of farmer revenues because of:		
	Mitigation scenario:	Land	Manure disposal	Direct costs*	Buildings	Labour, contractors, machines	Price changes (supply/demand)	Premium value form markets
Business as usual	+	0	0	0	0	0	0	0
Nature inclusive – EU challenge	0	+	+	0	+	0	+	+
Productivity driven – NL challenge	--	++	+	+	+	+	0	0
Nature inclusive – NL challenge	--	+++	++	+	+	+	+	+

*) Costs for resources (energy, feed, seed, plant protection, fertilizers) and animal-related costs (e.g. veterinary services)

Source: Lesschen et al. (2020); Gonzalez-Martinez et al. (forthcoming)

4 Findings with respect to the processes

In principle, the stakeholder workshops work well to generate contributions to the two projects which

dealt with model-based work. The stakeholder workshops depicted a number of similarities but also several distinctions in their function and consequently in their structure and their course of actions. In the following, those elements are compared to extract commonalities and differences and to point out difficulties which should be avoided.

Both stakeholder processes involvement took place during a similar time span, whereas the first one, although Brussels-based, was intended to capture input across the whole EU and was conducted in English was centred while the later one concentrated on the Netherlands and took place in Dutch. This had consequences for the participation of stakeholders who were required to speak English in the first case which was mother tongue only for very few. A number of invitees raised concerns whether they would be able to properly express themselves in English and turn down the invitation to participate in the stakeholder workshops. Additionally, their required travel effort was significantly higher if they were not based in Brussels and especially representative from businesses on the outskirts of the EU claimed high temporal expenditures for the travels involved as reason to cancel participation although travel expenses were reimbursed. In this respect to organise the first SUPREMA workshop back-to-back to another workshop helped to overcome partly the problem.

Financial resources involved in both stakeholder processes were relatively high compared to other instruments. On one hand they include significant cost like travel expenses, catering, materials and such but higher impacts have involved personal cost of involved researchers and other personal in the workshops for the organisation, concept development, preparation of inputs, conduction of concepts, registration and analysis of outcomes. Required effort may vary if recording is possible reasonable (Chatham-House rules) and are especially higher if personal is hired and provided with incentives like in the case of the Climate Table workshop. Those cost are often good investments but increase the pressure to come up with results in the process although there are no guarantees. That way including stakeholder workshops in projects form significant burden on the overall budget as the actual incurred cost are often underestimated and only partly covered by the foreseen resources.

Number of stakeholder groups considered and the diversity across those groups in knowledge and involvement in the respective processes increase the required efforts in preparing the workshops. This is strongly influenced by the topic of stakeholder workshops which was quite challenging in both workshops as a number of stakeholders feel not knowledgeable enough and inadequately prepared to deal with models and model results. In this context the personal involvement or interests respectively, play a major role in their voiced interventions. In most cases the involvement was much higher in the Climate Table workshop as it was indicated that an achieved solution based on a workable consensus could find entry into the Dutch implementation schemes. On one hand that increased the commitment towards an active participation in the process while on the other hand the complex interactions of measures to be validated and the option to influence the outcomes directly raised the risk not to voice opinions to avoid wrong decisions. Additional efforts of researchers were required to overcome the problem which aimed to close knowledge gaps. In case of the SUPREMA workshops, personal involvement was in most cases limited as "only" future challenges and needs in modelling and requirements for future research prospects were to be compiled together with narratives for testing the toolbox. Here, in contrast, the low level of personal involvement also led to a certain reluctance to voice opinions because some participants did not feel as well equipped to contribute to topics in the realm of modelling as others so that not all were engaged with the same intensity. Hence, it was an explicit objective of the workshops to engage all relevant societal groups not only academics or district groups who could be addressed easier.

Although the workshops included each respectively between 25 and 35 participants not all elements gained the same attention and active contributions. In general, contributions in smaller groups (group discussions) were easier to gain. Therefore, discussions in sub-groups were given preference, where applicable; hence, discussions in sub-groups require significant additional efforts and staff in cases in which recording is not an option. As a positive trade-off they provide useful insights into stakeholders' perception, interests, and values from their individual perspective but it is difficult to apply them to balance diverging interests and values.

