

ROADMAP

Rethinking of antimicrobial decision-systems in the management of animal production

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Report on participatory approaches framework

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About the ROADMAP research project

The overall aim of ROADMAP is to **foster transitions towards prudent use of antimicrobials (AMs) in animal production in different contexts to manage antimicrobial resistance (AMR). Prudent antimicrobial use (AMU) will be achieved by enhancing antimicrobial decision-systems along the food and drug supply chains.** ROADMAP will focus on supporting animal health and welfare through prevention and health promotion actions.

AMR is recognized as a significant threat to global public health and food security. Overuse and improper use of AMs in many parts of the world contribute to the emergence and spread of AMR. Although human and animal health require AMs, it has been estimated that two thirds of the future AMU growth worldwide will be in animal production. Improving the management of AMU in farm animals is therefore a critical component of dealing with AMR and optimizing production in the livestock sector. Nevertheless, the variety of contexts of AMU in the livestock sector is a major challenge to managing AMR. **There is no “one-size-fits-all” solution to improve AMU and strategies must be contextually developed** (for instance, strategies used in the Danish pig industry are difficult to adapt and adopt in the French free-range poultry farming). Successful solutions must be combined and tailored to the production systems and the social and economic context in which they operate.

ROADMAP will meet three general objectives, in line with the EU AMR Action plan: i) **Rethink AM decision-systems and animal health management**; ii) **Develop options for encouraging prudent AMU in animal production**; iii) **Engage all actors in the food and drug supply chains in fostering a more prudent use of AMs.**



Project consortium

Part. N°	Participant organisation name (acronym)	Country
1	Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE) **	France
2	Association de coordination technique agricole (ACTA) ***	France
3	Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) **	France
4	University of Liverpool (ULIV) *	United Kingdom
5	Cardiff University (CU) *	United Kingdom
6	James Hutton Institute (HUT) **	United Kingdom
7	Alma Mater Studiorum - Università di Bologna (UNIBO) *	Italy
8	Aarhus Universitet (AU) *	Denmark
9	Eigen Vermogen van het Instituut voor Landbouw en Visserijonderzoek (EV-ILVO) **	Belgium
10	Research Institute of Organic Agriculture (FiBL) **	Switzerland
11	Stichting Wageningen Research (WR) *	Netherlands
12	Swedish University of Agricultural Sciences (SLU) *	Sweden
13	Southern Agriculture and Horticulture Organization (ZLTO) ***	Netherlands
14	European Forum of Farm Animal Breeders (EFFAB) ****	Netherlands
15	Fundacion Empresa Universidad Gallega (FEUGA) ****	Spain
16	Dierengezondheidszorg Vlaanderen (DGZ) ***	Belgium
17	INRAE Transfert (IT) ****	France

* Universities/veterinary schools

** Research institutes specialized in both fundamental and applied agricultural and veterinary sciences

*** Public and private advisory services Organisations

**** Knowledge transfer and Innovation organisations



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List of acronyms and abbreviations

Antimicrobials	AM
Antimicrobial reduction	AMR
Antimicrobial usage	AMU
Community-based participatory research	CBPR
Decision support system	DSS
Living Lab	LL
Participatory research	PR
Science and technology studies	STS
Theory of planned behavior	TPB



1 Summary

Participatory research methodologies, action research and multi-actor involvement like Living Labs constitute a vital and important part of the ROADMAP project and build on participation with a negotiated and mutually agreed aim of reaching a common goal on reduced antimicrobial use (AMU).

In light of this aim, and to inspire partners and stakeholders working with Living Labs in agriculture, this report builds on current literature as well as known practices regarding participatory research in general and with potential relevance to AMU reduction, involving stakeholders and actors, who play a direct or indirect role in AMU in animal farming. It includes points regarding the Living Labs specifically developed in ROADMAP and opens perspectives and discussion points regarding the involvement of these institutions, seen from the viewpoint of participatory research. Therefore, it introduces key conceptual aspects of participatory research methods, and presents a critical view on the use of the term ‘participation’, which are relevant when setting up, planning and conducting Living Labs.

A participatory research project building on multi-stakeholder involvement will need to develop multiple versions of ‘optimal mix of stakeholders’, according to the diverse contexts within the project. In the case of ROADMAP, the farmers, farm-related actors and much of the veterinary, agricultural and food industry are core to the changes, which ROADMAP has set out to foster. This makes it different from many other participatory and action research projects where stakeholders and end-users are citizen-oriented.

Stakeholders need to be involved throughout the project and its different phases, including: planning, implementation and conclusions, and analysing and interpreting the results. In the conclusion, we suggest some guiding principles for the ROADMAP research as the consortium and each partner conduct participatory research in action and not just in words. The Living Labs bring stakeholders together and aim to create mutual understanding and trust, which can lead to changes and further transitions, which impact institutions and practices at a more overall level, regarding the common project goal of reducing AMU significantly. The Living Labs can play a major role in not only fostering change among individual and groups of individuals, but point to ways in which institutional and structural transitions can take place. Capacity, empowerment and ownership over the processes are important outcomes of participatory research projects, and this emphasises the importance of skilled facilitators in ROADMAP to facilitate the processes enabling social learning between the participants, and lead to these changes.

