

Research evaluation

EVALUATION REPORT OF THE UNIT UMR Transfrontalière BioEcoAgro

UNDER THE SUPERVISION OF THE FOLLOWING ESTABLISHMENTS AND ORGANISMS:

Université de Lille Université de Picardie Jules Verne

Institut national de recherche pour l'agriculture, l'alimentation et l'environnement - INRAE

Université de Liège

EVALUATION CAMPAIGN 2024-2025 GROUP E

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High Council for evaluation of research and highter education



In the name of the expert committee:

Gabrielle Potocki-Veronese, chairwoman of the committee

For the Hcéres:

Stéphane Le Bouler, acting president

In accordance with articles R. 114-15 and R. 114-10 of the Research Code, the evaluation reports drawn up by the expert committees are signed by the chairmen of these committees and countersigned by the president of Hcéres.



To make the document easier to read, the names used in this report to designate functions, professions or responsibilities (expert, researcher, teacher-researcher, professor, lecturer, engineer, technician, director, doctoral student, etc.) are used in a generic sense and have a neutral value.

This report is the result of the unit's evaluation by the expert committee, the composition of which is specified below. The appreciations it contains are the expression of the independent and collegial deliberation of this committee. The numbers in this report are the certified exact data extracted from the deposited files by the supervising body on behalf of the unit.

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Mr Philippe Nivez, Vice-Président Recherche SHS, université de Picardie Jules Verne

Mr Benoît Robyns, Vice-Président Recherche, École d'Ingénieurs Junia



CHARACTERISATION OF THE UNIT

- Name: BioEcoAgro Joint Research Unit
- Acronym: BioEcoAgro
- Label and number: UMRt 1158
- Composition of the executive team: Director: Mr Philippe Jacques (Gembloux/Liège University), and three deputy directors: Mr Jean-Louis Hilbert (University of Lille), Mr François Mesnard (UPJV Amiens) and Mr Joël Léonard (INRAE)

SCIENTIFIC PANELS OF THE UNIT

SVE2: Plan and Animal Production (Agronomy), Plant and Animal Biology, Biotechnology and Biosystems Engineering

SVE1: Basic and Applied Environmental Biology, Evolution ST5: Engineering Science SVE3: Living Molecules, Integrative Biology (From Genes and Genomes to Systems), Cell and Development Biology for Animal Science

THEMES OF THE UNIT

The research field of the BioEcoAgro cross-border Joint Research unit covers, globally, agro-biotechnological bioengineering 'from farm to fork', and even 'from farm to gut and health'. On 2023/12/31, the unit's staff was composed of 170 permanent and 201 non-permanent staff, including 155 PhD students.

The unit is organized in three clusters, each comprising three teams ranging between 12 and 109 total staff per team and between 6 and 41 scientists per team.

The research themes, in adequation with the One Health approach, focused on i) the development of innovative cropping systems to address the challenges of climate change, ii) the identification and production of biomolecules from plant and microbial origin, iii) the management of food quality and safety for human health.

The scientific and technological expertise of BioEcoAgro combines enzymology, microbiology and fermentation, analytics and bioactivity profiling, microbial and plant genetics, metabolomics and proteomics, bioprocesses, agronomy (crop sciences) and animal experimentation, simulation and modeling.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The BioEcoAgro Joint Cross-Border Research Unit has been created in 2020. It results from the merging of the Institut Charles Viollette (Lille) with TERRA-Gembloux (Liège), the BIOPI laboratory of the University of Picardie Jules Verne and the AgroImpact team of the INRAE Hauts de France Centre. These entities were previously connected through Interreg programs, through the international associated laboratory MOM (Metabolites of Microbial Origin), the Unit under contract (USC) Adaptation of Plants to Cold and the Condorcet Federative Research Structure. The fusion of these entities resulted in a very large unit, with a staff of 170 permanent people (31/12/2023). The laboratories of BioEcoAgro are located on thirteen sites in the Hauts-de-France and Wallonia (Belgium) Regions.

RESEARCH ENVIRONMENT OF THE UNIT

The BioEcoAgro Unit is affiliated to the University of Lille, the University of Liège, the University of Picardie Jules Verne Amiens (UPJV), INRAE, the University of Artois, the University of Littoral Côte d'Opale (ULCO), Junia (a French graduate school of science and engineering) and Anses. The Unit beneficiates from the following platforms and contributes to their technological developments: the agro-environmental platform of Estrées-Mons (INRAE), the Anses laboratory of Boulogne-sur-Mer, the CRRBM (Centre de Resssources Régionales en Biologie Moléculaire) and the analytical platforms, including omics technologies, of the UPJV, the food processing plants of Adrianor Arras, the high-throughput catalytic screening platform REALCAT of the École Centrale de Lille, as well as the platforms Environment Is Life, Food Is Life and Agriculture Is Life experimental farm. The researchers also have access to the animal facilities named PHEXMAR (Plateforme d'Hébergement et d'Expérimentation des Modèles Aquatiques et Rongeurs), to the Animal experimentation and production center (CEPA).

The Unit is integrated in the regional research coordination networks, both in Wallonie and in Hauts-de-France. Notably, it is involved in the USC (ULCO-Anses) biochemistry of aquatic products (BPA), in the Sciences and Technologies, Health cluster, as well as in the Adrianor Center of expertise in food processing, the EQUIPEX REALCAT (PIA) and two HUBs of the University of Lille (Science for a Changing Planet, Precision Health).



The unit is also involved in the Condorcet and in the Campus de la Mer Federative Research Structures.

Regarding the socio-economic fabric, the unit is part of the Nutrition-Santé-Longévité and Aquimer competitiveness clusters, of the Bioeconomy for Change (B4C) Certia Interface networks and of the CD2E's AVNIR expertise platform. The Unit also hosts a joint laboratory with Florimond-Desprez, and two industrial chairs (ProteinoPepS and Charles Viollette). The Unit has been strongly supported by the Hauts de France Region through the Alibiotech CPER/FEDER Agribusiness plan in agri-food and biotechnology, and through the MARCO (Coastal and Marine Research in the Coast of Opal) and IDEAL (Quality and Safety of Aquatic Resources) CPERs.

BioEco Agro is a member of three International Associated Laboratories: LIAAN (nutrition and functional foods, Laval University in Québec (Canada), Institut Charles Viollette, University of Lille), MOM (Nonribosomal peptide synthesis, University of Lille and of Liège), SAMBA (Agri-food and Biotechnology, University of Viçosa in Brazil). Finally, the Unit is affiliated to three doctoral schools (SMRE : Sciences de la Matière, du Rayonnement et de l'Environnement, STS : École doctorale en Sciences, Technologie, Santé, SCAIB : Ecole doctorale Sciences Agronomiques et Ingénierie Biologique).

Catégories de personnel	Effectifs	
Professeurs et assimilés	53	
Maitres de conférences et assimilés	63	
Directeurs de recherche et assimilés	1	
Chargés de recherche et assimilés	4	
Personnels d'appui à la recherche	49	
Sous-total personnels permanents en activité	170	
Enseignants-chercheurs et chercheurs non permanents et assimilés	7	
Personnels d'appui non permanents	35	
Post-doctorants	4	
Doctorants	155	
Sous-total personnels non permanents en activité	201	-
Total personnels	371	

UNIT WORKFORCE: in physical persons at 31/12/2023

DISTRIBUTION OF THE UNIT'S PERMANENTS BY EMPLOYER: in physical persons at 31/12/2023. Non-tutorship employers are grouped under the heading "others".

Nom de l'employeur	EC	С	PAR
U Lille	33	0	12
UPJV	29	0	7
U Liège	32	1	6
INRAE	0	4	17
Autres	22	0	7
Total personnels	116	5	49



GLOBAL ASSESSMENT

The research activities of the cross-border Joint Research Unit BioEcoAgro are globally very good to excellent. The objectives of the UMRt are very good to excellent. Thanks to its huge staff and a very large range of expertises, the positioning of BioEcoAgro within the scope of the One Health concept is unique. The UMRt very efficiently addresses several topics, such as plant adaptation to climate issues, green chemistry, food quality and safety for human health, which are key issues for its main supervising bodies and its four associated ones. Nevertheless, there is dispersion of efforts in some teams.

The resources of BioEcoAgro are very good to excellent. The 170 permanent staff, the nine platforms managed by the unit, the efficient funding engineering strategy, at the regional, France-Belgium trans-border and international scales, greatly contribute to the attractiveness of the unit. The balance between permanent scientific and technical staff is excellent at the unit scale, but very unequal between teams, some of them entirely relying on their own resources to maintain and develop technical expertise.

The functioning of the UMRt is evaluated as good because it lacks an internal council including representatives from all categories of personnel. Notwithstanding, the committee has been impressed by the structuring efforts that have been deployed by the direction and the managing staff to create the UMRt. After five years of functioning, the enthusiasm of all staff is real and the sense of belonging is progressively increasing, in particular on the French side, which acknowledges the added-value of the unit creation. The staff trust in the present and future direction team, which is very encouraging for the next few years. The functioning of the UMRt promoted scientific brainstorming between Pls, which led to the elaboration of several transversal projects and evolution of the team's contours, which will increase robustness, emergence of new themes and visibility of the youngest Pls. Nevertheless, the scientific animation and participation of all staff in the decision-making process are unequal between teams. There is no laboratory council yet, nor budget mutualization to support emerging, transversal themes.

The visibility and attractiveness of the UMRt are excellent at the regional and national levels, and very good at the international level. The international visibility is due to the high visibility of some PIs, to the creation of three International Associated Laboratories and to the organization of several conferences. Two Junior Professor Chairs were obtained during the period assessed. Success in fundraising is outstanding at the regional and transborder levels, excellent at the national level, and very good at the international one. The number of PhD students supervised over the period of evaluation is outstanding.

Scientific production of BioEcoAgro is excellent quantitatively and very good qualitatively. A few papers have been published in outstanding generalist journals, but the quality of the publications is heterogeneous between teams. The position of BioEcoAgro staff as first, last or corresponding author of the articles is very good. Excellent transversality between teams is shown by the high number of articles co-authored by different teams. Finally, the compliance of the unit to scientific integrity and to Open Science is very good.

The contribution of the Unit activities to society is very good to excellent. The ability to build collaborations with industrial partners is excellent, as shown by the number of contracts with industry, the two industrial chairs Charles Viollette and ProteinoPepS and the two LabComs CHIC41H and ALLInPep. The ability of the unit to valorize research results is moderate, given the number of patents. Activities of dissemination of scientific advances to the general public are good.

DETAILED EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Many recommendations were followed, but some improvements are still necessary.

A collective rule for the signature of publication has been set but it is not always implemented. The open access publication policy has been extended to the whole unit. The data collected are stored and secured on the Cloud. Valorization and interactions with the socio-economic sector were increased. Outreach activities exist but depend on personal initiatives. How these activities are supported and structured within the unit remains unclear. The help received by the UMRt to join or organize European projects and international meetings is unclear as well, although some Belgian members of the unit benefit from a stronger support. There is no mention of start-up creation during the period, yet implementation of a spin-off is in progress.

Given the administrative complexity of the structure, the sharing of management rules is still restricted to full sharing of platforms, part of doctoral funding and budget obtained as UMRt (CPER). The unit as a whole has no other fund sharing system.



Female representation has been improved, but women remain under-represented in the management committee (20% instead of the recommended 40%). Yet the next UMRt director will be a woman.

The role of poles is restricted to the presentation of convergent activities in reports and website.

No laboratory council has been implemented.

Policy of recruitment, training and psychosocial risks are not posted on the unit's shared repository, although these informations are available at each site, in relation with each supervising body. Common management and scientific animation have been organized by prioritizing remote communication tools. The creation of a doctoral student's association triggered some sense of belonging, but it did not extend to technical/administrative staff. Except once in 2023, no opportunity was given to the whole staff to visit the other sites to discover their potential.

A common website now provides information on the UMRt structure and team/transversal activities, but information on staff, team composition, contact information and localization are still missing.

Sensitization to quality approach and ethics was implemented but the rules applying are those of each supervising body.

Recruitment of non-teaching permanent staff was slightly improved (1 TR, 3 Al on INRAE side) and two spontaneous external applications (INRAE) were recorded.

Salaries of PhD students (and other personnel) are higher in Belgium. Strong variations in the PhD durations persist, mainly due to the different PhD systems in France (3 years) and Belgium (4 years), yet some borderline cases have been noted. PhD abandon remains a problem on the Belgian side, mostly due to attractivity of the private sector.

The organization as poles with common objectives contributes to the readability of the scientific project but has limited impact on the functioning of the unit. Transversal projects and activities involving different sites have clearly led to the implementation of common projects, common supervision of PhD theses and common publications, sometimes resulting in transfer of personnel and team merger (e.g. merger of Team 2 and 3 of pole 1, merger of Teams 7 and 8 of pole 3, and even transfer of three staff from Team 1 of pole 1 to Team 6 of pole 3). Refocusing on fewer plant models has somehow progressed (with the departure of one member of the unit or merger or teams 7 and 8). As suggested, the (re)structuration has proceeded without further extension.

Common strategies for funding applications have been implemented at the regional level (CPER for large equipment), at the European (for cross-border projects: an INTERREG managed by the UMRt, FEDER) and national (ANR, INRAE international network) levels. A common PhD funding system was also organized that in priority supports cross-border activities.

B - EVALUATION AREAS

Guidelines for all areas of evaluation (1, 2, 3 and 4): Considering the references defined in the unit's evaluation guidelines, the committee ensures that a distinction is made on the outstanding elements for strengths or weaknesses. Each point is documented by observable facts including the elements from the portfolio. The committee assesses if the unit's results are consistent with its activity profile.

EVALUATION AREA 1: PROFILE, RESOURCES AND ORGANISATION OF THE UNIT

Assessment of the scientific objectives of the unit

Thanks to its diverse expertises, BioEcoAgro may address all facets of the One Health approach, The unit has an outstanding vision of its environment and of the interest of resources mutualization and research structuration. The scientific strategy is in excellent alignment with those of its governing bodies and of the EU. The unit takes into account the societal and industrial impacts of its research in an excellent way through dense collaborations with companies, participation in think-tanks, competitive clusters and centers of expertise on agri-food. The ability of the unit to involve its staff in research is very good, but the mode of internal validation of the scientific strategy should be improved.

The ability to promote the emergence of new themes is very good. Yet, the diversity of scientific questions and objects of studies is too large.



Assessment of the unit's resources

The unit has very good to excellent human, financial and technical resources, unequally distributed between teams. The UMRt has excellent access to state-of-the-art technical facilities through the University of Lille (REALCAT, the bioactivity technical platform, the 3PB platform, the Norine database on the BiLille platform), the University of Liège ("Food is life", "Agriculture is life", "Environment is life") and INRAE.

The unit maintains large biological resources for microorganisms and plants.

Computer resources are managed within each supervisory body. Team 2 has access to resources from European networks.

Assessment on the functioning of the unit

The functioning is good considering the complexity of the structure affiliated to 7 supervisory bodies, and is spread over 13 sites in France and Belgium. The report shows the difficulties encountered to manage such a group. There is no general budget for the unit, with each supervisory body managing its own. A scientific council ranks at the unit's level the demands of thesis funding, which is a concrete example of collective decision-making.

Teams are grouped into three clusters to facilitate the description of the unit but the clusters have no functional or financial role.

There was up to now no unit's council where all staff could be represented. An external scientific council was set up, but only met once.

1/ The unit has set itself relevant scientific objectives.

