

EVALUATION OF INTERREG-VA MEDUWA-VECHT(E) PROJECT NR. 142118

With its 12+1 innovations, the German-Dutch cross-border MEDUWA-Vecht(e) project, developed solutions that reduce or prevent the contamination of water, soil and food by medicines and multi-resistant microorganisms



Recreation in the Regge

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Summary

The cross-border German-Dutch and inter-sectoral MEDUWA-Vecht(e) consortium operated within the shared river basin of the Vecht(e) River and its tributaries to address a common problem: the environmental cycle of human and veterinary medicines and antimicrobial resistant micro-organisms that are excreted by humans and animals and transferred via sewage, manure, soil, (drinking) water and food back to humans and animals. The environmental cycling of these contaminants is expected to be intensified by climate change.

The objective of the consortium was to develop techniques and services to reduce the environmental, social and economic impact of this environmental cycle. The overall performance of MEDUWA-Vecht(e) contributed to a successful achievement of this objective. The goals of all work packages that were set have been achieved. The project as a whole stimulated new ideas, concepts, models and effective tools for the prevention, mitigation, measurement, monitoring, simulation, visualisation and communication of environmental risks of medicines and multi-resistant micro-organisms. Tools were developed to assess and visualise the risks and to evaluate the immediate effects of the developed measures if taken. Other tools were successfully generated for the purification of water and soil; to stop pollution at the source; and to monitor animal health continuously. Also medicines are being developed that are less persistent in the environment.

These innovations have gained societal relevance due to the growing need to reduce and monitor biological and chemical contamination in the environment, the global demand to prevent antimicrobial resistance, and the growing demand for the development of a sustainable/green pharmacy and chemistry. Moreover, the benefits of these MEDUWA-innovations (although they are still at a developmental stage) can already be seen in the diversity of their application in to other services or products and their potential use in various sectors of society. For example, the river basin information system can also be used for pathogens, and the chemical industry is showing interest in continuous monitoring.

The collaboration between research institutes, companies and stakeholders from governmental and non-governmental sectoral organisations ensured that practical solutions have been developed that will not create new problems. The project provided an opportunity for a new generation of scientists to work transdisciplinarily, across sectors and across borders. The product chain approach and the management structure developed in the project are tools that can be applied in the design of other projects concerned with the transition towards a sustainable society.

This evaluation is based on input from 20 project partners. As the partners worked very closely together, in some cases the evaluation was completed on behalf of others. Overall, partners from all work packages participated in the evaluation. The evaluations by the two partners of the project management team and by stakeholders are not included in this report.

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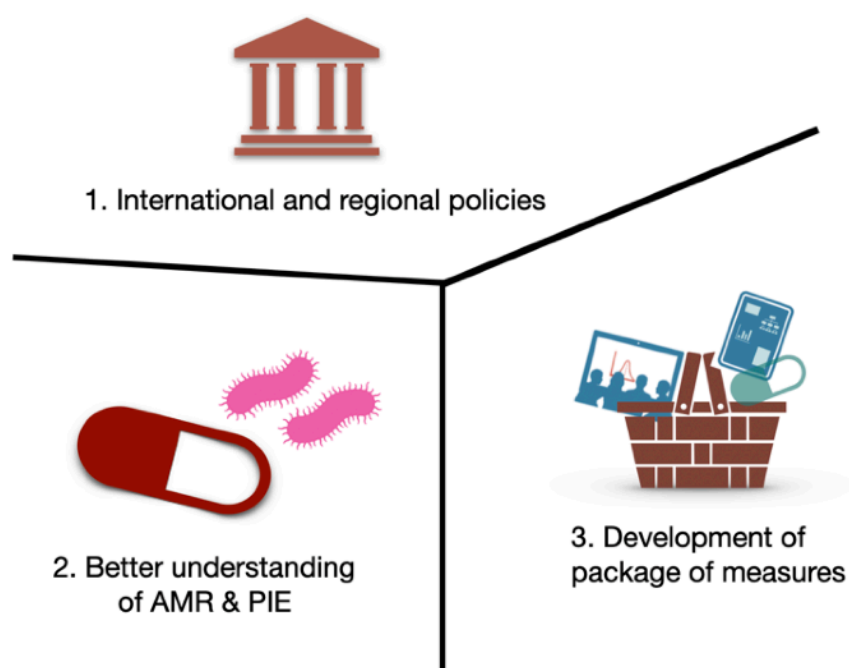
MEDUWA-Vecht(e) project partners whose evaluations have been processed:

	Scientific institutions	
1	Radboud Universitair Medisch Centrum (RUMC)	x
2	Radboud universiteit, Environmental Science (RU)	x
3	Saxion University of Applied Sciences, Dep. Life Science Chemical Engineering (SUAS)	x
4	Universitätsklinikum Münster, Inst. für Medizinische Mikrobiologie (UKM IfMM)	x
5	Universitätsklinikum Münster, Inst. für Hygiene (UKM IfH)	x
6	Universität Osnabrück (UOS)	x
7	Universiteit Twente, Water Management (UT)	x
8	Wetsus	x
	Companies	
9	Alloksys Life Sciences BV	x
10	AMRIF BV	x
11	Aix Scientifics	x
12	AVIV BV	x
13	DEMCON advanced mechatronics	x
14	Europa Ayurveda Centrum (EAC)	x
15	Geoplex GIS GmbH	x
16	InProSens	x
17	Microganic GmbH	x
18	Noldus Information Technology BV	x
19	Novaris Orbit Technology	x
20	NX Filtration BV (NXF)	x
21	Tournois Dynamic Innovations BV (TDI)	x
22	Ubisense GmbH	
23	VitalFluid BV	x
24	WEIL Wasseraufbereitung GmbH	x
	Governmental organisation	
25	Waterschap Zuiderzeeland (WZL)	x
	Nr of partners processed:	24

1. Efficiency and effectiveness

The MEDUWA-Vecht(e) consortium is made up of 16 companies, 8 scientific institutes, one water authority and two non-governmental, non-profit organisations. This multi-faceted group of 27 organisations formed 12 working groups for more effective collaboration and coordination of efforts in order to provide an integrated response to the phenomenon of the medicinal environmental cycle from its origin. The efficiency and effectiveness of this joint effort was determined using the following indicators: 1) contribution to international policies and regional strategies on sustainable development; 2) amplify perspectives on antimicrobial resistance and pharmaceuticals in the environment; 3) development of knowledge, methods and technologies to manage this phenomenon:

Indicators for the efficiency and effectiveness of MEDUWA-Vecht(e):



1.1 Contribution to collective global and European community goals



An intrinsic objective of the MEDUWA-Vecht(e) project was to contribute to the implementation of international policies (United Nations SDGs; EU Strategy for Pharmaceuticals in the Environment; European Green Deal; INTERREG-VA) to preserve the quality of water, soil, air, biological diversity, the food chain and public and animal health, as well as to support economic stability by promoting collaboration and development in the area.



It can be concluded that the MEDUWA-Vecht(e) project developed a methodological approach that led to measures and tools that contributed to bringing the academic and business world closer to these policies. The implementation of these policies was distributed as follows: 15 of the 24 partners think that they contributed to the SDGs; 20 of the 24 to the EU Strategy for Pharmaceuticals in the Environment; 5 out of 24 to the European Green Deal; and 22 out of 24 to the INTERREG-VA goals. Although all partners contributed in one way or another to these goals by participating in MEDUWA-Vecht(e) (see below), not all were aware of their contribution to these goals, especially the SDGs and the Green Deal.