2 Introduction to participatory research and the concept of participation

Participatory research (PR) and the term ‘popular participation’ emerged in the 1960s and gained significant traction in the 1970s in relation to development discourse (Stiefel and Wolfe 1994). PR has come to be used as an umbrella term that includes approaches such as action



research, participatory action research, participatory rural appraisal, and community-based participatory research (CBPR) among others (Cargo and Mercer 2008; Lawson et al 2015). These methods are now used in numerous disciplines but in particular in health and development. PR is not only a set of diverse methods but also “an approach, orientation, or way of working” that can and has been adapted in many different disciplines and kinds of projects (Cargo and Mercer 2008:327).

At the heart of PR is a focus on inclusivity. Inclusivity in PR means that those who will be potentially affected by particular policy or research are involved in the development and execution of said policy or research. In other words, “participation should include the notions of contribution, influencing, sharing, or redistributing power and of control, resources, benefits, knowledge, and skills to be gained through beneficiary involvement in decision-making. Participation is a voluntary process by which people, including the disadvantaged (in income, gender, caste, or education), influence or control the decisions that affect them” (Saxena 2011[1998]:31). Inclusivity in PR thus describes efforts to foster ‘bottom-up’ research, policy, and decision-making particularly with marginalized (and other) groups.

Moreover, PR can be a useful way to build capacity. According to Cargo and Mercer 2008, PR can be very useful for building and supporting projects through “aggregation of diverse partners’ financial, in-kind, social, and material resources [which] enables more comprehensive and coordinated responses to” complex problems (327). Capacity building can also refer to the building up of skills and competencies among stakeholder groups as well as the development of networks with the capacity to act.

In addition, PR has the potential to make academic research more accountable to real-world issues through integration of academic and real-world knowledge and experiences (Cargo and Mercer 2008). According to Cornwall and Jewkes (1995), differences between conventional research and participatory research lie ‘less in the theories which inform these methodological frameworks or even in the methods they use but in who defines research problems and who generates analyses, represents, owns and acts on information which is sought’ (1668). In other words, as Cornwall and Jewkes (1995) argue, PR is based on attention to the power dynamics involved in research and the politics of representation. The incorporation of PR in a diversity of research projects has partially been in response to research and research applications that have had little traction in the ‘real-world’ due to a misalignment of goals, values, and the definition of what constitutes a ‘problem’ as well as misunderstanding of the nature of social power relations and institutions in research contexts.

Despite the critical attention to power relations in PR, participation was taken up by numerous organizations and researchers in ways that did little to support empowerment and that, in some cases, further marginalized stakeholders. As Cornwall (2008) suggests, “it is vital to pay closer attention to who is participating, in what and for whose benefit” (269).



A French student poster from the Atelier Populaire des beaux-arts in 1968 illustrates an early critique of the use of participation to convey a superficial idea of democracy or “bottom up” governance. In the poster, the words are arranged in a typical conjugation of a French verb that means “to participate” (*participer*), which can be translated in the following way: “I participate, you participate, [s]he participates, we participate, you (plural) participate, they profit.” The switch of the final form to “profit” is meant to convey that the benefits of participation often accrue elsewhere and furthermore that participation might deepen processes of disenfranchisement for those who participate in projects or governance.

The aim of this report is to explore the use and critical points of the term ‘participation’ in the many different ways and contexts in which it is used, and to provide a framework for understanding the many different initiatives and forms of participatory methods used in ROADMAP, in widely different contexts and settings.



Figure 1: French student poster from the Atelier des beaux arts (1968)

3 Typologies of participation relevant for participatory research approaches

In an effort to bring “clarity through specificity” (Cohen and Uphoff 1980) in light of the sometimes-superficial use of “participation,” numerous scholars have developed ladders or typologies of participation. One of the most well-known and well-cited typologies of participation continues to be Sherry Arnstein’s “Ladder of Participation” from 1969 (see figure 2). In this ladder, Arnstein describes a hierarchy of participation from “manipulation” and “therapy” as two forms of “non-participation” involving the least amount of citizen power, to “citizen control,” “delegated power,” and “partnership” which represent the greatest extent of citizen power. Arnstein acknowledges the drawbacks of her ladder in that it simplifies gradations that in actuality could be far more differentiated, that it makes the groups of powerful stakeholders and powerless stakeholders appear to be homogenous in their position, and that the ladder does not include significant obstacles to participation such as racism or distrust. Yet, despite these simplifications, Arnstein’s ladder is useful in that it “helps to illustrate the point that so many have missed—that there are significant gradations of citizen participation” (1969:217). Furthermore, Arnstein’s ladder “reminds us that participation is ultimately about power and control” (Cornwall 2008).