Strengths and possibilities linked to the context

The Hauts de France region strongly supported the strategy of the unit through the CPERs Alibiotech, BiHautsEco de France, Ideal and Marco and the Ultrafel project (Stimule funding), as well as with 12 FEDER projects. The unit's strategy is also in line with the PIA of France 2030, the PEPR FairCarboN and the creation of IFSEA, a transdisciplinary graduate school dealing with the environmental, societal and economic issues of the seafood industry.

The scientific objectives also align with the priorities of the EU, which strongly supported the unit (Interreg projects, 4 H2020, 2 EJP SOIL, one Climate-KIC).

The unit contributed to several networks that led to the creation of three international associated laboratories (LIA). These structuration efforts also result in an impressive visibility in the field of agri-food and biotechnology. BioEcoAgro contributes to the scientific strategy of the European Union, participating in the '4 per 1000' and COPERNICUS initiatives, in two EJP SOIL (European Joint Program on Agricultural Soil Management), 20 Interreg and 4 Horizon projects (AI 4 Soil Health, BELIS, BIOSMART, BIOHEC). The Unit's also participates in the Erasmus+ projects Smart'Farming and Agreen'Smart. Regarding the resolution of societal challenges, the unit participates, in collaboration with private actors, to six think-tanks, competitive clusters and centers of expertise on agri-food. The unit also hosts 6 companies, including a LabCom, and two industrial chairs.

Weaknesses and risks linked to the context

Despite the ambition of the unit and its efforts to federate all the research activities around the concept of 'One Health', the diversity of research themes, expertise and, mainly, objects of study (plant models, metabolites, ecosystems) is the cause of dispersion. Although this represents an opportunity to diversify the funding sources, the risk is to lose visibility, and thus attractivity, on major themes.

The decision-making process regarding the scientific strategy, including recruitment of permanent staff is not sufficiently collaborative, relying on team leaders. The opportunity offered by the establishment of an external scientific council has not been fully exploited since there was only one meeting of the external scientific council over the period. There is no laboratory council in the unit.



Although some future adjustments are planned to increase the visibility of certain themes (such as pectin enzymology), to favor multidisciplinarity (integration of design and experimental studies in crop management, greater consideration of animal in agroecology, greater integration of socio-economic aspects and participative sciences in agroecological management), to promote emergence of new themes (development of alternatives to antibiotics, big data integration), and, finally, to promote the leadership of young Pls, the analysis of the declining activities and objects of studies has not been done.

2/ The unit has resources that are suited to its activity profile and research environment and mobilises them.

Strengths and possibilities linked to the context

The human resources include 371 staff, among which 201 are non-permanent. The scientific staff is mainly made up of teachers-researchers (116), only five research fellows and three research directors. The UMR has 55 HDRs, which is low compared to the number of scientists and to the very high number of Ph.D. hosted during the period (259).

The unit has access to diversified financial resources (CPER, ANR in France, FNRS in Belgium, Interreg, European Union, industry). More than 550 contracts are listed, for a total amount of self-ressources of 17 M€ in 2023. Over 5 years the main financial resource comes from national fundings (58%), followed by international projects (19%), collaboration with industry (12%) and local and regional support (11%).

On average, the resources per research FTE are 138 k€ for the period assessed. The funding strategy relies on a very large panel of PIs, 71% of the PIs managing at least one project for the unit.

A scientific council was set up to maximize the consistency of CPER applications and PhD fundings.

Finally, with 62 webinars (about 1/month), the organization of the One health international days, and the scientific animation of the unit, aims to promote transversality and collaborations across all themes. The structure of the unit, with a director from University of Liège and Deputy Unit Directors from INRAE, the University of Lille and the UPJV, facilitates daily budget and personnel management, as well as decision-making at the scale of the unit regarding equipment funding and major cross-border projects.

Weaknesses and risks linked to the context

The unit financial resources, excluding salaries, are irregular from one year to the next, ranging from 7.4M€ to 17.9M€ per year. Compared to self-resources, institutional funding is low, representing only from 3% to 10% of the total budget. A significant energy is required from permanent staff, which is mainly represented by professors and assistant professors, for applying to financial grant resources.

Although a Microsoft TEAMS tool allows sharing the skills, techniques and resources available on each site, the access to technical resources is difficult because the unit staff is dispersed over 13 sites on a large geographical area. Because of high turnover in non-permanent staff, the permanent technical staff is significantly overloaded with training and supervision tasks. The technical staff are not sufficiently involved in project elaboration and planification.

The staff in charge of administrative and financial tasks is not numerous enough given the size of the unit. The fact that the unit is supervised by 7 different institutions prevented the constitution of a joint budget at the unit level.

The number of theses that started before 2020 with no defense date mentioned (39) is worrying, although standard PhD duration in Belgium is 48 months.

3/ The unit's practices comply with the rules and directives laid down by its supervisory bodies in terms of human resources management, safety, environment, ethical protocols and protection of data and scientific heritage.

Strengths and possibilities linked to the context

In addition to the unit website, a Microsoft TEAMS cloud that has been set up centralizes descriptive information but does not allow sharing of working documents.



The sense of belonging of all staff is progressively increasing. Staff are satisfied with the current life of the unit. Doctoral students were particularly enthusiastic with the possibilities offered by the multidisciplinary skills in the unit. The "Association of Doc & Post-docs happy scientists", launched during the evaluation period, organizes poster sessions, webinars and a technical day. It is a very positive testimony of a new sense of belonging among young people. A monthly information letter is written by two PhD students.

Discussions showed that staff feel confident in how the Unit is managed.

Weaknesses and risks linked to the context

A global policy for the management of human resources was not presented. Each team, institution, doctoral school has its own policy. Likewise, no global policy on Health and Safety, sustainable development, and data management was presented in the report. "Common objectives" and "UMR standards" are not described but were mentioned in the discussions with the staff. The diversity of supervising bodies, the geographical dispersion of teams, and the diversity of scientific objects and methods make it very difficult to establish common rules and practices. In addition, the specific policies reported by the teams also differ strongly.

The modalities of scientific animation are very different among teams, which affects in some teams the involvement of all staff in decision-making. There was up to now no unit's council where staff other than scientists could be represented, but the idea of creating such a council for the next contract has been raised. The teaching hours of staff from ULille, UArtois and ULCO exceeds by factors of 1.5, 1.5 and 1.3 the standard teaching load. This is even more marked for teachers at the IUT of the ULille, for which the teaching hours exceed by 2.1 the standard teaching load (some by 3.3). This dramatically affects their research potential.

The lack of a collective life, of democratic processes and of a sense of belonging to the unit were reported in the self-evaluation document and in presentations during the visit. However, during the interviews, the different categories of staff were satisfied by the functioning of the unit. The sense of belonging seems higher on the French side than on the Belgian one, where visibility is more due to that of each PI than to that of teams or unit.

Teams are grouped into three clusters to facilitate the description of the unit, but the clusters have no functional role.

Only 61 weekly seminars were held during the 5-year period assessed.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment of the attractiveness of the unit

The unit has a very good to excellent attractiveness, although with differences among the teams, as seen through participation in international meetings, European projects and infrastructures. The unit organized 23 international conferences, 4 international thematic schools, and developed numerous collaborations with private companies. A wide range of instruments and platforms are accessible, although most of them are dispersed in many distant sites. In the framework of the European Research Infrastructure Consortium (ERIC) networks, Unit's facilities (Ecotron, Flow Tower, Soil Analysis Laboratory, etc.) are accredited (AnaEE, ICOS, SoPHy).

- 1/ The unit has an attractive scientific reputation and is part of the European research area.
- 2/ The unit is attractive because for the quality of its staff support policy.
- 3/ The unit is attractive through its success in competitive calls for projects.

4/ The unit is attractive for the quality of its major equipment and technical skills.



Strengths and possibilities linked to the context for the four references above

The unit organized many international conferences ((ex: Natural products and Biocontrol, One health international days, European congress of chemical engineering) and 4 thematic schools ((ex: Genome-mining for natural products 2022 and 2023).

The Unit is very well inserted in the EU research context. Over the 2019-2023, the unit has been involved in 10 international projects (leading 7 of them) and 64 projects at the European level including FEDER (leading 14 of them). The Unit is also involved in the B4C bioeconomy competitiveness cluster. The Unit also had set up international associated laboratories (LIAAN with the Université Laval (Québec) for example). Additionally, the unit is supported by Hubert Curien bilateral partnerships (PHCs) with Ireland, Japan, and Australia, and twenty PhD students every year are hosted thanks to the collaboration with the Chinese Agricultural Academy of Sciences (CAAS).

The Unit has contributed to or led ANR or national agencies projects (e.g., the complementary MisTigation and MisEauVert projects on Miscanthus). It is attractive in the PIA context (contribution to 4 PEPRs, and several PIA projects in the past), and also in regional/local funding such as CPERs.

The Unit facilities are accredited in EU infrastructures (such as ANAEE, ICOS, SoPHy).

Its platforms cover a wide range of fields, allowing to develop cross-disciplinary research: The REALCAT platform at Univ Lille, dedicated to high-throughput catalysis and biocatalysis is unique in the world. The platforms Agriculture Is Life and Environment Is Life at Univ Liège allow to test innovative crop production. The INRAE site provides skills and equipment for experiments in controlled conditions. The unit skills in simulation and bioinformatics provide a major contribution to the development of international simulation methods dedicated to the soil-plant-atmosphere system and to the generation of an international database (Norine for non-ribosomal peptides).

The fact that the Unit is open to collaboration with industrial and socio-professional sectors, mainly for the development of biotechnology tools (enzymes, microorganisms) applied on valorization of byproducts from agro-food industries, is also a positive aspect to attract collaborators.

Weaknesses and risks linked to the context for the four references above

The number of the members of the diverse institutions widely differ and there is considerable heterogeneity between teams. The absence of a unit/laboratory council precludes the definition of an overall staff policy.

Although the unit has set up a common procedure for welcoming new arrivals, an association for doctoral students and a general newsletter for important events, these legitimate actions cannot be considered, as a general policy for welcoming or supporting staff.

EVALUATION AREA 3: SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The scientific production of the UMRt is very diversified and aligns closely with the priorities defined by the EU and in France by INRAE. This production is excellent quantitatively and very good qualitatively, but with large heterogeneities between teams. The unit has implemented a strong policy regarding research ethics, integrity (namely for PhD students), and open science (HAL and ORBI repositories in France and Belgium, respectively). Given the topics developed by the unit and its numerous interactions with the industry, he production of patents is moderate (15 of which 4 international).

- 1/ The scientific production of the unit meets quality criteria.
- 2/ The unit's scientific production is proportionate to its research potential and properly shared out between its personnel.



3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science. It complies with the directives applicable in this field.

Strengths and possibilities linked to the context for the three references above

The complementarity of skills and expertises found in the nine teams of BioEcoAgro opened the possibility to get original results and develop innovations in line with One Health, agro-ecological transition and climate change consequences on agrosystems. Reflecting the unit multidisciplinarity, these results were published in a very wide range of journals corresponding to different fields of the teams.

The unit has published 1419 original articles (i.e. 4.6 articles/year/research FTE) in journals considered as good to outstanding in their fields and 51 book chapters, Both quantitatively and qualitatively, the production is very heterogeneous among the teams, with team 8 being the most productive (8.19 articles/year/PI FTE) and teams 4 and 2 publishing in the highest visibility journals. For example, articles have been published in *Nature Communications*, *Nature Geoscience or Nature Climate Change* by the team 2. *Nature Geoscience* article led by team 2, reports an estimation of carbon loss from northern circumpolar permafrost soils by 2100 taking into account its amplification by rhizosphere priming. This interdisciplinary study across the fields of biogeochemistry, soil science, microbial ecology and plant ecology is a milestone towards realistic projections of greenhouse gas emissions and is in the top 5% of all research outputs scored by Altmetric.

Team 4 published in the journals Nature Comm, PNAS, NAR, ISME Journal, EMBO Reports, mainly as first, last or corresponding authors, which is outstanding.

The members of the unit also presented 548 oral communications and seminars, 290 posters at national and international meetings in different fields.

33% of the publications were shared by two or more of the teams of the unit, which reflect significant intra-unit collaboration, mainly driven by team 7 with 62% of its publications shared with other teams of the unit.

The UMRt BioEcoAgro complies with directives regarding research integrity, ethics (PhD students' information), quality (e.g. for the statistical analysis of their results, data traceability, storage and management, signature charter) and for open science (data are stored in open databases).

Weaknesses and risks linked to the context for the three references above

Given the size of the unit, a few more significant breakthroughs under the lead of the unit would be expected.

There are large quantitative and qualitative production heterogeneities between teams and within the same teams (0 to 31 publications/FTE/year, see details in team analysis).

Some articles still do not mention affiliation to UMRt BioEcoAgro, although this has strongly improved. The involvement of PhD students (16 to 67% of the articles signed by PhD students in the different teams) is also very variable. On average, only 35% of the articles are co-authored by Ph. D students, but usually as first authors.

In the same way, there is large variability in the oral presentations at the international level between the teams. For example, from the 86 oral communications and seminars in international context, 71 were presented by the Belgian members of the unit. From 548 oral communications, only 86 were invited.

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

Assessment on the inclusion of the unit's research in society

The BioAgroEco unit has excellent interactions with breeders, private companies from various fields as well as collaborations with several local and regional partners and the non-academic world. Its research activities represent valuable contributions for the development of innovative biocontrol agents, antimicrobials and bioprocesses and valorization of agro-resources, thereby driving key socio-economic sectors like agriculture and food preservation. The unit actively contributes to the dissemination of knowledge and concepts with society, despite variability between teams.



- 1/ The unit stands out for the quality and the amount of its interactions with the non-academic world.
- 2/ The unit develops products for the cultural, economic and social world.
- 3/ The unit shares its knowledge with the general public and takes part in debates in society.

Strengths and possibilities linked to the context for the three references above

The BioEcoAgro unit reached excellent achievements concerning the quality and amounts of interactions with the non-academic world. The research is conducted in close connection with professionals, cooperatives, professional networks and/or associations involved in agriculture, plant breeding, agro-ecological systems, food and health. Collaborations with regional, national and international companies (Cargill, In Vivo, Solvay, PremierTech, Roquette, Lesaffre, Bonduelle, Florimond Desprez, Simrise, Ingredia, Puratos...), carbon storage (CybeleTech), lipopeptides (Lipofabrik, Elephant Vert) cover multiple sectors (biocontrol, hydrocolloids, enzymes, agri-food, modeling of carbon storage, climate change, ...), thereby providing 25% of the unit resources (125 contracts representing 6,8 million euros). The dynamic nature of interactions is clearly demonstrated by the unit's involvement in 16 Cifre PhD theses and its leadership and contribution to European territorial cooperation programs (InterReg), such as Smartbiocontrol (2016-2021) devoted to new molecules for biocontrol. The UMRt also coordinates two industrial chairs: the 'Charles Viollette' (2021-2024), which focuses on developing tools for valorization of plant-based (co)products, and the 'ProteinoPepS' (2022-2025), which focuses on transforming dairy proteins for new properties. The UMRt is involved in two mixed academic/private labs (LabComs (CHIC41H and ALLInPep) in collaboration with Florimond-Desprez and Ingredia Dairy Express companies, respectively. The UMRt also filed 15 patents of which twelve for France and one international, eight of them resulting from a collaboration between two or three teams (mostly teams 4, 7 and 8), and three including PhDs students.