MEDUWA-Vecht(e) contributed to 7 (out of 17) sustainable development goals:

MEDUWA-Vecht(e) & UN SDGs 2030

 <p>3 GOOD HEALTH AND WELL-BEING</p>	<ul style="list-style-type: none"> - Avoid misuse of addictive substances - No dangerous chemicals - Avoid contamination of air, water and soil 	 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	<ul style="list-style-type: none"> - environmentally conscious handling of chemicals - reduce emissions to air, water and soil - sustainable methodologies at multinationals - information and awareness
 <p>6 CLEAN WATER AND SANITATION</p>	<ul style="list-style-type: none"> - Avoid hazardous chemicals in water 	 <p>14 LIFE BELOW WATER</p>	<ul style="list-style-type: none"> - Preventing marine pollution
 <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	<ul style="list-style-type: none"> - Clean, environmentally conscious industry - More research & development 	 <p>15 LIFE ON LAND</p>	<ul style="list-style-type: none"> - Reduce the impact on biodiversity
 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	<ul style="list-style-type: none"> - Reducing environmental impact - Waste management 		

The project contributed to all six action areas of the EU Strategy for Pharmaceuticals in the Environment (PIE) and to two objectives of the EU Green Deal:

Areas for action PIE-Strategie COM(2019)128	MEDUWA-Vecht(e)
1. Increase awareness & prudent use	✓
2. Development of biodegradable medicines	✓
3. Improve environmental risk assessment	✓
4. Reduce wastage & improve waste management	✓
5. Expand environmental monitoring	✓
6. Fill knowledge gaps	✓
EU Green Deal COM(2019) 640	
§ 2.1.6 Significant reduction antibiotic use	✓
§ 2.1.8 Measures to stop pollution by medicines	✓

MEDUWA-Vecht(e) also contributed to strategic goals of the EU INTERREG-VA Program. Intersection has been made between three strategic initiatives Agribusiness/Food; Health & Life Sciences and High-Tech-Systems & -Materials:

INTERREG-VA C(2014)8740, C(2015)8615	MEDUWA-Vecht(e)
Priority 1	
- Research, technology and innovation	✓
- Cross-border cooperation between research institutes, small companies and institutes for higher education for development of products and services (pilots and first production), for exchange of technologies and for social and environmental innovation.	✓
Sector Agribusiness/Food	
- Better quality of products (healthy food)	✓
- Environmental protection	✓
- Prevention of formation/spreading of multiresistent organisms	✓
Sector Health & Life Sciences	
- Prevention of formation/spreading of multiresistent organisms	✓
Sector High-Tech-Systems & -Materials	
- Development and introduction of new products and services, like watertechnology, sensortechnology, ICT.	✓

1.2 Contribution to more consensus, communication and collaboration

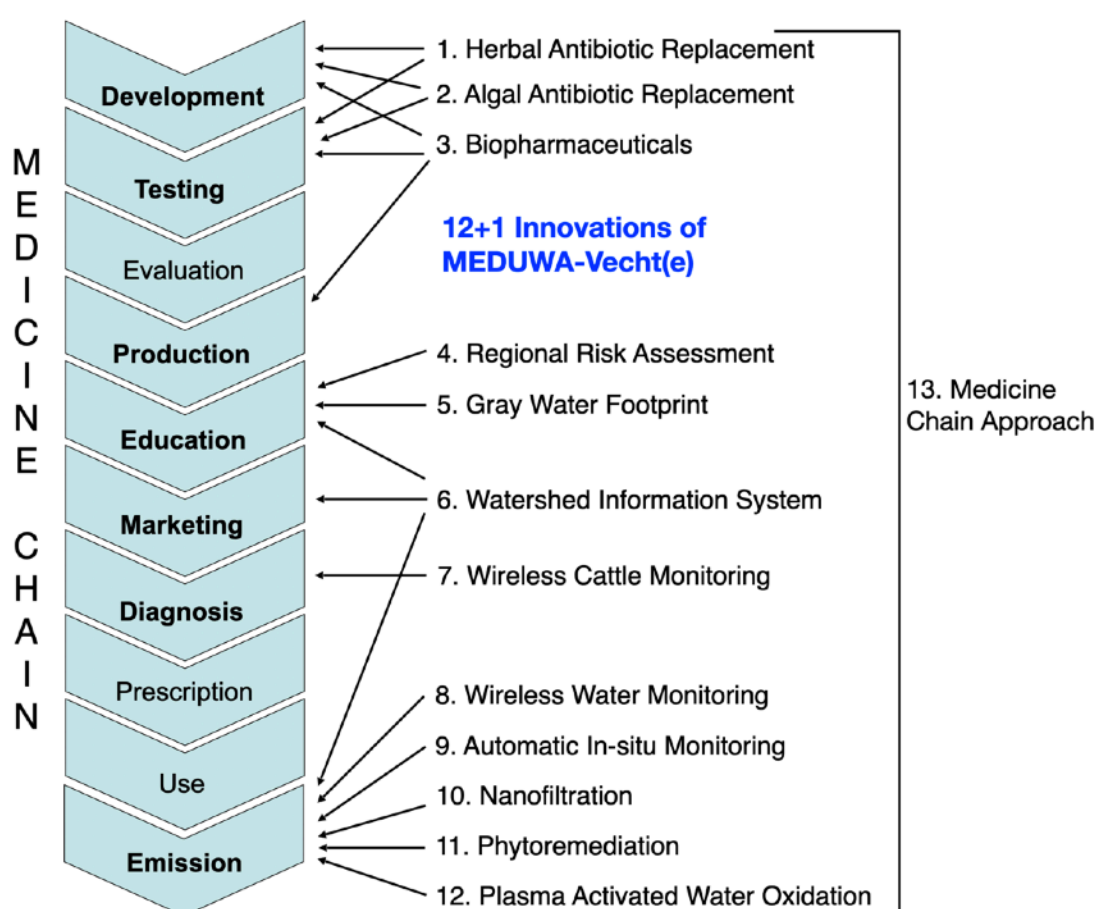
According to the coalition members, the integrative, interdisciplinary and multi-faceted working structure of MEDUWA-Vecht(e) successfully facilitated the achievement of the objective of awareness, communication and collaboration:

- Greater awareness of the magnitude, extent and dispersion of pharmaceuticals and antimicrobial resistance in the environment was achieved from different perspectives.
 - A regular exchange of knowledge and experiences between coalition members was achieved.
 - Needs and priorities for action were established.
 - Research and development work was improved.
 - Co-production was stimulated in the joint and complementary search for solutions.
 - A diversified network was created where the interests and needs of innovators, potential beneficiaries and stakeholders in the co-production of knowledge and innovations converge.
- However, it was necessary to link more partners to specific stakeholders. In particular, there is a lack of stakeholders in the veterinary chain.
- The innovations were disseminated nationally and internationally through conferences, meetings and publications in professional and scientific peer-reviewed journals.



1.3 Contribution to the development of knowledge, technology and economy

Thanks to the versatility and synergy of each of the innovations to reduce the environmental cycle of chemical and biological contaminants the MEDUWA-Vecht(e) consortium as a whole stimulated new ideas, concepts, models and tools for the prevention, mitigation, measurement, monitoring, simulation, visualisation and communication of environmental risks of medicines and multi-resistance in 7 of the 10 links of the medicine chain, see diagram.



Simulation, prediction, visualisation and communication systems were developed: a watershed information system; gray water footprint; and regional risk assessment of pharmaceuticals and antimicrobial resistance in the environment. The measurement and monitoring tools comprise continuous and automatic in-situ monitoring as well as wireless water monitoring. Several innovations tackle the problem of medicinal environmental contamination at its source through preventive measures such as herbal and algal antibiotic replacements, farm animal monitoring and

biopharmaceuticals. Finally, mitigation of pollution through medicinal contaminants is provided by nano-filtration, plasma activated water and phytoremediation.

The scientific institutes UKM IfH, UKM IfMM, RUMC and Wetsus contributed to the analysis of the effectiveness and impact of some specific innovations offered by companies in the MEDUWA-Vecht(e) consortium. These include plasma activated water, phytoremediation, herbal antibiotic replacement, and algal antibiotic replacement. Moreover, with the implementation of the [Watershed Information System \(WIS\)](#) the effectiveness and impact of selected innovations offered by the companies of the consortium has been assessed and presented in a visual interactive form. These include herbal antibiotic replacement; phytoremediation; biopharmaceuticals; plasma activated water; and nano-filtration.