Numerous scholars have built on Arnstein's ladder of participation through offering alternative terms and arrangements (see for example Biggs 1989; Lawrence 2006; Pretty 1995). Davidson (1989) proposed a "wheel of participation" in order to emphasize that varying levels of participation are legitimate depending on their use and context. Additional typologies move away from focusing on degree and instead propose a focus on the nature of participation (Rowe and Frewer 2000), the theoretical basis (normative or pragmatic) (Thomas 1993; Beierle 2002), or objectives (Okali et al 1994). In a review of these typologies, Mark S. Reed (2008) suggests that typologies can be useful for differentiating and selecting methodologies in PR. ROADMAP partners may find some of these typologies useful in the design and implementation of PR in their case studies and as part of their Living Labs (LL).

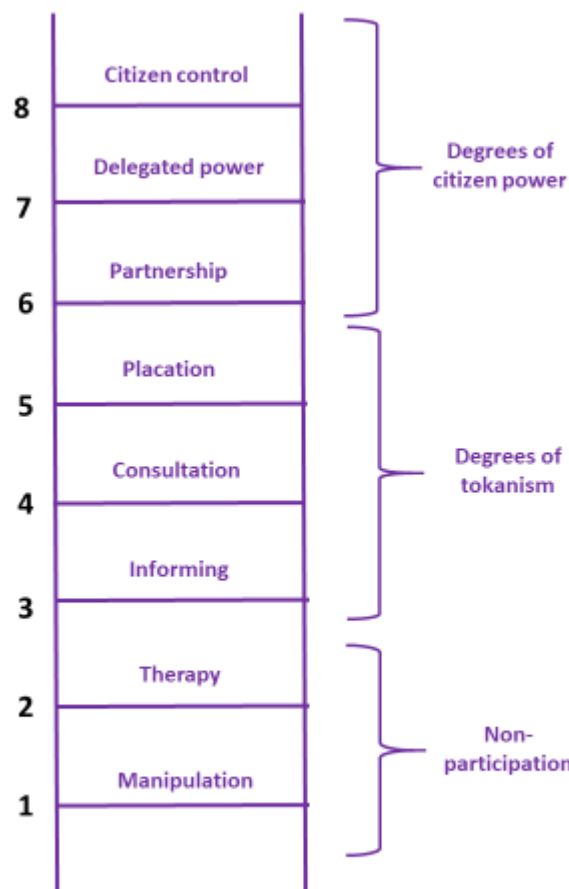


Figure 2: Sherry Arnstein's Ladder of Participation (1969)

Typologies, while they appear clear, may be less so in practice. For example, the level or type of participation can vary over the course of a project (Cornwall 2008). In addition, specific methodologies may be classified in some cases as not based in participation and in other cases as high in engagement and empowerment depending on the scope of the project and the group of methodologies (de Vente 2016). De Vente et al (2016) build on these typologies and use them to analyse the research design, methods, contexts, and outcomes of eleven projects



in Spain and Portugal that incorporated some level of participation toward improved environmental management. Based on this work, they developed a number of recommendations that can be useful for maximizing the benefits of participation in research projects (See Table 1).

Recommendations	Description	Expected outcome
1. Select your participants carefully	Perform a stakeholder analysis and select representative, diverse stakeholders (incl. land owners, government institutions, opinion leaders, innovators, private companies, and CSO's), in relation to the process objectives.	Information gain Learning Mutual gains (win-win) Sustainable solutions Goal attainment Increased trust Increased acceptance
2. Make participation attractive and easy	Participation must make a difference, so negotiate ambitious, realistic objectives, aid problem ownership and respect time constraints of participants, but take the time needed to build relationships and think solutions through. Establish collaboration with similar initiatives and link the process to ongoing political processes to ensure actual policy impact.	Increased problem ownership and participation Increased trust
3. Foster trust among participants	Build on existing relationships among participants by using existing networks for communication. Attract media attention about the problem and the process. A minimum level of trust is required among participants at the start of the process. Design parallel processes for high-level policy makers. Respect the knowledge of all participants critically evaluating both scientific and local knowledge.	Increased trust Increased acceptance and implementation of solutions
4. Provide participants with relevant information and actual decision-making power	Give participants actual decision-making power and provide high-quality, accessible, unbiased background information.	Information gain Learning Mutual gains (win-win) Flexible solutions Goal attainment Increased trust
5. Use professional independent facilitation and structured methods of information aggregation	Use a competent independent facilitator that can deal with power imbalances, stimulate active participation of all actors, and assure fair participation and deliberation with equal opportunity. Use structured methods of information aggregation and face to face contact between participants.	Information gain Learning Mutual gains (win-win) Flexible, sustainable, and socially equitable solutions Conflict resolution Increased trust Goal attainment
6. Promote long-term commitment of all participants	Successful participation requires long-term commitment from all participants and realistic economic support for implementation of solutions	Increased trust and implementation of solutions
7. Adapt language, location, and process design to the participants	Use accessible language and forms of information adapted to the education level of participants. Field visits or village meetings are often more effective than seminar presentations at universities or government buildings.	Increased trust Increased participation Learning