Towards the scientific community, the UMRt provides the international open-access database Norine dedicated to non-ribosomal peptides as well as bioinformatic tools such as BioAcPepFinder, which permits to detect potentially bioactive peptides in proteins. BioEcoAgro also provides data and solutions directed to professionals of the eco-agronomic sector, such as AMG-Sismeos, a tool that predicts soil carbon stocks evolution as a function of practices.

Outreach activities include talk shows, social debates, and documentaries in various media (France 5, radio, You Tube channel). BioEcoAgro members also communicate through general audience conferences and articles for non-specialist public (Bourgogne-France-Comté Nature), contribution to books linking science to environmental issues and public debate (Editions Quae), booklets/posters on various topics (sweeteners, essential oils...) and online articles (INRAE actualités). They also contribute to literature dedicated to professionals (Perspectives Agricoles). Communication through social media platforms (LinkedIn, X, and YouTube) is mediated by team members rather than at the UMRt level. Some teams focus more on interactions with the non-academic sector than on fundamental scientific impacts, resulting in heterogeneous diversity and volume of activities among the different teams.

The UMRt participates to public events and exhibitions (Fête de la Science, From Farm to Fork, etc.) and it organizes visits of the different laboratories at UPJV, U Lille, Gembloux) and of facilities (Ecotron soil-plant system) for high-school, and/or engineering school and university students as well as visits of experiments (for example on Miscanthus for breeders and the France Miscanthus association). The Unit welcomed politicians (French Minister for Research and Education visited INRAE Estrées-Mons site in 2020, French Minister of Agriculture and an EU delegation visited legume plots in December 2022). Members of the Unit visit high schools to present the careers in research. An interesting and original aspect of BioEcoAgro activities is the support of 3 artists for their artistic projects involving living microorganisms.

Weaknesses and risks linked to the context for the three references above

The report does not clearly mention a global strategy of the unit regarding links with the non-academic partners and communication with the society. Collaborations with 'non academic' partners are coming from initiatives of team members and from opportunities, which results in inter-team heterogeneity regarding partnerships, PhD student supervision and funding. The absence of a well-defined strategy with the 'non-academic' world may not secure the visibility and overall attractiveness of the unit. Likewise, the fact that communication in social media platforms (Twitter, LinkedIn, etc.) is managed by some team's members rather than at UMRt level, probably affects the unit's visibility and the feeling of its members to belong to a cross-border research unit.

Only 15 patents have been filed during the evaluation period, which is moderate regarding the staff of BioEcoAgro and the interest of its research for industry. No BioEcoAgro' spin-off was launched during the evaluation period.



ANALYSIS OF THE UNIT'S TRAJECTORY

The BioEcoAgro unit was created in 2018, by merging the Charles Viollette Institute (ICV) with Terra-Gembloux (ULiège), BIOPI (UPJV) and AgroImpact (INRAE). The launching of this very large UMRt, of which the 501 staff hosted over the evaluation period (371 staff on 31/12/2023, including 170 permanent ones, from four main and four associated supervising bodies) are spread over thirteen sites, was highly challenging, but really successful. The UMRt structure has been elaborated by the present director of BioEcoAgro, supported by the deputy directors representing the four main supervising bodies (seven in total) and the 18 team co-leaders. All of them did a huge amount of work to take advantage of the diverse expertises

gathered in the unit and to create scientific and methodological transversality. The structuring into 3 clusters and 9 teams originated from the close collaborations existing before 2018 between members of the different teams then part of the same unit (in particular the Charles Violette Institute), or of different units. The clusters have the sole objective of structuring the scientific presentation of the unit. BioEcoAgro is indeed structured around i) Innovative cropping systems for agroecological and bioeconomic transition in the context of climate change, ii) Biomolecules of plant and microbial origins: from identification to bioproduction, and iii) Formulation-Quality and Food quality nutrition- Health.

The activities of the UMRt over the evaluation period perfectly corresponds to what is presented in the SAD. With its 540 projects conducted over 5 years, and the 363 PhD students hosted by the unit, BioEcoAgro is greatly involved in research, in particular at the regional, national and cross-border levels, and research supervision. The UMRt also has a unique ability to structure research at the trans-border scale and even at the international scales, belonging to two International Associated Laboratories, The unit strongly contributes to valorisation, transfer and innovation in several domains of agro-ecology and biotechnology, with its industrial mixed laboratories and industrial chairs. The UMRt contributes moderately to research dissemination and to expertise. After five years of functioning, all the teams and staff highlighted the added-value of the creation of BioEcoAgro to address their scientific and technological challenges, thanks to facilitated exchanges at the local scales, access to a large panel of state-of the art equipment and complementary expertise. Opportunities of collaboration emerged during the past few years, as shown by the high number of publications and by patents co-authored by members of several teams. Active efforts in elaborating transversal projects resulted in the funding of large regional and cross-border European projects such as the CPER Alibiotech and BiHauts Eco de France, and Interreg Smartbiocontrol and Biocontrol 4.0 Trans-manage. Highly ambitious multidisciplinary projects have also been submitted in 2024 (an INRAE 2RI international research network project and a local Cross Disciplinary Project "Initiative d'Excellence"), to support the One Health approach highlighted by the UMRt for the next years. BioEcoAgro has indeed the potential to address all facets of the Farm to Fork, and even Farm to Animal and Human Health concept.

However, in order to increase its attractiveness regarding the One Health approach at the international level, the unit should pay attention to identify and support the main innovative topics and those already making the teams attractive, which should not be abandoned. The number of scientific questions and objects of studies are indeed still too high, in particular in the context of rarefaction of permanent scientist and technological staff, even if the support to the UMRt is strategic for all its supervising bodies.

Emerging themes deserving support have already been identified by the unit in the elaboration of its prospective strategy. Indeed, for the next evaluation period, the present clusters will remain, but Teams 2 and 3 will merge in Cluster 1, in order to better take into account i) animal as an agroecological lever within cropping systems in transition, as well as socio-economic aspects and participative sciences to support agroecological transition. Also, Team 7 and 8 will merge in Cluster 3, in order to support the emergence of the themes related to valorisation of metabolites, food biomolecules and microorganisms for health, thanks to an intensification of big data integration, in particular. These merges will improve robustness, technical staff mutualization and attractiveness in clusters 1 and 3.

Team 1 will work in continuity to the past few years. The committee supports the strategy of the team to reinforce even further multidisciplinary projects internal to the team, with other teams of the UMRt, and elsewhere in the world, focusing on the Miscanthus model and legumes. Three scientists of Team 1 will join Team 6 to better valorize their finalized works on production and valorisation of pectin-derived oligosaccharides.

In cluster 2, Team 4 will continue its excellent work on the identification and valorization of microbial metabolites for biocontrol or biostimulation, which might be applied, in the frame of the One Health approach, to various ecosystems. Team 4 will reinforce its bioinformatic activities for sequence-based mining of biosynthetic gene clusters, metabolite structural analysis in collaboration with the other teams of the UMRt, and deciphering their mode of action. These perspectives will allow Team 4 to provide the scientific basis to support the applications of these compounds.



The huge Team 5 will prioritize its activities on the identification and use of secondary metabolites from plant origins for biocontrol, with pharmaceutical & nutraceutical applications. This is a strategic transversal theme for the UMRt, which is also in line with the priorities of the European Union and Bioecoagro supervising bodies, and these priorities will support the emergence of more internal collaborations and international ones.

Team 6 will integrate three staffs from Team 1 to support its activities on the use of pectin-modifying enzymes to valorize plant-cell-wall components. With a very large range of skills from molecular to fermentation and separation process engineering, Team 6 will have to pay attention to disciplinary seclusion and to make the most of expertise synergy.

In Cluster 3, Team 9 will continue its work on the characterization of the quality of food raw materials and use of proteins as techno-functional ingredients. The team is encouraged to take advantage of the various expertises of BioEcoAgro to develop multi-criteria analysis approaches and heterogeneous data integration to rationalize the development of innovative foods and ingredients including nutraceuticals developed in cluster 3.

Finally, the management board of BioEcoAgro will evolve with a change of director. Three deputy directors who represent the four main supervising bodies will help her. Four specific deputy directors have also been nominated, to take in charge the human resources, communication, transborder relationships and scientific strategy. This is crucial to support team leaders in their prospective analysis of their respective themes. All staff trust in this new management organization and in the director, and the sense of belonging to BioEcoAgro is really increasing. The committee wishes all the best to all BioEcoAgro staff to make the most of this human, scientific and technological complementarities.



RECOMMENDATIONS TO THE UNIT

Recommendations regarding the Evaluation Area 1: Profile, Resources and Organisation of the Unit

The committee congratulates the Unit for the elaboration of transversal projects, recently submitted. However, the unit should continue to refocus the objects of studies and even themes on most visible and attractive ones. This would contribute to avoid dispersion, and to improve the adequacy between its scientific strategy and the human resources made available by the funding bodies. This would also allow the unit to rationalize the request for additional scientists and technical staff, to support the emergence of new themes. The role of the scientific council should be reinforced to build a more collective strategy, in particular with the team leaders. The unit should also exploit the opportunity offered by its external advisory board and consider its recommendations. The unit should establish a laboratory council in order to include the staff other than scientists in the decision-making process. The unit should encourage its young scientists and research engineers to defend their HDR. The unit should help all scientists to apply to ERC grants.

The internal repository has improved but is still not informative enough. Information on the staff, team composition, contact information and localization, and unit's policy should also be included in the Website. Affiliation to BioEcoAgro should be clearly stated in all articles to increase the international visibility of the unit. The detailed information and active policy of Team 9 would deserve to be extended to the other teams and at the unit level.

Recommendations regarding the Evaluation Area 2: Attractiveness

Given that the Unit is involved in very attractive and timely research topics, its members, even the young ones, should present more projects as coordinators and should create a group dedicated to the participation in national and international calls to improve their international visibility.

It is also important to encourage young people to attend international meetings. This is very relevant for creating new research networks. National meetings are also important to link the Unit with other groups.

Recommendations regarding Evaluation Area 3: Scientific Production

The proportion of articles co-authored by researchers from different teams (33% meanwhile) varies from 18% to 62% from one team to another: UMRt is thus encouraged to further promote projects involving several teams. Favoring transversality and systemic view of concerns related to the impact of climate change on agriculture, to the agro-ecological transition and application of One Health approach to food chain may increase the impact of the scientific production. A practical means to initiate this is to engage in the co-writing of reviews or position papers on subjects necessitating to gather skills belonging to different teams/clusters.

Pursuing work to ensure that Ph D students are aware of research ethics, quality of their data and ensuring that they co-author several articles related to their work is encouraged. Thirty-five % of UMRt BioEcoAgro article are co-authored by Ph D students. Considering that most of experiments are carried out by Ph D students, this proportion could be further increased.

Since several teams of the unit conduct research activities with good opportunities for applications in agriculture or in food control/food processing, patenting is another way of scientific and technological production to encourage.

Again, attention should be paid to clearly indicate BioEcoAgro affiliation in all the articles published by the unit.

Recommendations regarding Evaluation Area 4: Contribution of Research Activities to Society

The unit developed links with different partners (academic, non-academic, companies, etc.) over the period, which should be maintained and expanded over the long term. A global strategy at the level of the Unit for attracting and retaining companies and other organizations is encouraged to establish long-term relationships and to enhance the UMRt visibility.

All teams should participate in outreach activities towards the general public and in participating sciences with key stakeholders.



TEAM-BY-TEAM ASSESSMENT

Team 1:	Functioning and adaptation of the plant in interaction with its	
	environment	
Name of the supervisors:	Ms Isabelle Lejeune-Hénaut and Mr Jérôme Pelloux	

THEMES OF THE TEAM

Team E1 investigated plant adaptation to environmental constraints such as frost and pathogens, in species like pea, maize, miscanthus through genetic studies. The team evaluated the ecosystem services provided by crops, explored methods to enhance biomass production and analyzed the efficiency of mineral use and recycling under changing climate conditions. Complementing this first area of study, the team also studied the structural and biochemical analyses of pectin remodeling enzymes derived from plants and microorganisms. This fundamental knowledge is then applied to assess whether pectin-derived biomolecules can be useful for plant development and defense. To address all these aspects, the research relies on multidisciplinary approaches including genetics, agronomy, biology science, biochemistry and molecular studies. Team E1 thus explores plant biology from multiple aspects ranging from whole-organism adaptation to molecular-level enzyme studies.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous committee report was structured around clusters (Pole1) rather than research teams.

It was pinpointed a large diversity of research themes, heterogeneity in scientific output and some difficulties to establish a clear scientific identity. It was recommended to clarify the research questions. These recommendations are still partially relevant, though team1 has now identified two main lines of research (plant adaptation/plant cell wall remodeling enzyme) and include aspects regarding mineral use with the Belgium site. The team improved internal collaborative work and projects, and collaborations with other teams of the UMRt. Yet, a shared scientific strategy and synergy that could provide a better scientific identity is still under construction.

It was recommended to focus the research on a few of the most relevant plant models with the strongest economic impact. Over the period, team 1 has used various plant models of agro-economic interest, making it possible to collaborate with the Universities of Liège, Lille and UPJV (pea, miscanthus, flax) and conserved Arabidopsis as a historical model plant for molecular approaches. In the future contract, Team 1 will implant new plant models as *Physcomitriumpatens* or *Marchantia* to facilitate specific and comparative studies (cell wall/pectin remodeling). The diversity of plant species is well adapted to efficiently address the research topics of the team.

The previous recommendation to be more efficient to patent results was followed since 1 patent was deposited over the period.

It was recommended extending communication to the general public and participation in the science and society debate. Although team 1 interacted with different publics (schools, students, breeders..) by organizing conferences or visits of lab facilities during the period, efforts are still needed in this direction.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

Catégories de personnel	Effectifs
Professeurs et assimilés	9
Maitres de conférences et assimilés	7
Directeurs de recherche et assimilés	1
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	9,5
Sous-total personnels permanents en activité	27,5
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	5
Post-doctorants	0



Doctorants	18
Sous-total personnels non permanents en activité	23
Total personnels	50,5

EVALUATION

Overall assessment of the team

The global assessment, based on multidisciplinarity, is very good. The activity of the team related to plant functioning and adaptation to environmental changes combined three main research areas which have very good objectives. The scientific production is very good quantitatively and qualitatively, but not homogeneous among the team members. The very good attractiveness of the team at the national and local level, is shown by its implication as partners or leaders in national and non-academic projects. Team 1 has very strong relationships with the local and socio-economic world and performed very good collaborative work at the regional, national, but not at the international level.

The project is promising as long as collaborative work is enhanced, and common priorities identified.

Strengths and possibilities linked to the context

Two PR positions and one HDR were obtained during the evaluated period, but most MCF do not yet hold a HDR. The team benefits a very good 1.2 permanent/technical ratio. Currently 18 PhDs are present and 30 PhDs were supervised during the period with an average of 3.8 articles/PhD. PhDs duration was about 73 months, mainly due to the longer duration (4 years) of doctoral studies in the Belgium (4 years) and to the Covid crisis.