According to the partners the project also supports water policy developers and implementers, water resource managers and new generations of academics. As a result, the project helped to stimulate the transition to sustainable/green pharmacy and chemistry, to mitigate their negative effects on society. In the opinion of 23 of 24 MEDUWA-Vecht(e) partners who responded to the evaluation survey cross-border co-production of knowledge and technology is encouraged. Ten partners structurally improved in the form of cooperation with other organizations. The teamwork helped to improve the innovations of 15 partners. According to 19 partners their innovations were of interest to stakeholders. For all 24 partners their collaboration in MEDUWA-Vecht(e) broadened and diversified their network and 13 of them achieved unexpected results.



2. Societal relevance

The degree of societal impact of the tools developed in the MEDUWA-Vecht(e) project was measured by the following criteria which are elaborated in the rest of this section: consistency of the results with the design and implementation of the project; ownership of the theme and the project by the members of the consortium; use, application, dissemination and sustainability of results; cross-border, trans-disciplinary and cross-sectoral collaboration.

2.1 Consistency of results with project design and implementation

In order to seek joint and complementary solutions throughout the product human and veterinary medicine chain, the MEDUWA-Vecht(e) project was designed and implemented in such a way as to unify visions, interests and objectives of different disciplines and sectors. The joint work of science and technology ensured that possible measures developed within the coalition did not create new problems.

In total, 17 of the 24 coalition members believe that within the MEDUWA-consortium mutual trust was promoted and developed. Frequent communication and respectful cooperation between the different partners and their respective viewpoints has allowed for a responsible exchange of knowledge and experience between the different partners and stakeholders. However, during this exchange it became clear that access to information of public interest and crucial data is very difficult to obtain because of its dispersal among different sectors, its confidentiality and the protectionism of organisations. In some cases due to the sensitivity of certain organisations to hierarchical power relations. Bureaucratic processes were also sometimes an obstacle to obtaining essential information, despite communication on how and with whom the information would be shared and what would be done with it.

2.2 Ownership of the theme and project

According to 16 of the 24 partners in the MEDUWA-Vecht(e) project, personal motivation to participate was one of the keys to developing a vision and optimising processes for the mitigation of the environmental cycle of medicines and multi-resistance. MEDUWA supported 21 partners in creating new forms of collaboration to promote solution options. In total 21 partners are confident that they have contributed to sustainable development in the area. The positive experiences of the partners accumulated during the implementation of the project and the joint activities affirm the project ownership and the willingness to collaborate after the project end.

By participating in the project 11 partners confirmed that they were only able to realize the development of their innovation because of access to funding. Ten partners have contributed to generating work for young people. Three partners wanted to learn how the INTERREG programme works in practice.

In order to link partners, stakeholders and others in a sustainable way to the social mission that the MEDUWA-project also stands for, a declaration for action has been signed. Signatories are committed to taking follow-up steps in the protection of (water) environment and health. On October 10 2020 31 persons, in a personal capacity or on behalf of their organisation, have signed the [MEDUWA Declaration](#).



2.3 Use, application, dissemination and sustainability of results

In total, 22 of the 24 partners continue to develop their innovations and knowledge. Because of the complexity of the issue, providing a common solution to the problem of the environmental cycle of pharmaceuticals and resistant microorganisms at the level of a river basin is a challenge. Thanks to the versatility and synergy of the results of each of the MEDUWA-Vecht(e) innovations (although they are still at a developmental stage) the benefits of these innovations can already be detected by:

- their potential use in different sectors of society;
- their diversity of applications in other services or products. For example, the watershed information system, regional risk assessment, grey water footprint and filtering and oxidation techniques can be used for other chemical and biological contaminants such as pathogens; the chemical industry shows interest in continuous monitoring; and the life cycle approach makes sense for other product groups as well;
- the growing need to reduce and monitor biological and chemical contamination in the environment;
- the global demand to prevent antimicrobial resistance;
- the growing demand for the development of a green or sustainable pharmacy and chemistry.