Table 1. Summarized recommendations for the design of participatory processes to support more beneficial outcomes (de Vente et al 2016)

4 A participatory research approaches framework

While the above typologies have served to highlight the dangers of claims to participation that further perpetuate marginalization, they also arise out of a normative approach to participation. This normative approach is related to what some have called a “tyranny of participation” (Cooke and Kotharie 2001) or an assumption that all research and development projects should be as participatory as possible. In the setting of development projects, the critique has been raised that people, who live in the area, needs to drive the development of their own lives and life conditions, and the organisations (NGOs, CBOs etc.) needs to listen to their wishes and versions of the story. Having claimed that, they still at times use methods that are



‘participatory’ but still based on their own language and understanding of the world, and base ‘development initiatives’ on the outcomes, which are based on their interpretation of the situation.

When parallelizing to participatory research approaches, Neef and Neubert (2010) offer an alternative “participation framework” that they hope will enable “a process of self-reflection, informed discussion, and decision-making with regard to the usefulness of applying participatory elements in a specific research context.” Neef and Neubert (2010) hoped that their participatory framework can aid in the assessment of participation at different research phases and in monitoring the evolution of stakeholder involvement throughout the life of a project.

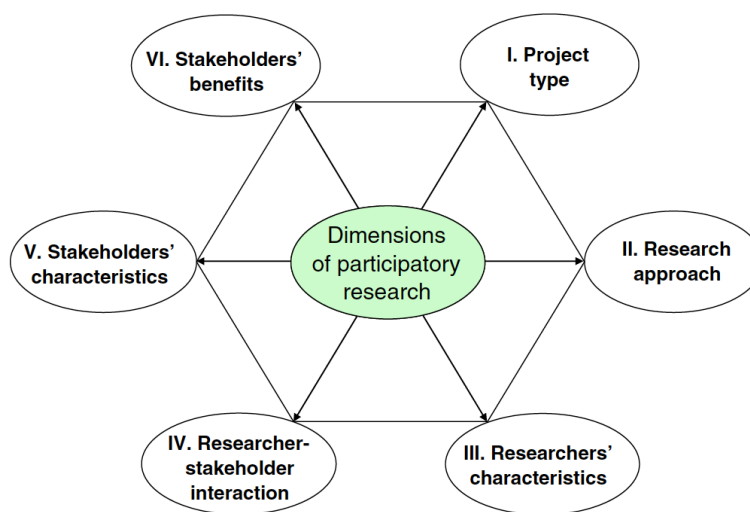


Figure 3 Dimensions of Participatory Research (Neef and Neubert 2010)

In Neef and Neubert’s participatory framework (Neef and Neubert, 2010), they divide research processes into dimensions (see Figure 3) and attributes related to each dimension. While many of the attributes that Neef and Neubert (2010) describe may be useful for ROADMAP members to review if they are undecided about whether to include a Living Lab or other participatory options in their case studies, a full summary of these is beyond the scope of this review. Instead, some attributes will be described here that may have direct relevance for ROADMAP partners and projects. For example, in Dimension II: Research Approach, Attribute C: Research Plan (see Table 2), Neef and Neubert (2010) describe how a rigid research plan, “may impede local stakeholders from influencing methods and experiments and to negotiate certain aspects of the research plan with the researchers.” Instead, a flexible and open plan, “can be more receptive to stakeholders’ priorities, experiences, and perspectives, and provides space for negotiation of methods, experiments, and adaptation to new conditions.” While openness and flexibility can be challenging to achieve in light of funding commitments and deadlines, it is worth considering where these characteristics *can* figure in research practices and interactions.



Dimension	Attribute
I. Project type	<ul style="list-style-type: none"> a) Type of research b) Research objectives c) Potential users and beneficiaries d) Institutional context of the research project e) Risks involved in the project
II. Project approach	<ul style="list-style-type: none"> a) Research methodology b) Research epistemology c) Research plan d) Research process e) Research methods for accessing local knowledge
III. Researchers' characteristics	<ul style="list-style-type: none"> a) Previous experiences with participation b) Attitudes towards participation c) Attitudes towards local stakeholders d) Accountability towards the potential users e) Commitment to the problem-solving cycle
IV. Researcher–stakeholder interaction	<ul style="list-style-type: none"> a) Involvement of stakeholders in the research process b) Control of research and centers of decision-making c) Contribution to the generation of knowledge d) Type, frequency, and intensity of interaction e) Investment of resources and payment
V. Stakeholders' characteristics	<ul style="list-style-type: none"> a) Local stakeholders' experiences with previous projects b) Local stakeholders' perception of the research project c) Local stakeholders' perception of the researchers d) Time availability of local stakeholders e) Local stakeholders' scope for action
VI. Stakeholders' benefits	<ul style="list-style-type: none"> a) Innovations, improved practices b) Creation of knowledge and awareness c) Improvement of skills d) Empowerment and social capital e) Improvement of livelihoods

Table 2. Table of dimensions and their related attributes in Neef and Neubert's participation framework (2010)

A second useful consideration raised by Neef and Neubert is the challenge of bringing together local and scientific knowledge (Dimension II, Attribute E; see Table 2). Research projects have shown many different approaches to the integration of “local knowledge into the process of knowledge generation.” While some researchers treat local knowledge and scientific knowledge as antagonistic, others see them as complementary. Neef and Neubert suggest that “rather than romanticizing local stakeholders' knowledge, local knowledge should be as critically examined as scientific knowledge that goes through a rigorous selection process by



peer-reviews and constant revision by other scholars” (see also Neef 2005). See more on this issue below, in the section on local and scientific knowledges.

In Dimension IV: Researcher-stakeholder interaction, Attribute D: Type, Frequency, and intensity of interaction, Neef and Neubert discuss the amount and context of interaction that researchers and stakeholders have in different projects. While some criticism has emerged around projects that are called “participatory” but that involve only single or very few meetings between researchers and stakeholders, Neef and Neubert point to the danger of “participation fatigue” that can result from too much interaction (see also Kanji and Greenwood 2001; Neef 2005).

Perception of the researchers on the part of stakeholders can also have a significant effect on the interactions between them as well as the outcomes of the project (Dimension V, Attribute C). As Bruges and Smith 2008 described in their case studies in New Zealand, stakeholders’ perceptions of the researchers’ attitudes are critical to the success or failure of the participatory research project (see also Chambers 1994; Biggs and Smith 1997; Keen and Mahanty 2005). While “local stakeholders observe the behavior of researchers, categorize their social position and they sue this classification in their interaction with the researchers,” Neef and Neubert (2010) emphasize that “local stakeholders’ perceptions are certainly not static, but can be changed through face-to-face communication and building of trust”. Indeed, trust and the importance of building trust are highlighted frequently in PR literature. Trust, many scholars emphasize, is crucial to participatory research.

In their description of Dimension VI: Stakeholders’ benefits: various outcomes of participatory agricultural research, Neef and Neubert usefully provide the following quotation from Lilja and Dixon 2008 (pg 6) regarding participatory research: “success is often not found in the agricultural technology alone, but rather in its grounding in and building of human and social capital—confidence, knowledge, networks, and capacity—which then allow technologies to have a full effect on livelihoods.” In the description of attributes related to Dimension VI, Neef and Neubert further describe how the benefits of participatory projects can lie in increased knowledge and awareness on the part of stakeholders (and researchers), skill-improvement, empowerment, social capital, the potential for collective action, and increased resilience in the livelihood of stakeholders.

5 An integrative practice framework in PR

Based on a critical review of an extensive literature in PR, Cargo and Mercer 2008 “distilled an integrative practice framework that provides academic and nonacademic partners with a structured process for developing and maintaining their partnerships as they design, implement, and evaluate their PR efforts and account for intermediate and long-term outcomes” (328). This integrative practice framework (IPF) revolves around the following five key domains (see Figure 4): 1) values or driver behind the research 2) participants and the nature of their environment 3) partnership process 4) core elements of PR and 5) added value of PR in



the interpretation and application of the research outcomes. In this review, we focus on the most relevant aspects of this framework for the ROADMAP project.

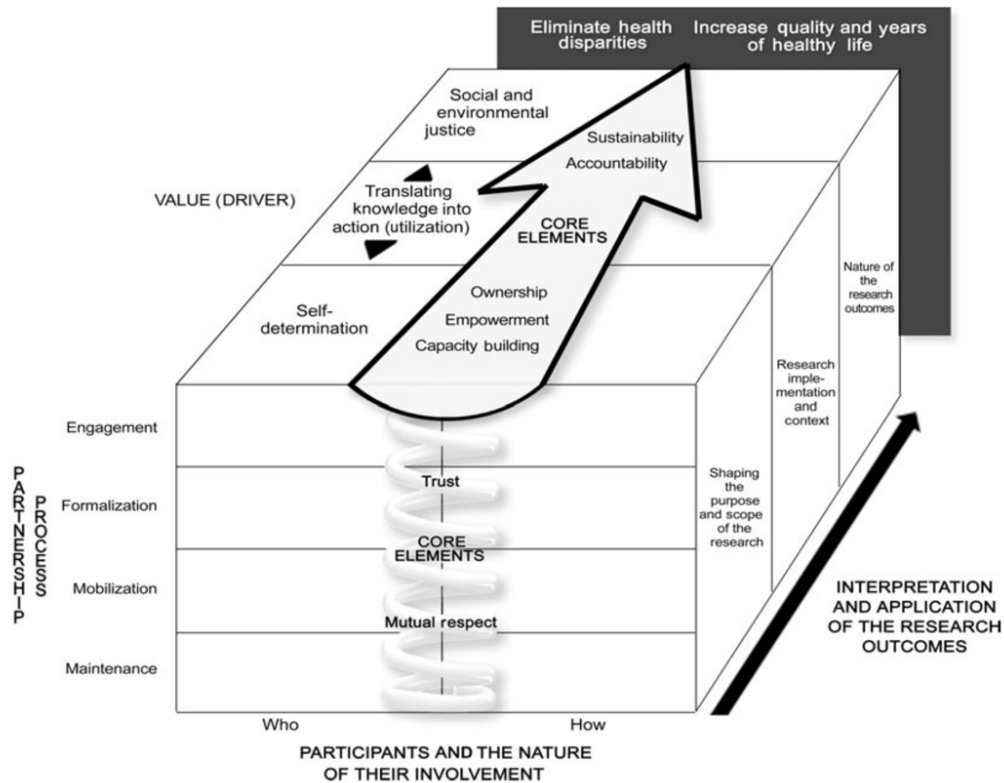


Figure 5. Cargo and Mercer's (2008) integrative practice framework for participatory research

Regarding domain 2 on participants, Cargo and Mercer 2008 provide a set of categories that is more tailored to human health projects, but they usefully (for ROADMAP) also provide some questions to help guide creating what they call the “optimal mix” of different participants. In their words (see Figure 5 and Table 3), “the optimal mix should favor establishing and maintaining group processes that promote equitable participation, trust, and respect among partners” (Cargo and Mercer 2008:332). In ROADMAP, these considerations are very relevant when establishing Living Labs, where a number of conflicting interests can be present, and the ‘optimal mix of stakeholders’ will depend on the context. Where many human health projects usually have ‘citizens’ as their end users, in ROADMAP, it will often be more specifically ‘farmers’ or other stakeholders involved in the animal farming sector. Depending on the focus and research questions of the Living Labs in ROADMAP, the stakeholders will represent different areas and are expected to have different degrees of commitment and decision power related to the topic in focus. Some farmers and farm related stakeholders may be independent (e.g. as individual farmers or practicing vets), where others may be part of integrated industries of e.g. poultry, pig or veal production.

Cargo and Mercer suggest that the questions in Table 3 might be used in the initial stages of partnership and then “revisited as the partnership progresses” (2008:332).



As mentioned above, mutual trust has been emphasized by numerous scholars as fundamental to the success of participatory research. In domain 4, Cargo and Mercer argue that “the presence of mutual respect and trust among partners is essential to support capacity building, empowerment, and ownership” (2008:336).

In order to support trust and respect, Cargo and Mercer emphasize that PR should foster “decision-making environments” that are diverse and that enable participants to express different viewpoints through “ongoing, open, and honest dialogue” (ibid). Since project participants may come from diverse backgrounds, Cargo and Mercer suggest that participants should engage in critical self-reflection on how various cultural, racial, educational, skill, institutional, resource access, and more may affect the power dynamics and privilege in the group. Cargo and Mercer suggest that it would be wise to adopt a sense of “cultural humility and overall humility toward all partners” (2008:336; see also Chavez et al 2003). In the LLs in ROADMAP, this points to the importance of a skilled facilitators, who can lead a process built on involvement, empowerment and mutual trust, which can lead to common decision making and interests.

1.	Who are the end users and beneficiaries of the research products, and what is the added value of their participation in the partnership?
2.	Which academic disciplines should be represented in the partnership to address the ecological complexity of the determinants of and solutions to the identified public health issue?
3.	Who needs to be involved in the partnership to ensure that the values driving the research are respected in the planning and implementation of the research?
4.	Who needs to be involved in the partnership to ensure that the research results will be translated into practice and action?
5.	Who needs to be involved in the partnership to ensure that the research can be implemented with a balance of scientific integrity, social relevance, and cultural relevance?
6.	Who needs to be involved in the partnership to ensure that the utilization of resources and assets from the community of interest are maximized during each phase of the participatory research process?
7.	Who needs to be involved in the partnership to facilitate sustainability of the (a) research products, (b) capacity, (c) relationships, and (d) infrastructure?
8.	Which other stakeholders could be involved to help the partnership achieve its goals and objectives without compromising its values?

Table 3. Guiding questions for establishing an optimal mix of participants in participatory partnerships (Cargo and Mercer 2008)

Participatory research studies show that empowerment is key to supporting action on the part of participants and that empowerment is in turn, supported by capacity. Cargo and Mercer define capacity in the following way: “capacity develops according to stages of readiness and reflects the potential (e.g., knowledge, skills, networks) of an organization, community, or other partner to address health issues that matter to it” (2008:336). In light of the importance of assessing how a project is meeting research objectives, capacity can be one way to measure outcomes and impact. Furthermore, capacity, empowerment, and ownership are key to the sustainability of project outcomes. It has to be emphasized that the local teams including the facilitator will aim at working on conditions for social learning, especially at the local level and at times expressed through informal knowledge. This will be very context dependent, and therefore, a strong and constant reference to the fact that LLs are not a



‘one-size-fits-all’ solution or methodology, but have to be formed to suit each environment, purpose and group of involved stakeholders.

	Added value for academic partners	Added value for nonacademic partners
Shaping the scope and purpose of the research	<ul style="list-style-type: none"> Enriched understanding of complex issues Refined and new research questions or hypotheses that address local concerns Enhanced local ownership of research enhances community or organizational readiness to implement research protocol 	<ul style="list-style-type: none"> Enhanced relevance and importance of research questions to the organization, community, or public health system Research is responsive to the community of interest Initiation of ownership, empowerment, and capacity building through active participation in the research
Research implementation and context	<p>Contextual advantage:</p> <ul style="list-style-type: none"> Enhanced fit of research activities with the context in which the research activities are implemented Removal of barriers to implementing research activities through nonacademic partners’ support for and ownership of the research <p>Research quality:</p> <ul style="list-style-type: none"> More appropriate study designs, methodologies, methods, or measures for the population and setting Reduced reporting bias from rapport between “community” data collectors and study participants Enhanced recruitment and retention rates of study participants strengthen sample representativeness and generalizability and transferability of findings Higher response rates enhance the statistical power of quantitative analyses and interpretive power of qualitative analyses Enhanced cultural validity and reduced measurement error and misinterpretation of interview questions because concepts, measures, and questions are culturally congruent 	<p>Contextual advantage:</p> <ul style="list-style-type: none"> Research is less disruptive to implementing contexts Enhanced credibility for other activities due to participation in PR projects Ethical agreements negotiated with academic partners address concerns of the community of interest <p>Capacity, empowerment, and ownership:</p> <ul style="list-style-type: none"> More targeted and efficient planning and problem solving Strengthened sense of ownership through active participation in research activities Increased capacity of nonacademic partners to do PR Acquisition of specialized research knowledge, skills, and experience Economic development through employment opportunities and local resource utilization Acquisition of management and leadership skills Development of decision-making skills
Interpretation and application of the research outcomes	<p>Research quality:</p> <ul style="list-style-type: none"> Enriched interpretation of quantitative and qualitative research results from the integration of multiple perspectives <p>Research capacity:</p> <ul style="list-style-type: none"> Enhanced capacity of faculty and students to do PR Enhanced social and cultural sensitivity of faculty and students to work with marginalized and hard-to-reach populations on sensitive topics Stronger alliances between academic and nonacademic institutions <p>Dissemination and translation:</p> <ul style="list-style-type: none"> Ability to reach diverse audiences (e.g., academic, policy, practitioner, general public) Potential to engage in political advocacy 	<p>Capacity, empowerment, and ownership:</p> <ul style="list-style-type: none"> Timely feedback of research results to nonacademic partners and the community of interest Enhanced capacity, empowerment, and ownership from participating in research dissemination and translation Enhanced understanding of problems, their root causes, and solutions can galvanize people to act Increased capacity for promotion of better practices Enhanced media and educational capabilities <p>Instrumental use of scientific knowledge:</p> <ul style="list-style-type: none"> Enhanced cultural and contextual relevance of developed interventions, program planning, and action



	<ul style="list-style-type: none"> Enhanced public exposure through media recognition <p>Sustaining the research:</p> <ul style="list-style-type: none"> Potential for infrastructure to support ongoing research programs that provide solutions to complex issues 	<ul style="list-style-type: none"> Creation of inventories, training manuals, and handbooks to inform practice Improved formulation of policy recommendations and policy changes <p>Participation:</p> <ul style="list-style-type: none"> Potential for higher intervention participation rates when end users are involved in intervention development <p>Sustaining the partnership and research products:</p> <ul style="list-style-type: none"> More effective applications for funding and leveraging of resources due to established credibility and capacity Augmented intersectoral mobilization of leaders, volunteers, agencies, institutions, and businesses catalyzed by participation in PR Improved linkages among community-, state-, and federal-level agencies
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Table 4. Potential added value of participatory research across three phases of the participatory research process (adapted from Cargo and Mercer 2008)

Finally in Domain 5, Cargo and Mercer summarize the added value of participatory research in the three phases of research that they describe as 1) “shaping the scope and purpose of the research” 2) “research implementation and context” and 3) “interpretation and application of the research outcomes” (see Table 4).

6 Developing participatory Living Labs

Based on the first discussions around the eleven Living Labs to be developed in ROADMAP (in the Milestone report 15), the following points were identified as important:

- 1) to ensure that every LL works as a ‘lab’, meaning that it conducts a significant part of the work between meetings in doing actual testing of strategies or actions to reduce AMU. The work in this review on participatory research approaches point to the importance of ownership among all participants, so that the aim of the LL echoes every stakeholder’s own interests.
- 2) to ensure that it remains a ‘multi-stakeholder approach’, both in participation, research focus, and points of action. The review in this report emphasises capacity, trust, empowerment and ownership as qualities, which give added value to the stakeholder community, and better focused, relevant research for the academic community. Participatory approaches should also give more appropriate study designs, which for example minimize risks: when people take ownership, they also take care to minimize risks connected to any experiment, and nobody forces others to do more than they feel comfortable with doing.
- 3) to collect data which is helpful for each LL, and at the same time allow the project as a whole to evaluate the effect and learnings from the different forms of Living Labs, which emphasises the shared ownership and mutuality in participatory research. In participatory projects, the results of the implemented research are shared, and it is not only the academic community which ‘owns’ or ‘harvest’ the results: everybody takes results with them



out of the LL or the research as a whole, and owns it. This enables reaching diverse communities and end-users, and the challenge is that the interpretation needs to be negotiated, although a part of it probably will be interpreted and told by individual LL members in addition to common interpretations.

- 4) to ensure that LL can bridge different interests between actors, some of whom may receive the LL idea with skepticism. The effort to commonly identify the problems, and to agree on which problems are common, and which potential conflicts of interest may hinder the co-creation of solutions, is an important part of the LL. Everybody in the LL should be involved in this process. It should be taken care of – through good facilitation – that every group member is heard and not ‘run over’ by stakeholders with a strong voice.

In MS16 we identified three options for the initiation phase of the LLs and how they identify what they want to focus on and which strategies they will test in the LL:

- Option 1: The national research team goes through a process where they identify critical points of change, and where they identify a focus area, or where they already have identified a specific tool or strategy which they want to test. They set up the LL and choose the relevant stakeholders / participants to suit this focus area / test.
- Option 2: The national research team has a main aim of reducing AMU and they collect a broad range of stakeholders and initiate a LL. This LL goes through a process of identifying critical points of change as well as strategies, tools and indicators to measure the outcome of the selected strategy & tools. They may also add other stakeholders, depending on their choice of focus area or question.
- Option 3: The Living Lab is set up with an initial broad question and involving a range of relevant stakeholders. They will go through a process where they analyse the critical points of change, the indicators and the strategies and connected tools which will be developed and tested in the LL, and identifies a more narrow and specific research question, and they may add some additional relevant stakeholders.

All three options potentially represent and encourages participation, which leads to common learning, shared benefits and mutual trust. The review in this report points to the importance of transparency and ensuring that everybody can take ownership over the process, so that their participation also becomes to their own benefit. When option 1 is used, it should be ensured that all members still go through a process in which they commonly identify the details of the problem, which they want to address as a LL.

The challenge in a research project – even an action research project - is to find the balance between ‘learning in the project and from the project’ and ‘learning as a group’, including the documentation of the process: what is confidential and what is public? In the MS16 report (as well as in MS14), the importance of alliances between members of the LL to keep confidential things inside the circle, in combination with a full transparency from the ROADMAP research



team regarding which information will be exchanged and brought into the public space, must be emphasised.

7 Conclusion

In this report, we explored literature on the use and critical points of the term ‘participation’ in the many different ways and contexts in which it is used and focused in particular on ‘participatory research approaches’.

Key conceptual aspects of participatory methods and research included also critical views and critiques of participatory methods, including a critical view on the use of the term ‘participation’. This emphasise the need to critically revisit whether the conception of ‘participation’ is shared within the project consortium and within all the different working groups within the project, especially in the light of the fact that ROADMAP builds on ‘participatory methods and approaches’. The following conclusions based on this work are particularly useful for ROADMAP:

1. A participatory research project building on multi-stakeholder involvement will need to develop multiple versions of ‘optimal mix of stakeholders’, fitting to the diverse contexts within the project. In the case of ROADMAP, the farmers, farm-related actors and much of the veterinary, agricultural and food industry are core to the changes, which ROADMAP has set out to foster. This makes it different from many other participatory and action research project where stakeholders and end-users are citizen-oriented.
2. Stakeholders need to be involved throughout the project and its different phases, including: planning, implementation and conclusions, and analysing and interpreting the results.
3. The problem which the project is going to address needs to be commonly identified, understood and agreed on. This is a major critical point for a well-working LL, and needs to be facilitated well, so that conflicts of interests among stakeholders can be transferred to commonality of interests, because transition can happen when joining forces and building co-created solutions toward a common problem(s).
4. the responsibility for planning and conducting the project and interpreting results as well as taking ownership of the process and disseminating the results do not belong to the research teams alone, but to all involved, and everybody owns a version of the same story,
5. the changes and transition go beyond individual or group of individuals, but deals with structural and institutional change,

These points must be considered fulfilled to a high degree through the Living Labs, which bring stakeholders together and aim to create mutual understanding and trust, which can lead to changes and further transitions which impact institutions and practices at a more overall level, regarding the common project goal of reducing AMU significantly.

Capacity, empowerment and ownership over the processes are important outcomes of participatory research projects, and this emphasises the importance of skilled facilitators in ROADMAP to facilitate the processes enable social learning between the participants.



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