The team 1 work spans from the cellular level to the canopy, and involves a large set of collaborations with socio-economic and industrial partners, academic institutions and other teams within the Unit. The scientific output is very good quantitatively and qualitatively (113 articles with an average of 2.1 publication/research FTE/year). The articles cover many topics: genetic basis of legume tolerance against biotic and abiotic stress, plant biomass production, carbon storage, efficiency of phosphorus utilization, digital farming to guide plant genetic/improvement by computer science, activity and processing of plant and microbial of pectin remodeling enzymes, effect of pectin-derived molecules on plant development, defense, nutrition, and communication with the rhizosphere. Noteworthy, around 30% of the articles result from internal collaborations with Teams 3, 2, 4, 5, of which ~50% were published in excellent journals (The Plant Cell, International Journal of Biological Macromolecules, etc.). The team led 51% of the publications. In addition to one Science article as corresponding author (U. Liege), the continuous high quality of the overall scientific output is shown by the fact that one third of its articles were published in (Carbohydrate Polymers, Soil and Tillage Research, Ecological Letters, BioEnergy Research, etc.). Scientific production is uneven between France and Belgium and within the team (ranging between 1 and 28 articles/research FTE over the 5 years). Seventy-two percent of the articles are in open access or deposited in various databases). One team member has co-authored one patent related to the use of a plant cell wall components to stimulate plant defense against pathogens.

The very good resources of Team 1 amount to 60 k€/research FTE/year. Support from the region Hauts de France and other collectivities, industrial partners (NoVabiom, Bonduelle, InterProfession Protéagineux, etc) and French breeders have helped the team's attractivity for PhDs students and increased their scientific expertise. The team continuously participates in European projects as the H2022 and INTERREG France/wallonie programs (BELIS, PATHOFLAX) dedicated respectively to the selection of 'European' legumes for greater sustainability and to the protection and optimization of cross-border (France/Belgique) plant resources. Team members are not engaged in International project as leaders or partners, but they implemented or pursued 20 national and PIA projects (ANR, Ademe, France Agrimer, BPI France, France Relance) as illustrated with their participation to the collaborative national France 2030/BPI call 'Innover en alimentation d'origine végétale'. The team supervised 50% of these projects (5 France: ANR, Ademe, France Relance, 5 Belgium: FRS, SPW), as shown by the recent acceptance (2023) of the MisEauVert ANR project dedicated to the ecosystemic services provided by *Miscanthus*. E1 members participate in one Industrial Chair (ProteinoPepS), one CASDAR project (PEAMAGE), and coordinate 3 projects among the 4 collaborative works developed with socio-economic partners (InterProfession protéagineux, Sofiprotéol, Ulco, Bonduelle). E1 hosts or collaborates with European and International partners (New Zealand, Australia, China, Finland, etc.).



The good dissemination activity is illustrated by 39 posters and 53 oral presentations (9 as invited speakers) at national and international congresses (MPMI, NSABS, PAG, etc), workshops and events with stakeholders. The team participated in "Fête de la Science" and the "Faites de la Science"., regularly receives visitors (including high school, university students) at UPJV and hosted a delegation from the French Ministry of Agriculture and the European Union on legume plots.

Weaknesses and risks linked to the context

Among the seven currently funded (excluding PhDs fellowships) projects (BELIS, WALLDERIVE, MisEauVert, MisTigation, AlinOVeg, PEAMAGE, the industrial chair ProteinoPepS,) only five carry on after 2025. In addition, only three projects are supervised by E1 team members and integration of three active members of Team 1 in Team 6 could jeopardize part of the funding for the next contract. Nevertheless, the acceptance of three ANR APP2024 supervised by Team 1, indicates a promising good dynamic.

Another weakness is that the scientific production and projects of the team are subdivided in specific scientific questions. In this context and to enhance team/unit visibility, three members from E1 team will join E6 team to conduct research on modeling/processivity and biochemical characterization of cell wall modifying enzymes. Although very significant efforts of scientific collaboration and integration are obvious between team 1's members, scientific animation could be improved between the two sites of the border to share a more focused scientific questioning and vision in the frame of plant adaptation in constrained environments.

Publication records between members of the team are very heterogeneous.

The aging of the team's permanent staff (PR, DR) may result in a potential loss of expertise (plant breeding, genetics) and consequently also insufficient HDR positions to supervise future PhDs students. In addition, a large proportion of the team's permanent staff are teachers (PR, MCF), and only one MCF among seven has its HDR.

Analysis of the team's trajectory

The future project of the team is in line with its past activities. Yet, for scientific coherence, three ECs will join the E6 team. This will favor the visibility of the research unit regarding the characterization of cell wall modifying enzymes. The E1 team proposes to strengthen the new cross-border synergy developed since the creation of the UMRt through co-supervised PhD theses or funded projects (CASDAR). The E1 team already succeeded in the development of collaborative work with different teams of the unit. This first step is well illustrated by the Miscanthus project, which allows collaborative work between members of team E1 with teams E5 and E6. During the next contract the team will aim to expand multifunctional studies to legumes by capitalizing on previous successful collaborations initiated during the over period.

RECOMMENDATIONS TO THE TEAM

The shared scientific organization with multiscale approaches within the E1 team is highly recommended and will be helpful to obtain grants and scientific positions securising the team. A better cross-border synergy may reinforce a shared scientific vision within the team, which could encompass the different skills of the members or lead to the emergence of a common innovative theme. Scientific animation and functioning could be improved between the different sites to enhance the scientific dynamism of Team1. The identification of genetic determinants of legume responses to multiple stresses could represent a shared trajectory.

Local and regional fundings are really important but do not exclude the exploration of other possibilities. It is recommended to focus efforts on grant application, maybe by seeking consortia or collaboration with other members of the lab to bring together complementary skills. The team is also encouraged to increase its efforts regarding leadership of scientific projects.

Three EC will move to another team to favor BioAgroEco visibility and future retirements are also planned in the team. All possible efforts are needed to compensate for these losses through new research positions.



Team 2:

Integrated functioning of the soil-plant system and exchanges between the ecosystem and the hydrosphere and atmosphere

Name of the supervisors: Mr Joël Léonard and Mr Bernard Longdoz

THEMES OF THE TEAM

Team 2 (E2) investigates the functioning of soil-plant systems at farm plot scale and their exchanges with the atmosphere and hydrosphere. The work is conducted in close connection with Teams 1 and 3 within Cluster 1 of BioEcoAgro "Innovative cropping systems for agro-ecological and bioeconomic transition in the context of climate change". E2 research activity relies on monitoring and modeling the biogeochemical cycles, greenhouse gas fluxes and energy cycles and the effect of societal and climatic constraints. It is based on longitudinal studies in the field together with experiments in controlled conditions (ecotron facility).

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

By proposing a team-by-team self-evaluation instead of the three-cluster organization in the previous document, the unit significantly improved the precision and clarity of its self-evaluation report.

The previous committee report recommended broadening communication to the general public (for example through the unit website) and to improve internal communication and shared strategy for organizing the work. The unit website now clearly presents the research activities of the team and highlights the main actualities, but it is still very concise. The team interacts with the young public by organizing school visits to INRAE facilities at Estrées-Mons and through visits at the Ecotron facility in Gembloux by students from engineering schools and university faculties. The funding sources show active interactions with environment monitoring agencies. In addition, the publication of a book, book chapters, and public conferences favor communication with the general public, but further efforts are needed.

Efforts have been made to strengthen topic-specific interactions by setting up a relay system allowing everyone to discuss their research topics with interested people. However, the interactions and coordination between the two sites of the team still need to be consolidated.

Evaluated as a whole, the cluster « AGROIMPACT » was considered in the previous report to have a very good PhD supervision activity, with a high number of PhD students. This trend is not true for Team 2, which indicates only one PhD student during the 2019-2023 period.

Catégories de personnel	Effectifs
Professeurs et assimilés	5
Maitres de conférences et assimilés	1
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	2
Personnels d'appui à la recherche	13,5
Sous-total personnels permanents en activité	21,5
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	4
Post-doctorants	1
Doctorants	1
Sous-total personnels non permanents en activité	7
Total personnels	28,5

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023



Overall assessment of the team

Overall, Team 2 is very good. Its objectives regarding improvement of carbon storage and nitrogen use efficiency in soil are very important in the context of global change. Despite its small size, the ressources of Team 2 are very good thanks to the available facilities and to the high self-funding. Its attractiveness is very good. Its ability to attract competitive fundings at the national and European levels is excellent, but the scientists are not sufficiently involved in Ph.D. supervision. The scientific production of Team 2 is excellent quantitatively and very good qualitatively. Its contribution to society is moderate. Team 2 has no contract with industrial partners but it has been involved in many outreach activities.

Strengths and possibilities linked to the context

The team has an excellent production in terms of number of articles with a very good quality (198 articles in journals such as Agricultural and Forest Meteorology, Soil & Tillage Research, Geoderma, Science of the Total Environment, Global Change Biology, Soil Biology and Biochemistry, Communication Biology, etc.). One book, 6 book chapters and 37 reports related to agriculture and ecological monitoring (ADEME, requasud, ...) were also prepared in the period 2019-2023. Among them, 17 publications are shared with other teams. The publication rate per FTE scientist/year is 3.,3 with an heterogenous situation (ranging 0 to 9.2).

The annual amounts of own resources in $k \in per$ permanent research FTE corresponds to 308 $k \in (1848 \ k \in /6 \ FTE \ of EC/C/IR)$ for the period, which is higher than for the other teams of the unit.

The team is well inserted in the EU EJP soil initiative, opening the possibility for new projects and networks. E2 is involved in 10 EU projects (1 horizon, 2 EJP soil, 2 DG EAC, Agroserv and MRV4SOC, 1 interreg, 1 Climate-KIC project) and in the project SWaM@Sc - Water Smart Cities, as coordinator. The E2 team also participated in about 50 national projects (more than in the half as coordinator) and 5 PIA projects (1 as coordinator). The team handles cutting-edge and complementary facilities such as the platforms Agriculture Is Life and Environment Is Life (Ecotron), for experiments in controlled conditions at Gembloux, and the national ACBB (Agroecosystems, Biogeochemical Cycles and Biodiversity) for long-term field experimentations, at INRAE Estrées-Mons. In addition to providing the experimental basis for the team's research, these facilities are attractive at the national and international level, thus generating fruitful collaborations.

The interactions with the economic-social word are good with 8 communications in the media, 1 CASDAR project (VARILUZ - Oser la diversité variétale et de gestion pour optimiser la production, la qualité de la luzerne et le bilan environnemental à l'échelle d'un territoire) and 3 Contrats avec les collectivités territoriales (2 as coordinator).

The ratio of permanent FTE scientists (C/EC)/permanent FTE engineers and technicians is of 5/13.5 = 0.4, which ensures an excellent technical support.

Weaknesses and risks linked to the context

The % of women is low as well (29% and only 22% of women in EC+C).

The two researchers at INRAE have no HDR and the number of PhD students is very limited (only one at U. Liège in the 2019-2023 period).

The scientific production is not balanced between the principal investigators of the team.

There is also an imbalance in the national funding obtained between the two sites (INRAE and U Liege), which may be related to funding opportunities in the two countries. Only 62% of publications are in open access.

Analysis of the team's trajectory

The team's trajectory concerning the study of innovative cropping systems and management in relation to the environment and ecosystem services is very important in the context of global change. The research performed by the team could lead to an improvement in soil carbon storage and nitrogen use efficiency. Long-term monitoring of the agroecosystems and modeling remain relevant to identify more useful systems and management practices. These topics, well inserted in a national and international context, are major challenges



mainly for INRAE. The projects of the team will consolidate its past achievements and extend its skills, with investments to renew and strengthen the infrastructures. Nineteen ongoing projects will be run after 2024. Improved relationship with team 1, more dedicated to plant adaptation, as well as closer interactions with non-academic entities are good points of the trajectory. Some new actions aiming to improve the exploitation of the datasets and tools provided by team 2 have been planned, including the merging between team 2 and team 3. This could enhance the capacity to evaluate agroecosystems performances, improving simulation tools and promoting the use of a spatialised approach for the functioning of agroecosystems. This would lead to a team dedicated to climate change with an increased critical mass with complementary competences.

RECOMMENDATIONS TO THE TEAM

The team is encouraged to continue its efforts in the directions initiated, including the possibility to develop more interactions within the team and with the other teams, and to maintain its competences that are very relevant in the climate change context. The team has to continue the efforts to secure fundings by participation in/coordination of national/international scientific projects. The gap in scientific production and project management between team members should be avoided through the development of team strategies and collaborations between members. The interactions and coordination between the two sites of the team still need to be consolidated. The INRAE researchers could invest more into PhD supervision and defend their HDR. The efforts should be pursued to consolidate the interactions with the non-academic sector at different levels (general public, farmers, agro companies) and using different supports (web networks, media, meetings, public conferences and debates, etc.). New figures dedicated to soil-plant interface projects should be included in the team. During the visit and in the answer to the committee's question, the will to open to this topic has been confirmed.



Team 3:

Management, optimization and design of cropping systems to meet multi-criteria objectives

Name of the supervisors: Mr Bertrand Vandroome and Mr Benjamin Dumont

THEMES OF THE TEAM

Team 3 focuses on two themes: the use of new technologies to optimize production systems and the design of innovative cropping systems.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous committee report was structured around clusters rather than research teams.

The first recommendation was to publish in more generalist journals. Applied to Team 3, this recommendation is still valid. Indeed, relatively few among the numerous publications of the team achieve this objective.

The previous report mentioned the need to reduce the drop-out rate for theses and to shorten their duration. For the 6 theses listed for team 3, no defense date was provided at the time of report submission, even for those that started in 2020. Three of them were however finished at the time of visit. Thesis duration seems long but are in the usual range in Belgium.

As far as collective organization is concerned, nothing new is mentioned in the present self-evaluation report. Difficulties in scientific leadership and the lack of a team spirit are noted in the SWOT analysis.

The final recommendation was to concentrate activity on a few plant models and to make the research questions more explicit. The document available for Team 3 does not satisfy this recommendation.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

Catégories de personnel	Effectifs
Professeurs et assimilés	3
Maitres de conférences et assimilés	4
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	1
Sous-total personnels permanents en activité	8
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	6
Sous-total personnels non permanents en activité	6
Total personnels	14

EVALUATION

Overall assessment of the team

Team 3 functioning and organization are poor and heterogeneous.

The team has overall good resources. The financial resources are very good but the team does not lead the majority of its contracts. It has access to modern field platforms in Belgium but has no technical staff. The attractiveness of the team is good. There are no post-docs or fixed-term contracts listed in the staff but the team hosted six PhD students.



The scientific output is very good quantitatively, and good qualitatively. The average number of publications per scientist is above 4 per year. More than 80% of the publications result from collaborations. However, the scientific output is actually based on only two scientists.

The contribution of the team to the relationship with the society is good. Although relationships with the general public or industry, as reported, are poor, non-INRAE members of the team are teacher-researchers, which gives a potential asset for the dissemination of knowledge.

Strengths and possibilities linked to the context

The self-assessment document for this team does not formally provide information on the four evaluation areas. The following analysis is mainly based on the other sources of information.

The objectives of the team are good. The demand for changes in agricultural production systems is high, not only for agro-ecology-oriented practices but also for adaptation to and mitigation of climate change. The themes developed by the team and its skills can meet these challenges. The local research context, particularly in synergy with the activities of teams 1 and 2 of cluster 1, is also very favorable. The dynamism and extensive collaboration network of the team members is a major asset. The team has excellent financial resources, 250 k€ per research FTE/year on average over the period. The team is however leading only 11 contracts out of 36. The availability of all these funds for the research axis of the team is however questionable. Indeed, one of the team members provides approx. Sixty percent of the resources but does not take part in the scientific output of the team.

The attractiveness of the team is good. The team organized a large meeting (Agreen'Smart Symposium, 150 attendants) and a seminar (SEGAE). Four scientific prizes are reported as well as two responsibilities in learned societies.

The team has access to experimental facilities in the field in Belgium. The expertise in livestock management is an asset for designing innovative cropping systems.