There are 16 out of 24 members of the MEDUWA consortium who think that they will continue to be part of the network after the completion of the project: a) because of the experiences they have gained from working with other partners and stakeholders; and b) because of the impact that the network can have on regional and (inter)national strategies to improve the quality of water, soil, food, public and animal health.

There are 12 partners who believe that the MEDUWA coalition increases the potential of their products and marketing. Some of the innovations are almost ready for the market and others will take a few years (two to five years). Other innovations depend on their rapid uptake and acceptance by stakeholders. In some cases further research and testing are needed. In the case of universities, commercialisation is not possible. The dissemination and acceptance of knowledge is done through international publications and scientific meetings, and also by the inclusion of the topic of green pharmacy and chemistry in academic agendas and curricula.

In total, 14 of the 24 partners identified new areas of attention for research, development, management and policy in the area of medicinal contamination and multi-resistance and 17 partners have involved young people in the project.

The dissemination and sustainability of the results depends largely on how the transfer of knowledge and the implementation of the measures developed in the MEDUWA-Vecht(e) project are managed in the future over the medium to long term. However, this process will always involve uncertainty and depends on the availability of financial resources in the future for the implementation of the measures developed in the project. Perceptions, values, interests and the working culture of the respective stakeholders may hinder or facilitate this process and therefore play an important role. This hypothesis is being investigated by the faculty of Sociology of the University of Groningen.



2.4 Cross-border, transdisciplinary and cross-sectoral cooperation

Cross-border, transdisciplinary and cross-sectoral cooperation are processes that need to be reinforced to be able to solve complex, interconnected, dynamic issues with a wide range of social effects. Including issues like the continuing threats to biodiversity, air, soil, water, food security and health by the constant increase in the daily use of highly toxic substances and the emission of resistant micro-organisms and pathogens.

The cross-border MEDUWA-Vecht(e) project collaborates to develop strategies that allow for the confluence of different approaches, perspectives and analytical approaches. MEDUWA has been characterized by several elements including the combination of information from different disciplines, integration and articulation of networks for decision making and practical application. The project also strengthened the transition towards a sustainable society by developing green solutions. For all 24 partners that submitted the evaluation, the cross-border collaboration was a positive experience.

Also 23 partners claim that the collaboration between the partners of the MEDUWA-Vecht(e) consortium and the stakeholders contributes to greater societal impact than if each partner worked independently. 23 partners expanded their network by participating in the different activities developed in the MEDUWA-Vecht(e) project, and 16 partners have made agreements with other partners to continue working after the completion of the MEDUWA-Vecht(e) project.

There are 21 partners who are of the opinion that the stakeholders involved in the project meet the requirements of variety and quantity. However, stakeholders in the area of veterinary medicine were not involved sufficiently. Only 7 partners made agreements with stakeholders for future collaboration.

Involving social sciences such as sociology, ethics and art could stimulate the development of a new vision for the joint solution of the medicinal environmental cycle.

The faculty of Sociology at the University of Groningen was invited to develop a study, based on the MEDUWA project, on the determinants of collaboration between different sectors that must necessarily be involved in the solution. MEDUWA has inspired the art and technology project, '[Beyond Technology](#)', of the University of Twente and ArtEZ University of Arts, Zwolle.

For the most part the feedback on this topic was very positive. However, during the implementation a few project partners detected the following factors that were, in their opinion, an obstacle to collaboration between sciences, industry and government in the border area: restrictions on data disclosure; for some innovations the state and pace of development differ too much for

organisations to cooperate effectively; laborious bureaucratic processes of the INTERREG Programme; lack of a common language; long distances for meetings; conflicting schedules that delayed planning; digital communication due to COVID-19 (easy, but not pleasant); the large number of people in the annual Stakeholder & Project Partner Meetings made the presentations very short and impersonal; each meeting tended to be attended by the same stakeholders who showed less interest and limited leadership; and the stakeholders did not have an important role within the project.



3. Management

The management structure was a unifying agent for the cooperation, communication and administration of the project. The management structure developed in the MEDUWA-Vecht(e) project is a tool that can be applied in the design of other projects for the transition towards a sustainable society. There are 23 of 24 partners who are satisfied with the work carried out by the project management team.