Running world cafés were organized to gain additional contributions and insights into already compiled results. Those elements require sufficient room for participants to move from one action point (here flipcharts or posters) to another. As the available space was limited participants, at least partly, were reluctant to move between groups and had to be motivated to do so. That may have led to the fact of even additional comments and contributions.

Round table discussions or open discussions worked quite well in defining narratives and resulted nicely in active contribution as long as not different options of diverting interest groups had to be balanced against each other. In contrast, validating scenario results in open discussions or round table discussion strongly

depended on ex-ante knowledge of participants, interests and values as well as on participants personality. Therefore, providing contributions and comments on cards combined with discussions at flipcharts often resulted in better responses as stakeholders had more time to reflect about their possible contributions as well as more time to reflect on expressing them in English. It was helpful to motivate stakeholders, then, to explain their interventions. In the analysis, the written cards proved valuable in itself especially for the further analysis. Provision of scores by ranks or points to items at the flipcharts also received a quite positive active stakeholder participation. In the latter they were given a limited number of points which they were asked to distribute in according to their perceived importance. They were not required to justify their choices.

The willingness to contribute was lower when it was necessary to balance different interests and values in the Climate Table workshops which could be regarded as semi-regulatory processes. Designing choices for the scenarios included numerous conflicting interests, e.g. should the livestock reductions affect all the sectors in a proportional way, should those sectors that pollute more face stronger reductions, should the reductions be made account the contribution of the sector to the value added of agriculture. Taken choices had to be defended and there was a feeling that choices had to be justified to the outside world as well. These conflicts required efforts to be solved by outcomes of an optimisation model indicating in a transparent way which could be most suitable ('the optimum') livestock reduction that could be implemented complying with the environmental regulation of the Netherlands. The process was helped by researchers who induce additional knowledge as well as by the respected and well know chair person.

5 Conclusions

In principle, stakeholder engagement involves people who may be affected by the decisions or may influence the implementation of decisions. In this respect, the SUPREMA stakeholder approach diverted from the classical approach and instead, stakeholders are involved to gain additional insights into different subjects where the stakeholders may have knowledge about, they may be, in turn, involved in preparing of decisions, they may seek additional knowledge to support their own decision making or they may be affected by decision of others in future. They supported in defining a research agenda to prepare models so that they will be enabled to support future decision making. In contrast, the Climate Table stakeholder workshop resembles a stakeholder involvement in regulatory process as it aimed to make choices to address the longer terms GHG reduction commitments the Dutch government had made (Paris Agreement). Stakeholders' involvement and concerns in the process were much deeper which was advantage and disadvantage at the same time, participants had to justify and defend choices. In general, in both projects the stakeholder workshops worked well to generate expected outcomes.

Hence, the stakeholder involvement depicts several limitations. Perception of participants vary over time and are influenced by the respective circumstances when the workshops are being conducted. The composition of the participants and their personality may also have influence on the outcomes as well as discussed topics and decisions.

Stakeholders' participation depends on the topic on hand: if a topic or decision affect a stakeholder stronger the person is more willing to participate. It requires considerable efforts to achieve a balanced participation across groups, to conduct structured discussion as well as to motivate an active participation. The broader the regional scope is which should be reflected the outcomes the more difficult it is to achieve it. It is easier to conduct stakeholder workshops in one country (i.e. The Netherlands) than for the whole EU. A way out for the whole EU could be to organize several workshops in different EU member states but this increases cost dramatically. The compromise is often to conduct the workshops in Brussels especially if policy and administration should be represented mostly requiring travel of other participants. A combination of different events may ease required efforts.

In this context, the language issue is difficult to overcome as the lowest common denominator is to use English and not all stakeholders felt well equipped to make talks in English. A solution might be to have small regional online workshops in several countries but online workshops limit significantly bilateral interactions and often reduce discussions on most topics.

Experiences also depict that stakeholder involvement requires higher input if controversial topics are discussed. A broad involvement of researchers and also of experienced moderators or mediators help in the process as well as application of different tools to provide insights in the consequences proved useful. How this can be achieved is case dependent but in total requires significant efforts. The mentioned elements indicate that stakeholder workshops are useful approaches but one should not underestimate needed efforts, personal and financial resources as well as necessary temporal expenditures.

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