The scientific output is quantitatively very good, and qualitatively good with 84 publications in peer-reviewed journals (4 per FTE scientist per year). Eighty-one percent of the publications are in open access. Six publications are reported for three PhD students (out of 6).

Weaknesses and risks linked to the context

The main weakness of the team is that the scientific activity and output is unbalanced, with only two scientists out of seven showing a scientific production. A significant number of the publications relate to livestock, from pasture management to food digestibility, which is only marginally in line with the team's stated objectives.

The quality of the journals is very heterogeneous. The very recent history of the team, set up in 2018, may explain this situation.

Most of the publications result of collaborations and they sign as last authors for only 15 of them (18%). Four members of the team do not appear in any of the publications. One of the professors does not appear in any of the UMR's outputs; the role of the two INRAE agents (one of whom is a trainee) is not presented, and Junia's teachers-researchers do not appear to be actively involved in research activities, and none of them has an HDR. This presentation of human resources is not in line with the team's output. The human resources of the team, as presented during the visit, are exclusively composed by six teachers-researchers. Two people previously listed in the permanent staff do not actually have a significant activity within the team. Technical and administrative support to the team is not explicit.

The team functioning is poor. No common rules for functioning, and no scientific animation system are presented. The SWOT analysis highlights the lack of team spirit. Women are underrepresented in the active team (2 out of 6 teachers-researchers, 1 PhD student out of 6).

The team hosted six PhD students, supervised by two professors, but no post-docs or fixed-term contracts. Four scientific prizes are reported as well as two responsibilities in learned societies.

One of the professors does not appear in any of the UMR's outputs; the role of the two INRAE agents (one of whom is a trainee) is not presented, and Junia's teacher-researchers do not appear to be actively involved in research activities, and none of them has an HDR. This presentation of human resources does not correspond to the team's output.

No relationship with private companies is presented nor events for a large public.



One of the team members contributes a high number of contracts whose thematic focus is difficult to identify, and none of his scientific production (articles, posters, etc.) is mentioned in the available documents. His place in the team raises questions. Similarly, the contribution of Junia's teaching staff is low, and that of the INRA staff mentioned is unidentified. The composition of the team in 2026 should be updated to take this into account. In addition, the proposed merger with team 2 is not visible in the projected list of unit members.

Analysis of the team's trajectory

Team 3 was a new team that was built up with the new UMRt in 2019. The past functioning of the team is not satisfactory and merging with team 2, seems entirely appropriate. During the visit, it was stated that two persons do not, in fact, contribute to Team 3.

RECOMMENDATIONS TO THE TEAM

The committee supports the decision to merge Team 3 with Team 2, which should overcome the present team's lack of coherence. Both teams should benefit from complementary skills and technical facilities. The list of members of the merged team should be consistent with the future objectives. We encourage the scientists who publish to continue to make an active contribution and to the other teachers-researchers to clearly define the positions they wish to hold in the future team. The committee also encourages the team to keep on supervising doctoral students. A common definition of objectives and an active scientific animation is a key condition for a productive life of the new team in the future.



Team 4:

MOM: Microbial secondary metabolites

Name of the supervisors: Ms Valérie Leclère and Mr Marc Ongena

THEMES OF THE TEAM

Team 4 works mainly on specialized metabolites biosynthesized by non-ribosomal peptide synthetases (NRPS) in bacteria and, to a lesser extent, fungi. The team characterizes the diversity and ecological role of these molecules as well as their valorisation potential in crop protection. The research relies on genome mining and development of bioinformatic approaches, heterologous expression, scale-up production through optimization of fermentation conditions and characterization of mechanism of action and ecological role in the rhizosphere. A major topic is devoted to lipopeptides produced by *Bacillus* and *Pseudomonas* species, in the context of crop biocontrol and biostimulation.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The previous evaluation highlighted the heterogeneous distribution between teams and a number of publications in low-impact journals. For the period 2019-2023, team 4 shows an excellent scientific production, although heterogeneity remains between France and Belgium.

A better selection of new PhD students was recommended. PhD students are selected based on scientific and soft skills. The number of publications per PhD defended within the 2019-2023 period is good (3.0). However, two PhD theses were abandoned.

The previous evaluation pinpointed the risk of difficulty to maintain funding over the long term. Team 4 has shown its capacity to maintain a good level of funding at the regional, national and international level.

The previous committee recommended to limit travel. This has been achieved through the use of remote communication together with a TEAMS group to share information. However, the mobility of technical staff and PhD students still represents an important need to benefit from the local experimental facilities.

A gradual balance in women representation was recommended. Team 4 is directed by one woman and one man hosted in U Lille and U Liege, respectively. A satisfactory balance in man/woman ratio is also observed for the different categories of team staff.

It was recommended to better highlight the synergies between teams. The synergies between geographical sites, within cluster 2 and with the other teams of BioEcoAgro are now clearly identified.

Catégories de personnel	Effectifs
Professeurs et assimilés	4
Maitres de conférences et assimilés	4
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	1
Personnels d'appui à la recherche	5
Sous-total personnels permanents en activité	14
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	4
Post-doctorants	3
Doctorants	26,5
Sous-total personnels non permanents en activité	34,5
Total personnels	48,5

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023



Overall assessment of the team

The global assessment of Team 4 is excellent. The team has a well-defined and focused research activity. Its scientific production is outstanding quantitatively and excellent qualitatively. Its two sites bring complementary expertise and equipment. Overall, the team demonstrates an excellent attractiveness, with major contributions to international initiatives. The team was able to raise outstanding funding from regional, national and international sources, with a remarkable success for EU grants. The professional networking activity and interaction with socio-economic society are excellent.

Strengths and possibilities linked to the context

The team focuses on a relevant research theme on microbial secondary metabolites, bringing together diversity description, functional characterization, ecological role and valorisation potential for crop production. Basic and applied research are supported by active public-private networks (industrial chair Charles Viollette, collaborations with companies and farmers' associations), well in line with the One Health perspective.

The two sites (Lille and Gembloux) bring complementarity in expertise and equipment. In addition, the team works in synergy within Cluster 2 "Biomolecules of plant and microbial origin" and with the other teams of the UMRt, as shown by many publications co-authored with members of other teams (47%).

The scientific production is outstanding quantitatively and excellent qualitatively. MOM published 148 articles in international journals (5 articles/research FTE/year). The articles are published mainly in major journals of the disciplines: Microbial Cell Factories (3 articles), Microorganisms (11 articles), Front Bioeng Biotechnol (6 articles), Food Chemistry (2 articles). Some results were also published in top generalist journals (1 Nature Comm as first, last and corresponding author, 1 ISME Journal as first, last and corresponding author, 1 EMBO Reports, 2 Proc Nat Acad Sci USA, 1 Nucleic Acid Res). One team member is first, last or corresponding author in 3/4 of the articles. The team also published nine book chapters, one patent and contributed to seven multi-team patents.

Thirty-seven PhD students were funded in the period, of whom 4 were co-supervised with another BioEcoAgro team. The number of PhD students increased notably (from 13.5 to 26.5) and 7 theses were defended during the past period. The PhD who defended published an average of 3 articles each and all signed at least an article as first author (average: 56% of their papers).

Fundraising is excellent (annual amount of 384 k€/research FTE) through multiple sources at the regional (ALIBIOTECH and BIHAUTS ECO funded by Region Hauts de France), national (ANR in France: 2 projects as coordinator and SPW Agriculture, Ressources naturelles et Environnement in Belgium) and international levels (PHC programs). Funding by the European Union is exceptional, with 10 interreg FWVL (including 2 as coordinator) and 3 FEDER programs (including 1 as coordinator). Affiliation of staff to two distinct universities in France and Belgium is a key asset for this success.

The team is recognized at the national and international levels for its expertise in (lipo)peptides produced by no ribosomal peptides. It provides an up-to-date and comprehensive database of these molecules, together with unique bioinformatic tools for their analysis (Norine, https://bio.tools/NORINE, awarded open science prize in 2022).

The team was involved in the organization of two international bioinformatics workshops (ex: International Workshop on genome-mining in 2022) and 7 international conferences (ex: European congress of chemical engineering/European Congress of applied biotechnology in 2019, 2021 and 2023). It is active in professional networks combining research, innovation and industrial policies (French Biocontrol Consortium 2016-2023, Digibiocontrol in Belgium).

Outreach activities are very good, with four conferences given outside the academic level and one scientific diffusion video.

Weaknesses and risks linked to the context

There is only a few permanent staff to support research (1 AJT, 2 TECH) for a high number of research FTE (= 6, involving 4 PR, 4 MC, 1 CR, A IR), leading to a critical ratio between permanent FTE scientists and permanent FTE ITA (=2). The recruitment of non-permanent staff (3CCDA, 3 CCDB at 31.12.2023, 2 at Lille and 4 at Liège) permits to overcome this difficulty, but high technical turnover may limit the maintenance of specific expertise.



The distance between the two sites of the team (Lille and Gembloux) implies many travels for PhD students, postdocs and technical personnel to benefit from specific equipment.

There is no explicit expertise nor facility on spectroscopic methods (mass spectrometry, NMR) in the team. This could limit their research activity for the detection, quantification and structural characterization of the compounds of interest and use of "omics" methods (metabolomics, proteomics) to investigate their mechanism of action or ecological role.

There is an imbalance in the number of publications, PhD students and post-docs between the two universities), which may be related to differences in funding opportunities and rules for PhD supervision rate in both countries. The annual number of publications per research FTE is overall 5, but the total number of publications per scientist varies between 3 and 16 at U Lille and between 28 and 33 at U Liège. The number of PhD students supervised per professors or HDR assistant professors varies with values between 1 and 3 in France and between 4 and 10 on Belgium. All three post-docs are located at U Liège, while the ATER is at U Lille.

The dual involvement in both research and teaching for PR and MC (who represents the most numerous working force to drive research) may result in an excessive workload to keep competitive research at the international level in the long term.

Analysis of the team's trajectory

The team proposes to continue their research activities with a reinforcement of studies on the mechanism of action and scaling-up and a strengthening of collaborations for structural analyses and involvement in social networking. These propositions are relevant. The favorable context provided by dynamic professional networking and private/public partnerships should yield more opportunities to valorize solutions for biocontrol or biostimulation.

RECOMMENDATIONS TO THE TEAM

The team is encouraged to maintain its dynamism and professional networking. Synergies between the different approaches developed and between the BioEcoAgro teams are also encouraged.

To reinforce its research potential and maintain sustainable expertise, the team is encouraged to apply for recruitment of permanent engineer and technical staff and to maintain transfer of expertises between non-permanent staff through overlapping contracts. The possibility to recruit an INRAE scientist could be considered to enhance research driving force in a context of non-replacement of retiring staff and strengthen interactions with Cluster 1, with the objective to develop holistic projects associating molecular mechanisms with agronomic challenges.

The development of genome mining and other bioinformatics tools for the discovery and characterization of non-ribosomal peptides and more generally microbial specialized metabolites is expanding rapidly, accelerated by machine learning and by artificial intelligence. The database Norine is already implemented in the popular genome mining machine-learning tool antismash. Its articulation/coordination with general databases dedicated to specialized metabolites such as MiBig would be beneficial to enhance dissemination of knowledge.

The team developed collaborations on mass spectrometry during the past period. The committee recommends strengthening collaborations on spectroscopic methods and to evaluate at each local Institute the potential platforms that could help in regular structural or global ("omics") analyses. Possibilities of collaboration in mass spectrometry with teams 5 or 7 or with the analytical platform of UPJV should be explored.



Team 5:

MOV: Specialized metabolites of plant origin

Name of the supervisors: Ms Sevser Sahpaz and Mr Eric Gontier

THEMES OF THE TEAM

Team 5, by far the largest of the unit, is mainly dispatched in three cities (Lille, Amiens, Gembloux) each with its specific scientific positionings. MOV collective activities are focused on the specialized metabolism of plants and its bioengineering for bioprotection and biomass valorization. Its priorities include the description of plant metabolism specificity and diversity, its exploitation to enhance plant's capacity of defense, and the development of diverse practical applications for plant, animal and human health, cosmetics and food optimization/biopreservation. Several aspects of this work are carried out in close collaboration with industrial partners. MOV main models are important crop plants, often with local relevance, such as wheat, chicory, hop and flax.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

This section refers to the recommendations to the Pole 2 of the prior report, since this pole for a large part corresponds to Team 5.

The qualitative aspect of the production has been improved to some extent but with still some significant margin of progress.

The funding sources are still mainly regional and industrial, the Belgian members of the Team being the most successful for obtaining European funds. Success in setting-up Interreg projects (with still a regional dimension) is also noted.

Efforts were made to palliate geographical dispersion with an efficient web network and intranet system. Yet geographical dispersion obviously remains a significant handicap.

Female representation, especially in the management of the team has increased.

All members of the team still did not have the opportunity to visit all platforms, although some opportunities were provided through transversal project meetings to visit facilities of partner groups.

Some efforts were made to refocus part of the activities on models of regional interest that promote some intra and extra team collaborations with attractive funding. However, the project remains extremely vague and broad, potentially resulting in counterproductive dispersion.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

Catégories de personnel	Effectifs
Professeurs et assimilés	13
Maitres de conférences et assimilés	27
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	17
Sous-total personnels permanents en activité	57
Enseignants-chercheurs et chercheurs non permanents et assimilés	3
Personnels d'appui non permanents	7
Post-doctorants	0
Doctorants	43
Sous-total personnels non permanents en activité	53
Total personnels	110



Overall assessment of the team

The interdisciplinary and transversal activities of team 5 are very good and well in line with local, national and international strategic priorities. This resulted in very good fundraising. The scientific production is quantitatively excellent. From a qualitative standpoint, it is very good. MOV interactions with the socio-economic world were very good and intensifying. Outreach activity is very good, but mainly ensured by a few members. Overall, large heterogeneities of activity exist among team members and the overall picture is blurred.

The trajectory sounds excellent and promising if the team keeps reinforcing internal cooperation and partnership with the socio-economic world, exploiting complementarities and refocusing on common strong priorities such as biocontrol.

Strengths and possibilities linked to the context

Major strengths of team E5 are its large size, multidisciplinarity and diversity of competencies that are combined on shared transversal objectives. The team recruited new staff members during the period (including 3 EC and 11 technical staff members; a researcher was hired by a company to work in the UMRT with support of ANR France Relance).

Each site benefits from specific and complementary technical platforms (e.g. the Realcat screening platform in Lille, the FoodIsLife and Ecotron platforms in Gembloux, the analytical platform and CRRBM (Centre de Ressources Régionales en Biologie Moléculaire at UPJV Amiens).

The team's efforts focus on crop models and applied scientific objectives (bioprotection, plant animal and human health) well in line with international (e.g. "One Health"), national (e.g. INRAE Grands Objectifs Scientifiques BAP-GOS2), local (e.g. UPJV and ULille, CPER Hauts de France Scientific policies and planning) and breeder's priorities. This provides many opportunities of public and private fundings.

Team members participate in various international projects (13 of which 5 in coordination: FEDER, INTERREG, CAPES-COFECUB). The team has contributed to the creation or extension of two International Associated Laboratories (with Québec and Brazil).

MOV is very active in networking through their contribution to the organization of 9 international or national conferences or workshops (such as the Conference "Agri-food in tune with the reduction of phytosanitary products?" in Arras, 2019; "One Health International Day" in Villeneuve d'Ascq, 2022). The team also coordinates the MetaSpe network (French network dedicated to plant specialized metabolism), the SFR Condorcet, participates in the GDR Cavitation and the RMT Bestim.

