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Flanders Research Institute for Agriculture, Fisheries and Food

POLICY ADVICE

OPPORTUNITIES FOR FURTHER REDUCTION OF THE USE OF PLANT PROTECTION PRODUCTS AND ANTIBIOTICS IN FARMING IN FLANDERS

MAY 15 2024

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Instituut voor Landbouw-, Visserij- en Voedingsonderzoek

ILVO POLICY ADVICE 2024.01

OPPORTUNITIES FOR FURTHER REDUCTION OF THE USE OF PLANT PROTECTION PRODUCTS AND ANTIBIOTICS IN FARMING IN FLANDERS

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Please refer to this policy advice as follows:

Baudoin, F., Peeters, K., Messely, L., Wustenberghs, H., Lox, S. & Ferreira H. 2024. Opportunities for further reduction of the use of plant protection products and antibiotics in agriculture in Flanders. ILVO policy advice 2024.01.

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SUMMARY

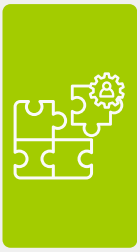
Policy brief

The Flemish food strategy focuses on ambitious goals, including reducing the use of plant protection products and antibiotics. This paper offers concrete recommendations to policy makers in Flanders and Belgium, to reduce the use of these agents by combining insights from different research projects.

Bottlenecks and recommendations for plant protection products and antibiotics

Insufficient approach to the issues at the chain level

- Facilitate communication between stakeholder groups.
- Enhance communication with citizens and consumers.
- Engage citizens in participatory citizen science projects.
- Seek regional partnerships through a place-based approach.



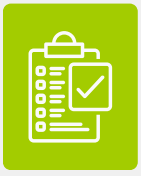
Knowledge gaps

- Develop specific awareness campaigns for farmers and seasonal workers.
- Inform farmers about their use of plant protection products.
- Finance research on interactions between different (alternative) products and techniques.
- Invest in long-term support through advisory services and business support.
- Continuously develop and maintain decision support tools.

Economic uncertainty in the application of integrated approaches

- Support farmers financially and cognitively in their transition process.
- Fund cost-effectiveness studies of alternative techniques and their combinations.
- Develop financial incentives for farmers to use fewer agents.

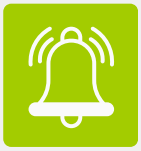
Bottlenecks and recommendations for plant protection products



No affordable alternatives for conventional pesticides

- Optimize and standardize the risk assessment of the registration process.
- Draw the attention of the European Parliament to the issues of the registration process.
- Fund behavioral research into norms and social values.

Bottlenecks and recommendations for antibiotics



Decreased urgency to further reduce antibiotic use

- Reformulate the need in a way that relates more to livestock rather than public health.

INTRODUCTION

GOAL OF THE FLEMISH FOOD STRATEGY: REDUCED USE OF PESTICIDES AND ANTIBIOTICS

One of the goals of the Flemish food strategy is to reduce the use of pesticides and anti-microbial agents (strategic goal 6: Care for environment, soil, biodiversity, and animal welfare). There are opportunities to reduce the use of these agents by focusing on business strategies that integrate a diversity of preventive practices and by further developing and incorporating alternative agents.

In practice, farmers encounter several bottlenecks in applying preventive and alternative agents and measures, both at the business and chain level. This note combines insights from six research projects (i.e. IPM WORKS, VIROPLANT, FABulous Farmers, ROADMAP, NetPoulSafe and DISARM) and identifies 5 key bottlenecks. To address these, this policy advice recommends a systemic approach that engages all stakeholders in the Flemish agricultural sector.

IDENTIFICATION OF 5 BOTTLENECKS AND ADVICE BASED ON RESEARCH PROJECT RESULTS

Although plant protection products and antibiotics are different agents, there are also many similarities when it comes to strategies to reduce their use. Therefore, in this policy brief we choose to combine insights and recommendations for both, resulting in the presentation of three common bottlenecks (bottlenecks 1-3).

Because recommendations may differ due to the specifics of arable and livestock farming, recommendations applicable to crop protection products are labeled green and recommendations related to antibiotic use are labeled blue. In addition, we also present a specific bottleneck for plant protection (bottleneck 4) and a specific bottleneck for the use of antibiotics (bottleneck 5).