3.1 Management structure

The MEDUWA-Vecht(e) project management team used a working structure that facilitated communication, collaboration and exchange of knowledge and experience among the different partners and stakeholders. This working structure consisted of cross-border teams organised in Work Packages between academic organisations and businesses. In the Work Packages a research and discussion environment was created to improve the expectations and characteristics of the final product. Each Work Package was assigned a leader who was responsible for coordination and communication within his group and with the management team. The annual Stakeholder and Project Partner Meetings supported the cross-border cooperation and the development of the innovations.

The Management Team (UOS, TIAS, SHA) promoted the use of everyone's qualities and ensured that absenteeism due to illness could be dealt with smoothly. The division of tasks within the team

made the implementation of tasks efficient and this efficiency was reflected in the unanimous appreciation of project management by the project partners.

By sharing responsibilities and tasks, the project management team composed of three representatives of three partner organisations was an effective way to provide the appropriate management of such a complex and diverse project with quality outputs.

In the future, the project manager should be enabled to concentrate more on steering the project and on the collective learning processes and outputs, and should be freed as far as possible from administration and communication tasks.



3.2 Communication strategy

The communication strategy of the MEDUWA-Vecht(e) project was aimed at:

- strengthening the exchange and cooperation between the project partners among themselves, and also with and among the stakeholders (in particular regional and national authorities and sectoral organisations);
- strengthening ownership of the problem and project by partners and stakeholders;
- promoting the mutual learning experience of the Dutch and German project partners.

This strategy consisted of two parts: internal communication between project partners and external communication with stakeholders.

According to 21 out of 24 coalition members who completed the evaluation the meetings for all project partners were satisfactory; for 21 members the Work Package meetings were satisfactory. 17 coalition members indicated being satisfied with the Stakeholder and Project Partner meetings.

The survey revealed that 17 coalition members were satisfied with the MEDUWA flyer; 10 were satisfied with articles in professional journals (although only in Dutch); and 21 members were satisfied with the [MEDUWA.eu](https://www.meduwa.eu) website. However, only 16 coalition members used the various features on the website occasionally. The news page was visited by 11 partners only and the Blog about pharmaceuticals and antimicrobial resistance in the environment was never visited. It can be concluded that the website has not fully served its purpose - to promote communication between partners. After the project the website will be used occasionally for updates about partners and innovations and for follow-up news by 16 project partners.

A general wish of partners to disseminate information about MEDUWA to the public through various channels has been expressed. Mentioned were television, radio, and press articles at the regional and local level as well as more webinars during the course of the project to attract more interest and inform the public.

Furthermore, local and regional policy makers, politicians and certain relevant organisations were seen as strategic to further increasing awareness about the topic of pharmaceuticals and antimicrobial resistance in the environmental cycle as well as to convey the need for the innovations that have been developed.

In different ways, the results of MEDUWA-Vecht(e) have been and will be disseminated to different target groups, see below (estimated for end project, March 31 2021).



Scientific
articles: 7



Scientific
articles
underway: 15



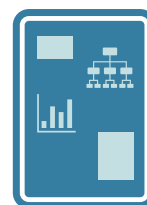
Reports: 5



Newspaper
articles: 2



Articles in
professional
journals: 6



Posters : 7



Stakeholder
meetings : 6



Presentations
to third
parties : 15



Webinars: 2



Conferences : 1



Youtube
video's: 4



Radio/TV
interviews : 2



Websites: 3



Flyer:1

4. Efficiency and effectiveness of economic investment

The financial support the coalition has received from the INTERREG-VA Programme Partners has been spent in a responsible manner.

According to 16 out of 24 coalition partners the budget was allocated adequately to partners in relation to the objectives, activities and outcomes. The half-yearly payment period was appropriate for 13 partners. Five partners experienced financial problems due to payments being made several months after they submitted their biannual financial report. Especially for the small enterprises it was a challenge to pre-finance the expenditures for half a year and encounter additional delays due to internal administrative processes of the lead partner and the bureaucratic requirements of INTERREG. This was a burden to their business operations. Here, it is desired that funds can be made available by INTERREG more flexibly and in a timely way especially to small enterprises.