The team has been successful in competitive fundraising (8,480 k€ In total or 70.6 K€/year/research FTE, including 1,476 k€ from local/regional calls, 5,065 k€ from national sources, 1,545 k€ from international funds and 405 k€ from public-private collaborations), via participation to national collaborative projects (ANR: 2 as participants, 12 Belgian SPW (Service Public de Wallonie) grants, of which 5 in coordination), European projects (4 FEDER of which 3 in coordination, 3 INTERREG of which one in coordination) and 40 public-private partnerships.

Internally, a funding priority was given to co-supervisions and cross-border collaborations to implement more ambitious projects, some of which already resulted in shared publications.

Collectively, the publication record is quantitatively excellent, with 408 articles (4.1 articles/research FTE/year). Among those, 26% were co-published with other members of the UMRT, and 54% were (co)signed by doctoral students, 192 (47%) have MOV members in leading positions, and 62% were led by BioEcoAgro members. These articles were published in a wide range of journals considered as good to excellent. For example, the team developed original plant models such as hop (Phytochemistry, 2023) or chicory (Molecular Sciences, 2019; Plant Physiology, 2022), new approaches (seaweed polysaccharides) for biocontrol of pests in grain crops (e.g. Frontiers in Plant Science, 2021). There are also a couple of high visibility reviews (e.g. Trends in Plant Science, Trends in Food Science and Technology, Frontiers in Microbiology...) published mainly by the Belgian team members.

The team implemented or pursued 40 collaborative projects (for 405 k€) with the private sector (breeders, major industrial players), resulting in the filing of two international patents listed in the data table, although two others are mentioned by the team. Most prominent is the creation of a new joint laboratory with the company



Florimond-Desprez entitled "Chicory for one health" to improve the nutritional, organoleptic and physiological qualities of chicory. The team also participates in the Industrial Chair Charles Violette dedicated to the valorization of co-products and in the joint Allinpep team (ANR ProteinoPEP chair) with the Ingredia company. Members of the team are solicited for Public policy assistance and technical expertise in the private sector. To be mentioned also a sustained collaboration with 3 start-ups has been co-founded by team members before the evaluated period. Two international patents were filed during the period, one by French and another by Belgian members of the team.

The team reports around 30 dissemination activities (such as 2 videos, 18 conferences or webinar for general public, one booklet on hop cultivation, one interview, 2 interventions in secondary schools or for training of secondary school teachers, etc.).

Weaknesses and risks linked to the context

Although very significant efforts of integration and communication are obvious, the main weakness of this large team remains its initial thematic and geographic dispersion. The local capacities, competencies and knowhows of the team are not properly highlighted.

Total funding concentrates on a few components of the team and hides large internal disparities.

Staff members (leading researchers and support) are aging and retirements are anticipated with a risk of loss of critical know-how and knowledge.

Publication records are quantitatively excellent but could be improved on the qualitative side. Publication heterogeneity and lack of publication of some staff members are a concern. There are large differences in publication activity between the staff members (from 0 to 31 articles/full time researcher over the period)).

A few breakthroughs and very high visibility publications would be expected given the size and funding of the team.

From 79 oral presentations at national or international meetings over the period, only 16 were invited. From the 75 PhD theses ongoing during the period (18 in Belgium), only 35 have been defended. PhD duration is extremely variable within the team from 1 to more than 10 years (average 48 months). Long PhD theses are mainly in Belgium with 13 of them longer than 4 years. While this can be explained by the Belgian PhD funding system, PhD also involving teaching work, several seem to exceed reasonable duration. This is maybe why four PhD students gave up in Belgium and did not defend.

Although collaborations with the socio-economic world are very intensive, they only contribute to 5% of the operational budget of the team.

Analysis of the team's trajectory

The SMP team maintains the same priorities for the next period, though with a reinforcement of collaborations and visibility. Main priorities are set on pharmaceutical and nutraceutical activities of plant metabolites, and on their potential for biocontrol. Biocontrol in particular becomes a common focus, already well supported by funded INTERREG and Casdar projects, by a junior professorship at university of Amiens), and by a joint laboratory with Florimond-Desprez that just started. Another regional joint laboratory in the field of biocontrol within the regional frame "EMILE" of the FEDER, led by a member of the team and in partnership with Agrostation, is still waiting for final validation. As this is environmentally relevant and a well identified priority of many national and international funding bodies and supervising institutions, this choice seems appropriate.

RECOMMENDATIONS TO THE TEAM

MOV is encouraged to pursue its scientific integration and communication efforts to fully benefit from the complementary skills and platforms of the team. This could lead to high impact papers, which could be a strong motivation to boost cooperation.

Further focusing on a few relevant plant models and/or pathways would be highly desirable to increase both efficiency and visibility of the team (or teams).

Retirement of staff members has to be anticipated in terms of strategy, training and acquisition of new skills and prepared with the supervising bodies.

Efforts should be intensified in the direction of a homogeneous duration of PhD theses across the border and to avoid abandons.



The French team members should participate in more international conferences with oral presentation in order to boost their visibility and to attract self-funded foreign students. The team's very large size (one third of the UMRt) makes it difficult to compare MOV to other teams within and outside the unit. It obviously induces some difficulties in management (due to staff number, history and large geographical dispersion), and requires posting of very general objectives that obscure the valuable strengths and originality found in some local and transversal projects. The committee therefore questioned the relevance of such a large team in terms of readability, and visibility of its members. While integration was useful to build excellent transversal projects in a first step, reshaping into two or three main structuring lines able to propose more focused attractive objectives and projects might be considered in the future. This is not a compelling recommendation but could be opened to discussion within the team.



Team 6:

BEB: Biotransformation/Enzymes and Biocatalysis

Name of the supervisors: Mr Re

rs: Mr Renato Froidevaux and Mr Patrick Fickers

THEMES OF THE TEAM

Team 6 focuses on the bioengineering and development of new biorefinery processes aiming at the valorisation of plant lignocellulosic biomass and industrial by-products for the production of molecules of interest. To this end, the team uses enzymes, eukaryotic microorganisms (filamentous fungi or yeasts) and develops a concept of hybrid catalysis (enzymes combined with chemical catalysis). The team also develops molecular tools and pilot processes for enzyme production, solid medium fermentation technologies, strategies of large scale membrane or chromatographic purification of metabolites. One of its recent focuses for the implementation of innovative purification strategies was the bacteriocin nisin (a biopreservative agent for the food industry).

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

Team 6 was not evaluated as a team but within Pole 2 in the prior contract. It is thus not possible to apply here the recommendations of the prior report to Pole 2, since Team 2 does not suffer from the same geographical and thematic dispersion.

Nevertheless, as previously recommended for cluster 2, the qualitative aspect of the team production has been improved to some extent but with still a significant margin of progress. The team was successful in raising European funds, both from Interreg and H2020.

Catégories de personnel	Effectifs
Professeurs et assimilés	3
Maitres de conférences et assimilés	3
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	1
Sous-total personnels permanents en activité	7
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	5
Sous-total personnels non permanents en activité	5
Total personnels	12

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

EVALUATION

Overall assessment of the team

The project on the valorization of biomass and of industrial by-products is very good, and well in line with the priorities of the supervising bodies, the region, the EU, and the industrial demand. Yet the team activities led to significant dispersion, especially considering the workforce available. The team benefited from the active support of the REALCAT high-throughput platform dedicated to "hybrid catalysis" and was able to raise outstanding funding from public (local, national, international) and private sources, through the coordination of an industrial chair. Its scientific production was very good quantitatively and good to excellent qualitatively. The team maintained excellent interactions with the socio-economic world. Its outreach activities were good.



The trajectory of the team is excellent and its project is very promising with the recruitment of some of the staff from team 1 working on similar topics, and refocusing on more ambitious objectives.

Strengths and possibilities linked to the context

The scientific objectives align well with those of the supervising bodies (Lille University (Cross Disciplinary Projects, ISite), INRAE, University of Liège), the Hauts de France Region and the local companies, which provides an excellent basis to obtain support.

Team 6 strongly benefits from the REALCAT platform and cutting-edge equipment for high-throughput enzyme activity measurements, screening and molecule purification (one team 6 research engineer is working on the platform).

Although quite small, the team was very successful in fundraising with a total of 6900 k€ (i.e. 345 k€/research FTE/year) during the period, from which 1650 k€ from local and regional sources (CPERs), 2700 k€ from national funds (including one BPI France and 2 ANR PRC(E) as coordinator and one ANR as participant), 530 k€ from international agencies (including two EU Interreg and one H2020 project as partners and 2000 k€ (29% of its self-funded budget) from industrial partners. These funds allowed for example investments in a microfluidics spectrophotometer, supported doctoral work (including 1 Cifre), and permitted to maintain an IE position in the team.

Compensating the departure of one MCF, the team was able to hire one MCF and one IR during the period. All staff work on at least two projects, thus supporting transversality.

From the 12 PhD theses ongoing during the period, 9 have been defended, with a very good average duration of 37 months.

A highlight is the implementation of the Industrial Charles Viollette Chair of the Metropole Européenne of Lille (3 M€) launched in 2021 and coordinated by the team. This chair associates 2 academic partners (the UMRt EcoBioAgro and INAF-Québec) and 7 industrials partners (PremierTech, Eurabiotech, Gecco, Extractis, Leroux, APEF, VFBiosciences) for the development of biological tools applied to the valorisation of by-products from the agri-food industry.

The team produced 51 publications during the period (2.55 publications/research FTE/year), of which 17 (33%) are co-authored with other UMRT teams and about 30% by PhD students usually as first authors. Twenty-one of these articles (41%) and 34 (66%) are signed as first, last or corresponding authors by members of BEB and BioEcoAgro, respectively. Those articles appeared in a large set of good to excellent international journals relevant to the field: *Microbial Cell Factories* for the development of tools for the expression of proteins in *Yarrowia lipolytica*, or *ChemCatChem* for the development of a hybrid catalysis process for the production of HMF ((5-hydroxymethylfurfural). To be mentioned also 20 oral presentations at international meetings, 7 of them invited.

Team 6 has maintained extensive interactions with socio-economic partners (local, national and international), sometimes major companies or long-standing partners, with 26 funded partnerships providing close to 30% of its self-funded budget and 2 filed patents including a world patent filed in collaboration with team 4. This also results in publicly funded projects associating private partners (e.g. the Charles Viollette Chair and an ANR PRCE).

Weaknesses and risks linked to the context

BEB has a very low support staff/researcher staff ratio (0,16 ITA/EC) and the research engineer does not co-sign the publications.

Given the small size of the team, its activities are quite dispersed, both from a point of view of the diversity of approaches/methodologies, and as concerns the industrial by-products to process or the targeted end products, that extend well beyond the posted team main priorities (e.g. waste oil, coffee ground recycling, nisin). This is often due to opportunistic industrial collaborations.

Considering its excellent funding, the team could be more ambitious in its publication strategy. The visibility of most of the team is mainly limited to a focused ecosystem of regional/national and long-lasting international collaborations. Invited presentations/seminars in an international context are relatively few.

The team seems on a shrinking track given the aging of the staff and the recruitment prospects. This concerns researchers as well as technical staff that must be maintained on self-funded contracts. The existing team suffers from an overload of administrative responsibilities.



The team disseminates its activity via organization and participation to national and international conferences, participation to the Fête de la Science, organization of a dissemination workshop, but the topics of the team could be better advertised given their impact on the society.

Analysis of the team's trajectory

The prospect of team 6 is expected to improve for the next period, with the integration of 3 members of team 1 specialized in pectin enzymes. Besides this increase in workforce, the team aims to refocus its activities on a single type of industrial by-products, pectins for the production of compounds of interest such as pectin monomers or oligomers. Its main objectives are to produce pectin modifying enzymes, to determine their mode of action via structure/function studies, and to implement them in optimized enzymatic cascades that can be stabilized and scaled-up in bioreactors as eco-friendly industrial processes. The potential biological activities and industrial applications of the generated products will also be explored for further developments.

Both staff merger and project refocusing are sensible choices that should increase the team efficiency and visibility. Funding of these activities is well anticipated.

RECOMMENDATIONS TO THE TEAM

The team dispersion on interesting but very divergent projects obviously requires a refocusing on a more ambitious and long-term objective. The team has identified this problem and has taken measures in this direction. The committee recommends to stick to this decision and to resist or at least select solicitations that would lead to new dispersions.

The planned staff merger is strongly encouraged and should strengthen the team's applications for further recruitments and replacement of aging members. It could also help to build more complex stories to increase the qualitative level of publications.

The research engineer should be involved in publications.

The committee suggests to clearly post the new team's projects and to present them at national and international meetings to become an obvious actor and unavoidable partner in the relevant fields. Visibility could be also boosted by a more ambitious publication strategy including some reviews in high visibility journals.



Team 7:

Health benefits of protein hydrolysates and agri-food co-products: production control, characterization and valorization

Name of the supervisors: Ms Rozenn Ravallec and Mr Christophe Flahaut

THEMES OF THE TEAM

The team has developed expertise regarding health-promoting properties of biomolecules with a focus on peptides. Its main objective is to unravel the fate of biomolecules in the gastro-intestinal tract and their interactions with the gut barrier to modulate physiological processes such as food intake, carbohydrate metabolism and inflammation. Therefore, *in vitro* models of biological activities and cell co-culture models simulating the intestinal barrier were developed.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

In the prior report, the team was not evaluated as such, but included in the Pole 3. The present analysis therefore refers to the recommendations made to this Pole. As recommended, inter-team collaboration has remarkably increased. Team 7 successfully implemented a clear scientific identity based on strong technical skills and platforms. As such they became a node integrating collaboration among a large number of teams of the units.

The members of Team 7 did not take full coordination of most of their projects except notably BioSmart BBI.

They were encouraged to improve the visibility of their articles, namely those co-authored by Ph D students.

It was not totally clear how scientific animation was coordinated at the different levels (unit, pole, team). A significant effort was made to unify management and rules between sites and supervising bodies. It seems that the team 7 leader had a significant positive role in this direction.

Research Data Management Plans have been implemented.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

Catégories de personnel	Effectifs
Professeurs et assimilés	4
Maitres de conférences et assimilés	4
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	5
Sous-total personnels permanents en activité	13
Enseignants-chercheurs et chercheurs non permanents et assimilés	0
Personnels d'appui non permanents	0
Post-doctorants	0
Doctorants	35
Sous-total personnels non permanents en activité	35
Total personnels	48



Overall assessment of the team

The scientific production is quantitatively excellent and very good to excellent qualitatively. The team has a very good visibility shown by diversified international collaborations but does not lead international projects. Their very good funding mainly results from excellent collaborations with regional companies. Outreach activities are good but could be intensified. The central role of team 7 in internal collaborations, as well as team complementarities, fully justifies their merger with team 8 towards an unifying project centered on antibioresistance and intestine peptidome and microbiome.

Strengths and possibilities linked to the context

Team 7 benefits from complementary technical skills (analytical biochemistry, animal experimentation, cell biology...) and expertise in cell culture, which allowed the development of *in vitro* intestinal barrier models, supported by a dedicated technical platform in adequation with the 3R rules in animal experimentation. The Team investigated the impact of peptides on physiological processes and microbiota in human and animal models and *in vitro* for gastrointestinal digestion and intestinal barrier. Its position is reinforced by strong links with the REALCAT platform (biocatalysis for production and mass spectrometry for analysis of bioactive molecules), animal experimentation facilities (PHExMAR for rodents, CEPA for piglets, Gembloux experimental farm) which fosters many collaborations. As a consequence, Team 7 is the team sharing most publications with other ones (61%).

Qualitatively the scientific production is very good to excellent with articles in Food Research International or *Critical Reviews in Food Science and Nutrition*. The development and publication of innovative models and tests for biological activity at the intestinal level are original and valuable contributions. A major and promising discovery has been made in the regulation of carbohydrate metabolism by dietary proteins at the intestinal level (*Nutrition*, 2022).

Quantitatively, the scientific production is excellent with 141 articles over the evaluation period (5.6 articles/research FTE/year). One hundred and five of them (74%) are co-authored by members of several BioEcoAgro teams, who signed as first, last or corresponding authors. Regarding the 55 articles published by team 7 members only, 37 (67%) are signed by a Team 7 member as first, last or corresponding author. This is consistent with the hosting of 48 Ph D students in team 7 over the period.

Team 7 addresses societal issues perfectly aligning with EU and regional bioeconomy initiatives. This allowed them to secure 3.5 M€ external funding (i.e. 140 k€/research FTE/year), mainly related to industrial partnerships. The team benefits from the EU BBI funding Biosmart (650 k€), from the FEDER support AllInPep (482 k€), from an Industrial Chair ANR-Ingredia ProteinoPeps (350 k€, as coordinator to develop a more ambitious project for the valorisation of casein), from regional funds like CASH (Walloon region) or two CPER (AliBiotech and BiHauts Eco De France), and numerous contracts with companies (34 industrial contracts for 2.8 M€). Team 7 filed patents and developed a self-service bioinformatics software BIOAcPepFinder hosted by the Bllille platform in the context of a Cifre contract with COPALIS.

The team benefits from excellent FTE ITA/FTE EC (1.25) and PhD students/EC (6) ratios.

International collaborations are diverse (China, Tunisia, Spain, Italy, USA) and on a long term with the active participation to 2 LIA (LIAAN with Université Laval (Canada), and LAI SAMBA with Brazil). This allowed the team to benefit from projects funded by Canada (e.g. CRIBIQ projects co-supervise PhD students).

Supported by both industrial (9 Cifre contracts) and academic collaborations, the number of PhD students supervised by team 7 is remarkable (48 among which 35 are/were co-supervised over the period, for only eight PI (6 HDR (accredited as Ph D supervisor)) and five permanent engineers/technicians). PhD students actively contribute to the scientific production (65% of the team's articles, usually as first author).

Weaknesses and risks linked to the context

Two staff members (one professor and one assistant professor) have not been replaced. One assistant professor did not co-author any article over the evaluation period. Another professor will head the UMRt BioEcoAgro for the next period, thereby limiting her availability for her team. In addition, currently 70% of the salary of a research



engineer is paid by the team. In a context of a limited number of staff with required expertise, it becomes critical to secure some research engineer position(s).

Animal experimentation facilities are an asset, but the team still lacks connection with the medical field, which limits the development of health-promoting products for human nutrition.

The fate of food biomolecules and microorganisms in the human and animal gastrointestinal environment and the understanding of their impact on health is a strategic issue for food, pharmaceutical and biomedical sector, this topic is thus highly competitive.

The team is very dynamic in networking. Yet, given its leading position in its field, the team still lacks visibility at the international level in terms of invitations to present work at major international meetings and participation in European projects (with some in coordination).

Outreach activities are still limited while the topic could be popular.

Analysis of the team's trajectory

For the next period a merger of Teams 7 and 8 is scheduled into the Sol4Health team "Solutions for Health: "Beneficial and adverse effects of food products and micro-organisms on human and animal health". This will contribute to the formation of a more critical working force: the number of Pl will increase from 8 to 23, but the technical staff will only increase from 5 to 6. The new team will combine the analytical biochemistry, cell biology and animal experimentation skills of team 7 with skills of team 8 in microbial ecology, physiology and biochemistry. This is fully justified since interactions between digested biomolecules and microorganisms in the intestine are increasingly reported to modulate animal and human health. The merger will provide opportunities to develop new approaches, such as the development of new models of digestion and intestinal barrier in fish with the integration of the ULCO scientists. The new research areas of Sol4Health will thus be: 1 - the valorisation of microbial metabolites as an alternative answer to antibiotics, and their impact on health – 2- the fate of food biomolecules and microorganisms in the human and animal gastrointestinal environment and the understanding of their impact on health – 3- the integration of big data and the development of analytical strategies.

It can however be noted that, at this stage, the merger also introduces a thematic dispersion and reduces the team readability by introducing new and rather unrelated projects on *Vibrio* pathogens and microplastics. In addition, it is not obvious that it will solve the problem of technical statutory staff and the need for recruitment.

RECOMMENDATIONS TO THE TEAM

Special attention will have to be paid to renewal of permanent PI and support staff (this latter point being critical for the platforms and the transmission of practical skills to non-permanent researchers).

While team merger provides promising opportunities, it will also require some refocusing: e.g. integrating subjects such as the impact of microplastics ingested by seafood on the environment (previously developed by some team 8 researchers) means a risk of dispersion.

Team 7 has developed a panel of skills which could be broadened to contribute with team 8 to the theme 1 "Microbial and metabolite valorisation, alternative answer to antibiotics and impact on health". However, the committee recommends that the contributions of former team 7 and team 8 staff members to the different themes developed in the new team are detailed. The 2 new team managers are encouraged to help permanent staff to align with the scientific priorities of the new team and to engage younger PI in applying regularly to calls to get funding in line with these priorities. Refocusing can be supported by financial incentive for the recruitment of PhD students.

The team is encouraged to further increase their international visibility by attending (oral presentations) more international meetings abroad and by writing reviews in major journals. Team members are also encouraged to coordinate EU or ANR projects.

Connections with the biomedical field should be improved by searching local partnerships (invitations to joint meetings), publishing in appropriate journals, or recruitments of medical students.

Dissemination activities could be intensified and diversified (in the press in particular).



Team 8:

Food and digestive microbial ecosystems: interactions - dynamics - application(s)

Name of the supervisor: Ms Véronique Delcenserie and Mr Djamel Drider

THEMES OF THE TEAM

Team 8 studies many microbial ecosystems, in particular those of food matrices, in order to identify beneficial bacteria of interest as probiotics, as well as bioactive compounds, and ultimately, to control pathogenic microorganisms.

The microbiota studied are mainly those of aquaculture and of fermented foods, as well as those from human and animal guts. The targeted microorganisms are non-*Saccharomyces* yeasts, *Vibrio*, studied as pathogens, and Bifidobacteria used as probiotics or fermentation starters. The bioactive compounds are antimicrobial (in particular bacteriocins), anti-inflammatory and antioxidant molecules.

The expertises of the team cover classical microbiology, microbial omics, metagenomics, establishment of *in vitro* digestion models, molecular biochemistry and protein engineering.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

The recommendations of the previous Hcéres report were extracted from those of Pole 3 of the Institut Charles Viollette 'Formulation - Qualité et Sécurité des aliments - Nutrition-Santé', from which Team 8 is partly issued.

Regarding coordination of national and international projects, efforts were actually made by Team 8's members to coordinate national projects, but not international ones, except the FEAMP LUVIBAR (fond européen pour les affaires maritimes, la pêche et l'aquaculture).

The previous committee recommended improving the quality of publications, which has been done during the period assessed. Regarding improvement of scientific animation, nothing is detailed in the SED.

The team should still reduce the number of objects of studies to gain in visibility, already recommended by the previous committee.

The team improved its collaborations with other teams of the unit, as was recommended.

There is no mention of internal « Research Data Management Plan » at the scale of the team, although this was previously recommended.

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

Catégories de personnel	Effectifs
Professeurs et assimilés	8
Maitres de conférences et assimilés	7
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	1
Sous-total personnels permanents en activité	16
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	0,5
Post-doctorants	0
Doctorants	5
Sous-total personnels non permanents en activité	6,5
Total personnels	22,5





Overall assessment of the team

Some themes are attractive and original, such as the control of pathogens in aquaculture, and bacteriocin identification and molecular characterization. However, the objects of studies are too diverse with regard to team size and composition. The scientific production of the team is original, especially regarding the control of pathogens in aquaculture, and bacteriocins, that are fairly confidential fields at the international level. It is very good qualitatively, and outstanding quantitatively. Involvement in PhD supervision is outstanding. The success in competitive funding highlights an overall excellent attractivity of the team at the national level. The attractiveness of team 8 towards socio-economic partners is also excellent but while outreach activities are weak.

Strengths and possibilities linked to the context

The activities of the team in aquaculture align with the missions of the ULCO and of Anses, which supports them with a PAST position.

With 6 regional (conventions de partenariat), 31 national (including 5 SPW Economie, Emploi, Recherche, 4 SPW Agriculture, Ressources naturelles et Environnement,, 4 CPERs, 1 Pôle d'excellence SPAQUE, 1 WBI -Wallonie-Bruxelles International, 1 ANR, 1 IFSEA-PIA,1 I-SITE) and 5 international (1 PHC Utique, 1 Interreg, 2 FEAMP (Fonds européen pour les affaires maritimes et la pêche), 1 EACEA European Education and Culture Executive Agency) projects, the own resources of Team 8 reached a mean value of 93 k€/research FTE/year, which is excellent. The team coordinate 70% of these projects, which is also excellent.

More than 40% of the team's articles are published in the best journals in the fields of food and nutrition, such as *Food Chemistry* and *Food Control*. The team also published articles in exceptional review journals, such as *Critical Reviews in Food Science and Nutrition* and *FEMS Microbiology Reviews*. One article was awarded Best Scientific Publication 2022 by the French Animal Health Network.

Quantitatively, the scientific production is outstanding, corresponding to 6.8 articles per research FTE/year, especially considering the very good quality of the publications. Eighteen percent of Team 8' articles are coauthored with other teams of the unit, frequently Team 7. Fifty five % of the Team 8' articles contain a BioEcoAgro staff member as first, last or corresponding author. Regarding the publications published by Team 8' members only, 48% are published by a Team 8' member as first, last or corresponding author, which is outstanding.

All articles are available in open access (HAL or ORBI platforms), and 58% are in Gold Open Access.

The PhD students published on average 2.8 articles and signed as first author in 72% of their papers. All the postdoctoral researchers hosted by the team have at least one publication as first author. These figures show a very good valorization of the work of young researchers.

With two research collaboration contracts, 1 ANRT, 1 SATT, 1 Cifre grant, totalizing 20% of its own resources, the activities of the team regarding innovation and the socio-economic fabric is very good. Seven patents were filed by the team, of which 1 was licenced to a company after a maturation project. An only spin-off of the UMRt is being launched to exploit Team 8' results on the discovery and use of a lactic strain producing bacteriocins of interest for animal health.

The visibility of some team members on the national and international scenes is outstanding, as highlighted by 38 invited lectures in international conferences. The team is also involved in two international associated laboratories with the University de Viçosa in Brazil (SAMBA), and with the Université Laval (Québec) in Canada (LIAAN). The transversality with the other teams of Cluster 3 is supported by 3 projects (ANR Sincolistin with Team7, PIA-IFSEA and one PHC Utique with Team 9), and co-supervision of a PhD student with Team 7. Team 8 also published 19 papers and filled 6 patents with Team 7. These figures support the future plan to merge Teams 7 and 8.

There are 11 HDRs out of 16 scientists and research engineers, resulting in an excellent potential for Ph.D supervision. Sixteen PhD students were supervised during the period, which is outstanding for a permanent staff of 8.5 research FTE. The mean duration of PhD work is 2.7 years, which is excellent. Eighty-one percent of the PhD projects were in "co-tutelles" (co-supervision) with international partners.



Weaknesses and risks linked to the context

The number of objects of studies (in terms of microbiomes, microbial phyla and bioactive compounds) is too high for such a team which gathers 8.5 research FTE.

The team 8's own resources correspond to only 6.6% of the Units's own resources, and only 1.5% of the Unit's own resources notified in 2023. The Team's own resources decreased by 4.2 times between 2021 and 2023, reflecting a significant decrease in attractivity and a risk for the future of research (except regarding *Vibrio* and bacteriocins, probiotics and impact of food components on the human gut microbiota). Seventy-one percent of the projects are led by 4 scientists only, on who rely the funding resources of the team.

Only 5.2% of the Team 8's own resources come from international projects, which is very low. No international project has been funded in 2022 and 2023, which reflects a weak attractivity at the international level.

The ratio between the research FTE and technical staff is 7.5, which is extremely high. There were very few postdocs or CDDA recruited on the team's own resources.

One scientist did not publish any paper in the evaluation period, due to long sick leave. PhD students are coauthors of only 16% of the team's publications, while their staff represents 50% of the team's staff. This indicates that PhD students do not play a critical role in the team's activities. Only 64% of the publications are available in Open Access.

Only 6 out of the 11 scientists and engineers with an HDR supervise PhD students. The involvement of all staff in the supervision of students could thus be improved.

Despite the existence of a Cluster three PhD day and half-day thematic workshops, there are no regular meetings involving all permanent staff of the team.

The team only participated marginally in outreach activity or communication towards the general public.

There is nothing claimed in the self-evaluation report regarding ethics. In particular, it is not stated if PhD students, especially those belonging to a non-French university, followed a course on scientific integrity and ethics.

One ULille scientist retiring during the evaluation period, for whom replacement is not yet guaranteed Two ULiège scientists and the only one ULCO research engineer will be retired in 2027 and 2028. Their replacements have been considered, but without any guarantee from the supervising bodies, this represents a risk of expertise loss.

Analysis of the team's trajectory

Team 8 will merge with Team 7, to create the team 'Beneficial and adverse effects of food products and microorganisms on human and animal health", Sol4Health (Solutions for Health).

This merge is well in line with the previous collaborations initiated between Teams 7 and 8, which led to common publications, patents and PhD co-supervision. The recent loss of attractivity of team 8, in particular at the international level, will be compensated by very recently funded projects of Team 7 (Agrilabel, Heteroclips, Proteinopeps). The ratio between scientists and technical staff will be more balanced, with the 4 engineers from Team 7, and the merge will bring task force to Team 7, which was one of the smallest teams of the unit. The fusion should thus improve the robustness compared to Teams 7 and 8 taken individually. In addition, the fusion will renew the management team and operational implementation of the research strategy, and will give more visibility to young researchers who will be involved in the scientific animation.

However, there is a major risk to increase thematic dispersion even more than currently, and generally, to decrease visibility. There will indeed be an increase of the number of objects of studies and scientific questions that were not transversal between Teams 7 and 8 (such as alternative dietary proteins from algae, insects, microorganisms; ingestion of microplastics, digestion models in fish).

RECOMMENDATIONS TO THE TEAM

The new team should refocus its activities on the most attractive and original themes and objects of studies, in order to avoid dispersion and to gain even more attractiveness. This would allow the team to rationalize its demand of permanent positions to its supervision entities, and to focus the scientists efforts on the submission of large international projects. The team should encourage all its scientists, including the youngest ones, to manage large projects. This would allow the team to recruit post-doctoral researchers and engineers in order to balance the non-permanent staff, which currently comprises 89% of PhD students in Team 8. The team should increase efforts in proposing ambitious international projects, as partners or coordinators.



The team should pay attention to involve all its research staff in publications and in international conferences, in particular the youngest scientists, post-doctoral fellows and PhD students). The team should increase the number of publications available in Open Access, by considering pre-prints, post-prints and reprints deposition in HAL (for example), in accordance with editor policies.

The team should improve its internal scientific animation.

The team should participate in science communication with the general public.



Team 9:

Structure-function relationships for the rational formulation of foods and ingredients

Name of the supervisors: Mr Christophe Blecker and Mr Romdhane Karoui

THEMES OF THE TEAM

Created in 2018, team 9 brings together staff from 4 sites: University of Artois, University of Liège, University of Littoral Côte d'Opale and ISA Lille (part of Juna engineering school). Its research focuses on the characterization of food freshness, authenticity and quality and on proteic ingredients in terms of structure and techno-functional properties. The research, conducted in close collaboration with private partners, is based on studies at the macroscopic, microscopic and molecular scales. Food types studied are mostly aquatic (fish and fish products) and dairy products together with olive oil, and main functional ingredients investigated are dairy, and increasingly plant and insect proteins as techno-functional food ingredients in the context of dietary changes.

CONSIDERATION OF THE RECOMMENDATIONS OF THE PREVIOUS REPORT

This team created in 2018 is issued from Institut Charles Viollette (ICV) in France and Terra in Belgium. The recommendations of the previous report considered for this team are recommendations to Pole 3 (Formulation - Food Quality and Safety - Nutrition & Health). Consistently with these recommendations, team 9 (i) increased its coordination of international projects (e.g. coordination or co-coordination of 3 Hubert Curien bilateral cooperation programmes and 2 FEDER programmes), (ii) the mean quality of publications by PhD students. The mean duration of PhD theses is still higher in Belgium than in France but this is due to differences in PhD studies in Belgium (between 48 months and up to 6 years for Ph D students having teaching duties and in France (recommended PhD thesis duration: 36 months).

Catégories de personnel	Effectifs
Professeurs et assimilés	4
Maitres de conférences et assimilés	6
Directeurs de recherche et assimilés	0
Chargés de recherche et assimilés	0
Personnels d'appui à la recherche	6
Sous-total personnels permanents en activité	16
Enseignants-chercheurs et chercheurs non permanents et assimilés	1
Personnels d'appui non permanents	2,5
Post-doctorants	0
Doctorants	11
Sous-total personnels non permanents en activité	14,5
Total personnels	30,5

WORKFORCE OF THE TEAM: in physical persons at 31/12/2023

EVALUATION

Overall assessment of the team

The global assessment is very good to excellent. The objectives are mainly driven by the societal and economic context of food quality. This young team has excellent resources and shows a remarkable progression in workforce, funding and equipment during the period. Its scientific production is excellent quantitatively and very good qualitatively. However, the contribution to research is unevenly distributed between sites and between teachers-researchers. The team develops very good to excellent interactions with the socio-economic sector, through important collaborations with foreign universities and private partners.



Strengths and possibilities linked to the context

Team 9 develops strong interactions with the agri-food socio-economic environment, shown by the cooperation with the technological resource center ADRIANOR and 14 contracts with the socio-economic sector (10 as coordinator), including three Cifre PhD theses. These contracts correspond to either prestations (ex: PET FOOD SAS 2018-2022) or research partnerships (ex: COSUCRA 2021-2025).

In addition, the team demonstrated an expanding capacity to fund research through regional, national and international programs. Two European FEDER programs 2023-2025 (1 as coordinator) recently started on the development of protein ingredients (WAL'PROT 7 and WAL'PROT 9). Ten national programs have been financed: 1 ANR as coordinator, 6 SPW including 2 as coordinator, 1 FRS as coordinator, etc. At the regional level, 11 contracts have been obtained (2 as coordinator), including 2 STIMULE and 3 FEDER programs.

The team has an active network of international collaborations with universities in Maghreb, sub-Saharian Africa and Asia. This results in the hosting of PhD students (20 during the evaluated period).

Created in 2018, the team has significantly expanded with an increase in the number of professors (from 1 to 4), recruitment of fixed-term and permanent engineers and technical staff (14 persons). This was accompanied by recent workspace extension at the Artois site and acquisition/installation of new equipment that results in an open spectral platform between Artois and ULCO sites, for the molecular characterization of food and food ingredients.

The team works on food biopreservation and food processing in close collaboration with teams 5, 6, 7, 8 of the unit. Twenty-eight percent of the team publications are co-authored with other teams.

The scientific production is excellent quantitatively (7.6 articles/permanent research FTE/year) and very good qualitatively. The team has published 189 articles in peer reviewed journals (59% as first, last or corresponding author), one book (published in 2024) and 2 book chapters. Sixty percent of these articles are published in the best journals of Food Science area (Scimago Journal & Country Rank) including high impact journals in this area such as Food Chemistry (16), Foods (13), LWT - Food Science and Technology (10), European Food Research and Technology (7), Food Research International (7), Food Control (6), Food Hydrocolloids (6), Critical Reviews in Food Science and Technology (6). This is also true for PhD students (mean of 4 publications per defended thesis, with a mean of 2.8 as first author). Seven PhD theses were defended in the evaluated period, and the average thesis duration is 3.35 years.

Weaknesses and risks linked to the context

There is a limited number of HDR at the French sites: the 6 assistant professors (MC) have no HDR (one of them defended in May 2024). As a result, there is an uneven distribution of PhD supervision (only for the professors) and number of publications (from 2 to 98 for associate professors/professors of the team).

The description of research activities and unit trajectory are not precise enough in terms of scientific questions in the written report. In addition, the progress expected from spectroscopic techniques other than mid-infrared and fluorescence spectroscopies as well as the data treatments and integration approaches should be detailed more precisely. These points have been clarified during the oral presentation of the team leaders.

The distance between the different sites can impede coordination of the team.

There is a limited number of permanent supporting staff (one technician and 3 CDI) and the funding based on projects implies the recruitment of non-permanent staff. High technical turnover can limit maintenance of specific expertise.

Analysis of the team's trajectory

The team is on a dynamic trajectory, expanding in terms of workforce, equipment, professional networking and funding opportunities. The program proposed is very short, in the continuity of the three axes developed during the past period: (1) food raw materials in terms of quality and authenticity, (2) proteins as techno-functional ingredients and (3) impact of formulation, manufacturing and storage on quality of food. The preferred directions and scientific questions would need to be detailed and developed further. For example, the choices of equipment recently acquired is not discussed in terms of associated expertise and objectives of implementation.



RECOMMENDATIONS TO THE TEAM

The team's dynamics should be maintained by encouraging assistant professors to participate in PhD supervision and defend their HDR. It appears as the key to re-equilibrate involvement in research among the teachers-researchers.

The committee recommends that the team continues to build on its successful funding efforts. However, scientific questions should be carefully prioritized and the team should make sure that these drive the research forecast. Indeed, there would be a risk in multiplying applied research projects dictated by industrial partners and companies.

It is also recommended that the team develops a database to assemble the multiple data generated (imaging, spectroscopy, functional properties, metadata) and multi-proxy integration methods including artificial intelligence, to better exploit the data generated for raw materials, food and ingredients qualification.

Finally, It is recommended that the team reinforce its collaborations with other teams of the unit. The tools characterizing the variability of raw materials, namely those containing proteins and those developed to characterize techno-functional properties of protein ingredients could advantageously be used to better characterize and/or optimize the techno-functional properties of innovative health-promoting ingredients developed by team 7 (e.g. protein hydrolysates rich in bioactive peptides). Multi-criteria approaches to develop innovative foods/ingredients are required and could be an asset for BioEcoAgro with a significant contribution of team 9 in these developments.



CONDUCT OF THE INTERVIEWS

Dates

Start: 03 octobre 2024 à 09h00

End: C	4 octobre 2024 à 18h00
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Interview conducted: online

INTERVIEW SCHEDULE

October 3, 2024

09h00 - 12h10 09h00 - 09h15 9h15- 10h35	Open sessions Introduction (Hcéres Scientific Advisor) and presentation of the committee The BioEcoAgro unit: presentation, past and future activities (40 min presentation, 40 min discussion
10h50-11h30	Team 1 Functioning and adaptation of the plant in interaction with its environment (20 min
11h30 - 12h10	Team2 Integrated functioning of the soil-plant system and exchanges between the ecosystem and the hydrosphere and atmosphere (20 min presentation + 20 min discussion)
12h10-12h30	Closed meeting of the committee
13h30-15h30	Open sessions
13h30-14h00	Team 3 Management, optimization and design of cropping systems to meet multi-criteria
14h00-14h40 14h40-15h40	Team 4 MOM: Microbial secondary metabolites (20 min presentation + 20 min discussion) Team 5 MOV: Specialized metabolites of plant origin (30 min presentation + 30 min discussion)
15h40-16h00	Closed meeting of the committee
16h15-18h15	Open sessions
16h15-16h45	Team 6 BEB: Biotransformation/Enzymes and Biocatalysis (15 min presentation + 15 min discussion)
16h45-17h25	Team 7 Health benefits of protein hydrolysates and agri-food co-products: production control,
17h25-18h15	Team 8 Food and digestive microbial ecosystems: interactions - dynamics - application(s) (25 min presentation + 25 min discussion)
18h15-18h45	Closed meeting of the committee
October 4	
8h45-9h40	Open session
9h00- 9h40	Team 9 Structure-function relationships for the rational formulation of foods and ingredients (20 min presentation + 20 min discussion)
9h40- 13h00	Restricted sessions
9h40-10h10 10h10-10h40	Discussion of the committee with the scientists (in the absence of the unit's direction) Discussion of the committee with the support personnel (in the absence of the unit's direction)
11h00-11h30	Discussion of the committee with the non-permanent staff (in the absence of the unit's
11h30-12h00	Discussion of the committee with the governing bodies 'in the absence of the unit's direction)
12h00-12h30	Discussion of the committee with the unit's direction
12h30-13h00	Closed meeting of the committee
14h00-17h30	Closed meeting of the committee



PARTICULAR POINT TO BE MENTIONED

The committee's report is based on the data of files vf_bioecoagro-tableau_donnes_caracterisation and HAL+ORBI-production BioEcoAgro 2019-2023, provided by the Unit on September 20, 2024 after two rounds of corrections, since errors and discrepancies with the self-evaluation document had been detected by the expert committee.



GENERAL OBSERVATIONS OF THE SUPERVISORS





Direction générale déléguée Recherche et valorisation Les vice-présidents recherche de l'Université de Lille

à

HCERES - Département d'Evaluation de la Recherche

Lille, 27/02/2025

Objet : Courrier d'observation de portée générale Université Lille DER-PUR260025116 - UMR Transfrontalière BioEcoAgro

Direction générale déléguée Recherche et valorisation Direction d'Appui à la Recherche

Affaire suivie par :

Directeur jean-francois.delcroix@univ-lille.fr dar-structurespartenariats@univlille.fr

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Chère, Cher collègue

L'université de Lille tient tout d'abord à remercier le comité de visite HCERES pour l'attention qu'il a portée au travail mené par l'unité BioEcoAgro - UMR 1158 et pour la qualité de l'évaluation qu'il a produite.

La visite du Comité a été l'occasion, pour les membres de l'Unité de Recherche et pour l'Université, d'approfondir certaines questions et de répondre aux interrogations des experts, dans un esprit constructif dont il faut se féliciter.

Les recommandations émises dans le rapport d'évaluation seront précieuses pour l'unité pour le déploiement de son projet lors du prochain contrat.

Vous trouverez ci-joint un relevé des erreurs factuelles à corriger en vue du rapport définitif.

Nous vous prions de croire, chère collègue, cher collègue, à l'expression de notre considération distinguée.

Pour le Président et par délégation, Les Vice-Présidents Recherche de l'Université de Lille

Sandrine Chassagnard

Olivier Colot

General comment HCERES Evaluation BioEcoAgro

Generally speaking, the UMRt management board and the team leaders are very satisfied with the report drawn up by the HCERES evaluation committee. A procedure is being developed within the Unit to make the best use of the various comments and suggestions from evaluators. This first five-year period (2019-2023) allowed us to lay the foundations for the construction of an ambitious structure but made more complex by its cross-border nature and the very different organizations of research between France and Belgium. These differences are the basis of a certain number of remarks which appear in the report. As it was not always possible to explain them in detail given the size of the Unit and the duration of the evaluation, we would like to recall them here:

- The concept of the laboratory council does not exist as such on the Belgian side and its creation initially appeared to us to be inappropriate and above all at odds with other existing structures on the Belgian side. We therefore encouraged close contacts with the different bodies that should have been represented within such a structure and used the Scientific Council or the General Assembly as a decision-making body when necessary. The positive feedback from the various bodies to the HCERES committee demonstrates that this pragmatic view has worked. We are convinced that our mode of operation has met the concern for democratic debate reflected by the establishment of a laboratory council. We understand, however, that this situation is not satisfactory, and we are therefore going to specify a mode of operation which makes it possible to meet this concern for democracy and the constraints present on both sides of the border.
- Linking the opening of the majority of teacher-researcher positions with teaching constraints does not make it possible to have a human resources policy in relation to a scientific strategy. Only the positions allocated to research or the CPJ could be discussed in a more collegial manner.
- The notion of a common budget is also very difficult to conceive of in this type of structure. During the initial discussion with supervisory officials in July 2019, it was proposed by the First Vice Rector of the University of Liège that a specific budget be allocated by the institutions to the UMRt. It could constitute the common pot enabling a more proactive policy to be implemented. We are therefore still asking for this budget.
- Furthermore, the budget of the Belgian part being completely dependent, both for the vast majority of staff and for operations, on responses to calls for projects (the situation is also evolving in this direction on the French side), the diversity of subjects despite a desire to rationalize them risks remaining strongly present in the years to come.
- Finally, but this is already underlined by certain experts, the contractual duration of theses is higher on the Belgian side (from 4 to 6 years depending on the statutes).





A l'attention de

Monsieur le président du comité d'évaluation HCERES de l'UMR transfrontalière BioEcoAgro

Lille, le 24 février 2025

Objet : commentaires d'INRAE sur le dossier d'évaluation de l'Unité mixte de recherche transfrontalière BioEcoAgro

Monsieur le Président,

Les départements AgroEcoSystem et BAP ainsi que le Centre INRAE Hauts-de-France ont pris connaissance du rapport d'évaluation de l'UMRt BioEcoAgro. Nous tenons à vous remercier des éléments de diagnostic posés.

Nous prenons bonne note de l'évaluation globalement positive de l'unité, tant pour ce qui relève de la pertinence de son positionnement thématique (appui à la transition des systèmes agricoles dans un contexte de changement climatique, production de biomolécules d'origine végétale) que de sa production scientifique. Nous notons également l'encouragement à resserrer les questions scientifiques ainsi que la perfectibilité de l'insertion dans le tissu partenarial régional, jugé globalement satisfaisant.

Sur cette base, la tutelle INRAE veillera à l'avenir à (i) la cohérence scientifique globale de l'unité, (ii) son insertion partenariale régionale et l'amélioration de sa contribution au transfert, (iii) la dynamique scientifique associée à la fusion des équipes 2 et 3, y compris s'agissant de l'animation et de l'encadrement doctoral.

Par ailleurs, nous souhaiterions que trois points mineurs soient corrigés :

- page 3 : remplacer Agroécosystèmes par AgroEcoSystem ;
- page 21 : la liste des journaux scientifiques utilisés comme support de production ne mentionne pas les journaux mentionnés page 12 ;
- la charte de communication d'INRAE prévoit que son acronyme soit indiqué en majuscules.

Je vous prie de bien vouloir agréer, Monsieur le Président, l'expression de mes sentiments les meilleurs.

Le Président du Centre INRAE Hauts-de-France

Julien FOSSE

la science pour la vie, l'humain, la terre

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