Advice applicable to the use of pesticides

Advice applicable to the use of antibiotics

BOTTLENECK 1

INSUFFICIENT APPROACH TO THE ISSUE AT THE CHAIN LEVEL

Policy measures aimed at reducing the use of pesticides and antibiotics in agriculture are often strongly focused on the farm level, and thus on the farmers themselves. However, other stakeholders also significantly determine the use of these agents on the farm (De Gussem et al., 2021; Peeters et al., 2021; Baudoin et al., 2024).

PLANT PROTECTION PRODUCTS

For pesticides, we mapped the network of stakeholders and their influences on each other (see Figure 1).

Figure 1 shows that there are only two pathways originating from farmers, indicating that they have limited influence on other actors. On the other hand, we see that farmers are the end point of many other pathways, which means they can be influenced by many other actors (De Gussem et al., 2021).

Furthermore, interviews indicate that the most decisive influence on the use of plant protection products comes from policies and supermarkets, which set legal and extralegal requirements, respectively. As illustrated in Figure 1, citizens and consumers also influence growers both directly and indirectly through policies, auctions and supermarkets. This means that the attitudes of many stakeholders can potentially change under the influence of consumers and citizens.

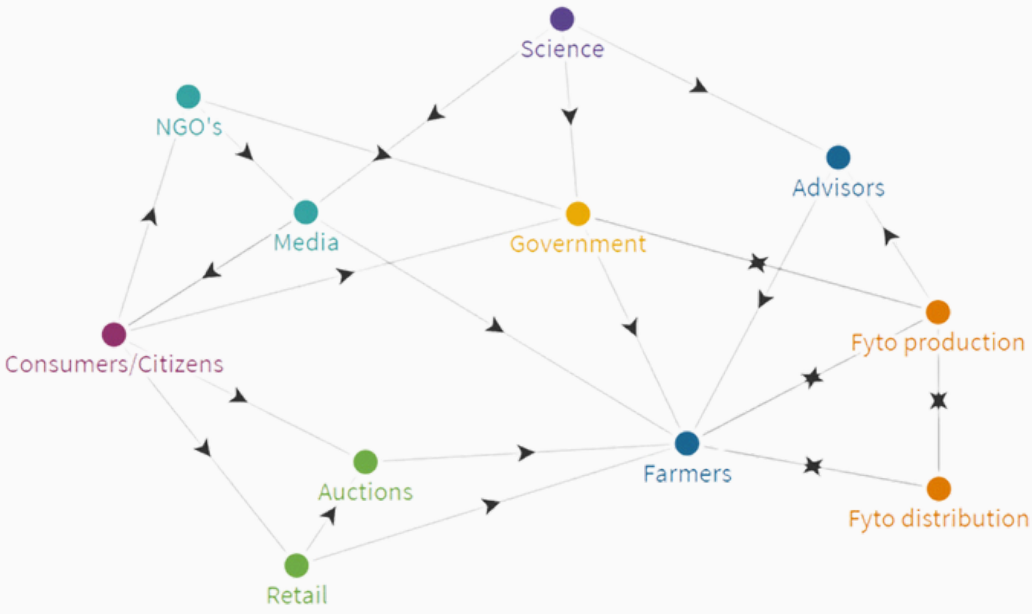


Figure 1: Network of Flemish actors and their mutual influences on the use of pesticides (De Gussem et al., 2021).

BOTTLENECK 1 INSUFFICIENT APPROACH TO THE ISSUE AT THE CHAIN LEVEL

ANTIBIOTICS

Also for antibiotics, we mapped important actors that can influence decisions about animal health and/or the use of antibiotics in the Flemish pig and veal sector (see Figure 2) (Wauters & Baudoin, 2023). Again, several other stakeholders, including consumers, were found to be able to influence these decisions. Interestingly, it was reported during focus groups that consumers are more likely to associate antibiotic use in livestock with the presence of antibiotic residues in meat, and thus with a potential food safety problem, than with antibiotic resistance in human medicine (Baudoin et al., 2024). This suggests a lack of consumer knowledge regarding the resistance issue, as well as agricultural processes.

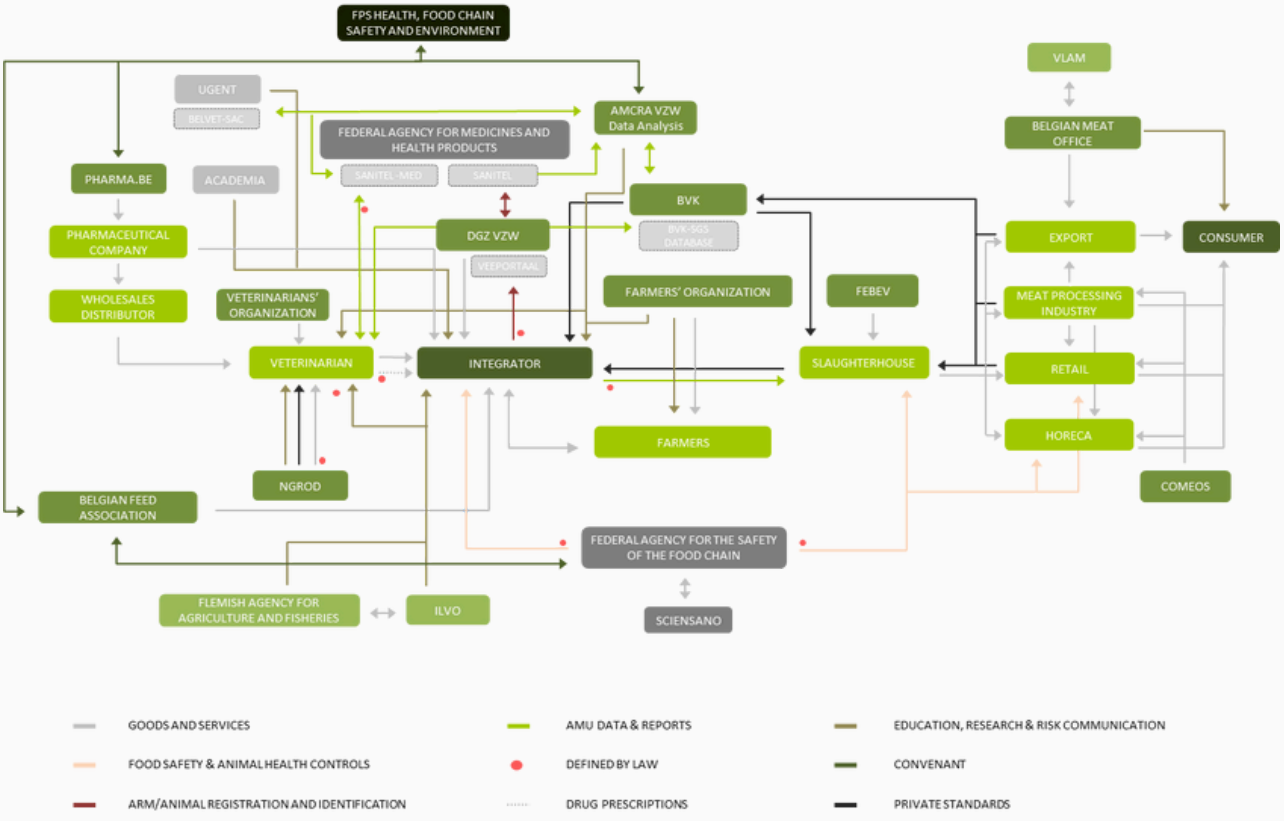


Figure 2: Map of the main actors influencing decisions on animal health and/or antibiotic use in the Flemish pig and veal sectors, and the main interactions between them (Wauters & Baudoin, 2023).

ADVICE

FACILITATE COMMUNICATION BETWEEN STAKEHOLDER GROUPS

Our advice is to focus more on the value chain level, recognize all actors and identify the relationships in the chain. Changing farmers' behavior should involve all identified actors and more communication between them (e.g., more targeted communication using images and coaching for crucial actors such as temporary workers in the Flemish poultry sector).

ENHANCE COMMUNICATION WITH CITIZENS AND CONSUMERS

Changing the behavior of consumers and citizens starts with informing them correctly. Only on the basis of clear and substantiated information can citizens modify their buying behavior. This implies adequate consideration of their needs and values. On the other hand, it is very important to inform consumers transparently, regularly and thoroughly about the usefulness, use and effects of these plant protection products and antibiotics.

ENGAGE CITIZENS IN PARTICIPATORY CITIZEN SCIENCE PROJECTS

Because citizens share responsibility for data collection and interpretation of results, their knowledge and awareness increases (Cillen & Messely, 2023). The researchers give the results back to the citizens in an accessible way, making the citizens better informed. In some cases, this new knowledge also leads to behavioral change (Gerits et al., 2023).

SEEK REGIONAL PARTNERSHIPS THROUGH A PLACE-BASED APPROACH

In such a place-based approach, stakeholders along with their motivations and resources to promote biodiversity, are identified (Georgoulas & Messely, 2020). Through consultations, strategies are devised to utilize these resources and motivations effectively, addressing the needs identified by farmers (Messely & Cillen, 2023). Additionally, integrating the monitoring of specific impact indicators can enhance the effectiveness of this place-based approach (Wustenberghs et al., 2020).

BOTTLENECK 2 KNOWLEDGE GAPS

Farmers are committed to reducing the use of antibiotics and plant protection products (Peeters et al., 2021; Baudoin et al. 2024). However, this requires a lot of knowledge. Unfortunately, this knowledge is not always available or does not reach farmers and advisors to a sufficient extent for three main reasons (Wustenberghs et al., 2016; Peeters et al., 2021; Baudoin et al. 2024):

- First, it is sometimes difficult to identify the (cause of) problems, due to the multitude of factors affecting livestock and crop health. Thus, farmers do not always know which factors to consider when trying to reduce their antibiotic use or use of crop protection products,
- Second, for many alternative agents and techniques, the impact on pests, diseases and weeds is not well known. There is also a lack of accessible knowledge about the effect of combinations of agents and techniques and how they interact with each other and with pests, diseases and weeds,
- Third, it requires considerable knowledge to adapt alternative means and specific techniques to the specific needs of the farm, taking into account economic, social and practical factors. There is a diverse range of alternative agents from different producers, but an overall picture is often lacking to make informed choices.

ADDRESSING KNOWLEDGE GAPS

AWARENESS CAMPAIGNS

For the first problem, information campaigns and benchmarking can provide a solution to draw farmers' attention to certain factors.

ADVICE, BUSINESS SUPPORT AND DEMO'S

Furthermore, advisory services and farm guidance, combined with demonstrations and a facilitated peer-to-peer learning process, can address the three problems mentioned above. A learning network of farmers, where members visit each other's farms and explain and demonstrate their strategies, gives farmers an opportunity to gain inspiration, to see different techniques adapted and applied in a recognizable context, and to help each other find practical solutions to problems. Moral support and peer pressure are also factors that cannot be underestimated, as they encourage farmers to permanently adapt and improve their farming strategies.

Such networks can be facilitated by an advisor, who can contribute specific knowledge and moderate conversations among farmers for optimal learning. Advisors help farmers think "holistically" and find solutions adapted to their specific farm by using individual and collective facilitation methods.

BOTTLENECK 2 KNOWLEDGE GAPS

This approach necessitates that advisors stay informed about the latest developments in their field and possess specific coaching skills. Ideally, farmers should receive guidance from fully independent advisors; in other words, advisors who are not affiliated with the sale of crop protection products (IPMWORKS consortium, 2023).

DECISION SUPPORT TOOLS

Decision support tools (DSTs), which support effective environmentally or health-conscious choices, can also provide a solution. In plant production, DSTs have proven to be an important tool for controlling plant diseases and reducing fungicide use.

Decision support tools are also emerging for pest management. Therefore, the further development and maintenance (e.g., to adapt these tools to new cultivars or to changing climate) of DSTs can be a strong lever for further reducing the use of crop protection products, as can the integration of economic constraints and environmental and health impacts of available tools (Wustenberghs et al., 2018). In addition, effective support is also needed for farmers to implement DSTs on their farms (Coteur et al., 2020). Support for development, maintenance, and implementation should meet the same criteria of independence as for advisors, as mentioned above.

ADVICE

DEVELOP SPECIFIC AWARENESS CAMPAIGNS FOR FARMERS AND SEASONAL WORKERS

Invest in information campaigns on the importance of specific aspects such as ventilation, water quality and barn cleaning. Target these campaigns to both farmers and temporary workers.

INFORM FARMERS ABOUT THEIR USE OF PLANT PROTECTION PRODUCTS

For antibiotic use, this information is collected at the farm level. Each farmer receives information on antibiotic use by animal category and how it compares to the national average. This is not the case for the use of plant protection products, although comparative research and regular communication about their use and impact can be interesting to raise awareness. It is important to tailor the indicators being monitored to a specific sector or region.

FINANCE RESEARCH ON INTERACTIONS BETWEEN DIFFERENT (ALTERNATIVE) PRODUCTS AND TECHNIQUES

Commit to more scientific evidence of agro-ecological interactions between different agents and techniques and pests, diseases and weeds. In doing so, also ensure better flow of this information to practitioners (i.e., farmers and advisors).

INVEST IN LONG-TERM SUPPORT THROUGH ADVISORY SERVICES AND BUSINESS SUPPORT

Provide a combination of demonstrations and (facilitated) peert-to-peer learning to ensure ongoing knowledge exchange on the diversity and implementation of alternative resources and practices. Here, it is crucial that advisors themselves also stay informed about the latest scientific developments by participating in advisor training and learning networks. Better information flow is needed from scientific research to advisors and farmers.

CONTINUOUSLY DEVELOP AND MAINTAIN DECISION SUPPORT TOOLS

Provide ongoing support for the development and maintenance of decision support tools (including the integration of economic constraints and environmental and health impacts of available resources) and for their implementation on farms.

BOTTLENECK 3

ECONOMIC UNCERTAINTY IN THE APPLICATION OF INTEGRATED APPROACHES

Effectiveness and cost are crucial attributes in choosing particular practices and agents. Cost effectiveness is considered high for conventional plant protection products and antibiotics. Currently, in most cases, their use cannot be replaced by a single alternative product, because they often do not have the same effectiveness.

However, they can be replaced by integrated approaches, which involve combinations of practices and alternative products and/or tools. However, these are accompanied by a number of economic uncertainties, as summarized in the table below.

Table 1: Economic uncertainties in the application of integrated crop or animal health protection

	PLANT PROTECTION	ANIMAL HEALTH
PREVENTION	Alternative crop protection measures often require an input of land lost to crop production, e.g., creating elements that encourage functional agrobiodiversity, such as flower strips, beetle banks or banker plants.	Animal disease prevention can be achieved in several ways, including improving the barn environment (e.g., improving biosecurity, optimizing ventilation, etc.) Sometimes such modifications can be expensive.
MONITORING	Monitoring pests requires extra labor and time, which farmers do not always have.	Identifying sick animals to treat them individually requires extra labor and time, which farmers don't always have.
ALTERNATIVES	Alternative, non-chemical interventions are often more expensive to purchase and/or apply and require more capital and/or labor (e.g., mechanical weed control requires both an investment in machinery and additional labor). The mechanism of action of alternatives often differs from conventional agents, requiring additional knowledge on the part of the person applying it.	Alternative agents, such as vaccines or phytopharmaceuticals with antimicrobial properties, are often more expensive to purchase and often do not have the same efficacy as antibiotics.

BOTTLENECK 3

ECONOMIC UNCERTAINTY IN THE APPLICATION OF INTEGRATED APPROACHES

ECONOMIC UNCERTAINTIES

Farmers have limited insight into the actual costs and benefits associated with the application of (combinations of) alternative agents and practices (Baudoin et al., 2024; Peeters et al., 2021).

There are often many uncertainties related to labor, time, and the purchase of machinery and other aids (Baudoin et al., 2024). Additionally, minor differences in application methods can lead to significant variations in results, creating substantial uncertainties regarding cost-effectiveness (Peeters et al., 2021). This results in insufficient certainty about the business models associated with these alternatives (Baudoin et al., 2024; Peeters et al., 2021).

LACK OF ECONOMIC INCENTIVES

There are too few economic incentives for farmers to use less chemical plant protection products and antibiotics. These conventional products are often very cheap compared to the alternative products. There are insufficient premiums and labels available to introduce alternative products and practices (Baudoin et al., 2024, Peeters et al. 2021). However, in livestock production, agri-environmental and climate measures have recently been developed within the Flemish Common Agricultural Policy as incentives. In crop production, there is strong pressure from legislation and customers to reduce the use of chemical pesticides (Baudoin et al., 2024, Peeters et al. 2021).

ADVICE

SUPPORT FARMERS FINANCIALLY AND COGNITIVELY IN THEIR TRANSITION PROCESS

Farmers will need to adjust their expectations and practices to the available set of alternatives to maximize effectiveness. During this transition period, farmers must be supported financially and cognitively.

FUND COST-EFFECTIVENESS STUDIES OF ALTERNATIVE TECHNIQUES AND THEIR COMBINATIONS

Invest in research on the cost-effectiveness of these alternative techniques and means and various combinations of them. These insights can be used in financial support and sustainability labels, for example, decision support tools and feasibility studies.

DEVELOP FINANCIAL INCENTIVES FOR FARMERS TO USE FEWER AGENTS

Invest in financial incentives for farmers to use less plant protection products or antibiotics. This can be done, for example, through a sustainability label developed together with the sector that includes various sustainability aspects, for example, better animal welfare, reduced nitrogen emissions, or less use of chemically synthesized plant protection products or antibiotics. Alternatively, existing labels could be expanded. In addition, the federal government can explore the effectiveness of financial incentives, such as subsidies for the use of alternative products, to reduce the price difference between alternatives and chemically synthesized products.

BOTTLENECK 4

NO AFFORDABLE ALTERNATIVES FOR CONVENTIONAL PESTICIDES

For the control of fungi, pests and weeds, our Flemish/Belgian agriculture relies heavily on conventional plant protection agents. However, the number of conventional agents is decreasing and relatively few new biological alternative agents are entering the global, European and Belgian markets (Peeters et al., 2021).

RISING DEVELOPMENT COSTS

This is due to the increasing development cost and time of conventional agents. Indeed, more and more components must be screened before finding a chemical that meets increasingly stringent environmental and welfare standards. Given the complex nature of biological agents, the research and development phase for these agents is also risky, long and expensive (Peeters et al., 2021).

COMPLEX REGISTRATION PROCESS

In addition, the European registration procedure is also so strict, complex and expensive that it deters many producers from marketing products here. For example, an active substance must be authorized at the European level and the entire plant protection product at the national level. The registration procedure also includes a risk analysis that, despite much progress, is still insufficiently adapted to the new generation of biological plant protection products (Peeters et al., 2021).

FEWER PRODUCTS ON THE MARKET

Finally, the number of agents already available on the market is decreasing as they lose their effectiveness due to the development of resistance. Fewer agents are also available because authorizations are being withdrawn due to adverse environmental effects and/or health risks, or because producers choose not to renew authorizations for specific markets. When an authorization expires, it is often not economically viable for small markets, such as Belgium, to go through this procedure again. In Belgium, many different crops are grown in a limited area, leading to a small market for specific crop protection products (Peeters et al., 2021). This results in a more limited supply of crop protection products in Belgium compared to other European countries, especially for niche crops. The shortage of agents to control pests and diseases contrasts strongly with the principles of integrated pest management (IPM). Moreover, the lack of agents promotes the development of resistance in pests and diseases and thus jeopardizes sustainable agriculture and food security (Peeters et al., 2021).

ADVICE

OPTIMIZE AND STANDARDIZE THE RISK ASSESSMENT OF THE REGISTRATION PROCESS

Make registration faster and simpler, adapted to the new generation of biological plant protection products. One way to do this is to ensure that national authorities have the necessary knowledge to conduct the risk assessment.

DRAW THE ATTENTION OF THE EUROPEAN PARLIAMENT TO THE ISSUES OF THE REGISTRATION PROCESS

Draw the attention of the European Parliament to the registration of plant protection products through relevant national and international bodies. This way, the cost of this procedure can be spread over larger markets, making it more interesting for producers to apply for new authorizations for plant protection products or to renew authorizations.

FUND BEHAVIORAL RESEARCH INTO NORMS AND SOCIAL VALUES

When incorporating new techniques and products on the farm, the farmer should not be seen only as an economic actor. Behavioral research shows that farmers also consider social norms, cultural habits, and many other personal and social aspects that can be a barrier or an incentive to accept and adopt new techniques and products. The development and provision of alternative techniques and means must also take into account the whole life and thinking of the farmer. Attention is also needed to the overall well-being of farmers that affects their overall capacity for resilience and innovation.

BOTTLENECK 5

DECREASED URGENCY TO FURTHER REDUCE ANTIBIOTIC USE

ILVO research shows that antibiotic reduction is not always the priority of the livestock farmer. In addition, the need to reduce antibiotic use in agriculture is sometimes questioned (Baudoin et al., 2024). This is because it is not clear to what extent the use of antibiotics in animal agriculture contributes to the development of antibiotic resistance in humans. Moreover, these agents are already used less in veterinary medicine than in human medicine.

ADVICE

REFORMULATE THE NEED IN A WAY THAT RELATES MORE TO LIVESTOCK RATHER THAN PUBLIC HEALTH

We suggest trying to convince livestock farmers and veterinarians of the urgency of pursuing antibiotic reduction by describing reasons relating to livestock farming rather than public health. This can be done, for example, by highlighting the proven (financial) benefits of reducing antibiotic use.

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RESEARCH PROJECTS

DISARM, IPMWORKS, VIROPLANT, ROADMAP and NetPoulSafe received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements No 817591, 101000339, 773567, 817626 and 101000728, respectively.

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Funded by
the European Union