MEDUWA-Vecht(e) created 35 full-time and 7 part-time jobs. After their introduction to the market the project partners expect that the MEDUWA innovations create overall about 190 full time jobs. The project also prepared future professionals by involving 6 PhD-candidates, one post doc, 9 scientific assistants, and about 20 Master students in an integrated approach to addressing complex societal (in this case environmental quality) issues through transdisciplinary, cross-sector and cross-border collaboration. About 60 pharmacy students have been introduced to green pharmacy through the project.

5. Conclusions and Recommendations

It can be concluded that the MEDUWA-Vecht(e) project contributed in a satisfactory manner to policies and programmes on the reduction of chemical and biological pollutants in water and soil. The project contributed also to the INTERREG-VA-goals for regional development, particularly in the sectors Agribusiness/Food, Health & Life Sciences, and High Tech Systems & Materials.

Tools were developed to assess and visualise the risks of the medicinal environmental contamination, and to evaluate the immediate effects of the measures. Other tools were successfully generated for the purification of water; to stop pollution at the source; and to monitor animal health continuously. Also medicines for humans and animals are being developed that are less persistent in the environment and prevent the use of antibiotics.

MEDUWA-Vecht(e) developed collaborative strategies that make use of different approaches, perspectives and analytical methods. The project has contributed to the introduction or reinforcement of green pharmacy and chemistry, especially among a new generation of researchers.



MEDUWA combined technical, digital and social information that identify new research and policy areas. It integrated and articulated networks linked to decision making and practical application. The project has been characterized by the collaboration between research institutes and companies. In teams they collaborated to develop practical solutions. With six PhD candidates, one post doc and about twenty Master students the project provided an opportunity to a new generation of scientists

and stimulated co-production between disciplines. The commitment to and passion for their work has ensured that all members of the “MEDUWA family” have achieved good results. With all of this MEDUWA-Vecht(e) strengthened among partners and stakeholders the ethical values aimed at the transition to a sustainable society.

5.1 Scientific and economic potential of the pilot region

The pilot area of MEDUWA-Vecht(e), the cross-border watershed of the Vechte River, has considerable economic potential. The catchment area is increasingly a source of drinking and irrigation water. The landscape with its rivers and streams is very much valued for recreation and tourism. However, the rain-fed rivers and streams carry high concentrations (up to 95%) of sewage effluent in summer. Effluent still contains considerable concentrations of chemical and biological contaminants like medicines, multi-resistant and pathogenic microorganisms. It is precisely in such areas that innovations such as those of MEDUWA are very much needed. With its research and development of tools, MEDUWA-Vecht(e) has contributed to the protection of welfare and prosperity in this region.



5.2 Recommendations

Based on the project partner evaluation the following recommendations have been formulated.

- To promote the societal acceptance of innovations partners should be better informed about the extent to which their innovations contribute to policy, especially the SDG's and the Green Deal.
- In order to promote the success of innovations throughout the product chain, social sciences, human and veterinary medicine, marketing, design and the arts should contribute throughout the development process.
- In order to better assess the impact of the innovations, this project evaluation can be broadened to include stakeholders.
- For a broad acceptance and application of innovations for the protection of cross border natural resources such as soil and water, local and regional authorities and sectoral organisations should be more actively involved in the development of these innovations.
- Stakeholders must have decision-making power within their organisations and should also include representatives of state organisations and policy development.



- In subsequent projects, more attention must be paid to the risks of recreation in water bodies containing high levels of effluent, in particular in relation to contact with pathogens.
- Project management should be separated from project administration and the latter be assigned to an external organisation that has experience in administering large INTERREG-projects.
- Project communication should be executed by an organisation that is specialized in providing balanced and professional communication services on both sides of the border.



MEDUWA-Vecht(e), a cross-sectoral and cross-border coalition for action and change:



Sponsors of MEDUWA, with the European Regional Development Fund and other INTERREG-V Germany-Netherlands programmes as partners:

