The PRIMA programme is supported under Horizon 2020 the European Union's Framework Programme for Research and Innovation

SUSTAVIANFEED

ALTERNATIVE ANIMAL FEEDS IN MEDITERRANEAN POULTRY BREEDS TO OBTAIN SUSTAINABLE PRODUCTS

CAPACITY BUILDING AND CONFERENCES ORGANIZATION

DELIVERABLE 5.4

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Partners

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SUSTAvianFEED

PRIMA

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Introduction

1.1 SUSTAvianFEED Project

SUSTAvianFEED-2015 is a four-year project part of the PRIMA programme, supported by the European Union, with a project budget of 2,6 million Euros. SUSTAvianFEED project focuses on the development of sustainable poultry feeds as an alternative in the livestock farming sector. The alternative feed will be more environmentally friendly than the regular sources and will have a close relationship with local agriculture and agri-food sector, while accomplishing with feed safety regulations. In order to develop a sustainable feed, the main proposed approaches will be followed: 1) To use insects as source of protein, 2) To formulate and develop a targeted and sustainable diet considering the product of poultry farming (meat and eggs) and production phase.

1.2 Purpose of this plan

The purpose of "Capacity Building and Conferences Organization" is to enhance the skills, knowledge, and competencies of individuals and organizations through structured training, workshops, and knowledge-sharing events. By organizing conferences, we create platforms for professionals, experts, and stakeholders to exchange ideas, best practices, and innovative solutions to common challenges. This initiative aims to foster a culture of continuous learning and development, empowering participants to effectively address current and future demands within their fields. Through these efforts, we strive to build

stronger, more resilient communities and organizations capable of achieving sustainable growth and excellence.

1.3 Development of this plan

The development of "Capacity Building and Conferences Organization" involves a strategic and multifaceted approach to ensure maximum impact and relevance. Initially, a comprehensive needs assessment is conducted to identify the specific skills gaps and knowledge areas requiring enhancement. Based on these insights, tailored training programs and workshops are designed, leveraging the expertise of seasoned professionals and industry leaders. Concurrently, planning for conferences includes selecting pertinent themes, securing keynote speakers, and curating a diverse array of sessions that address both broad and niche topics. Cutting-edge technologies and innovative formats, such as virtual and hybrid events, are integrated to broaden accessibility and engagement. Additionally, partnerships with educational institutions, professional bodies, and international organizations are established to enhance resource sharing and expand outreach. Continuous evaluation and feedback mechanisms are also embedded to refine and improve the initiatives, ensuring they remain aligned with the evolving needs of participants and stakeholders. Through these deliberate and dynamic efforts, the "Capacity Building and Conferences Organization" initiative evolves to effectively support and empower communities and organizations.

1.4 Context of the methodology

The methodology for "Capacity Building and Conferences Organization" is rooted in a systematic and evidence-based approach designed to maximize learning outcomes and participant engagement. The process begins with a thorough needs assessment, utilizing surveys, focus groups, and stakeholder interviews to pinpoint specific knowledge and skill gaps. This data-driven analysis informs the design of customized training modules and conference agendas that are relevant and impactful.

For capacity building, a blend of instructional methods is employed, including interactive workshops, hands-on training sessions, and e-learning components to cater to various learning styles and preferences. Expert facilitators and trainers are selected based on their subject matter expertise and ability to engage participants effectively.

In organizing conferences, the methodology includes meticulous planning and coordination. This involves selecting themes that address current industry challenges and trends, securing prominent speakers and panelists, and curating a mix of plenary sessions, breakout sessions, and networking opportunities. Advanced logistical planning ensures a seamless event experience, from registration to post-event follow-up.

To enhance accessibility and inclusivity, hybrid and virtual formats are incorporated, allowing broader participation regardless of geographical constraints. Feedback mechanisms, such as post-event surveys and evaluation forms, are integral to the methodology, providing insights for continuous improvement.

Overall, the methodology is iterative and adaptive, ensuring that each capacity-building initiative and conference is tailored to meet the evolving needs of the target audience, fostering a robust learning environment and facilitating meaningful knowledge exchange.

1.5 The key elements

The key elements of the methodology for "Capacity Building and Conferences Organization" are:

1. Needs Assessment:
    a. Identify specific knowledge and skill gaps.
2. Customized Program Design:
    a. Ensure relevance and impact by addressing identified needs.
3. Expert Facilitation:
    a. Focus on effective participant engagement.
4. Diverse Instructional Methods:
    a. Cater to various learning styles and preferences.
5. Feedback Mechanisms:
    a. Use insights for continuous improvement.
6. Partnerships and Collaborations:
    a. Establish alliances with educational institutions, professional bodies, and international organizations.
    b. Enhance resource sharing and expand outreach.
7. Iterative and Adaptive Approach:

a. Ensure alignment with the evolving needs of participants and stakeholders.

These elements collectively ensure a comprehensive and effective methodology for capacity building and conference organization, fostering a robust learning environment and facilitating meaningful knowledge exchange.

UNITO

The University of Turin, under the SUSTAvianFEED project, recently organized a pivotal event to promote circular economy principles in agriculture. This initiative comprised a specialized workshop for 20 small-scale farmers and agricultural entrepreneurs and a broader conference to disseminate the workshop's objectives and outcomes.

The workshop aimed to introduce participants to circular economy concepts and practical applications in agriculture. It covered topics such as resource efficiency, waste reduction, recycling and reuse of agricultural waste, and sustainable inputs. Key sessions included an introduction to circular economy, emphasizing its fundamentals and global examples, and differentiating it from the traditional linear economy. Participants explored techniques for improving resource efficiency and reducing waste, and methods for recycling and reusing agricultural by-products. The workshop also focused on developing innovative business models, identifying opportunities, and creating strategies, as well as fostering collaboration and investment in sustainable technologies. Additionally, strategies for educating consumers and building market demand for sustainable products were discussed.

The conference, titled "Innovations in Sustainable Agriculture: Embracing the Circular Economy," aimed to spread awareness about the workshop. It began with opening remarks introducing the SUSTAvianFEED project and emphasizing the importance of circular economy in agriculture. A detailed presentation explained circular economy concepts and their benefits. Insights into the SUSTAvianFEED project’s vision and achievements were shared, followed by a comprehensive presentation of the workshop structure and objectives.

Testimonials from past participants highlighted the practical benefits they gained. A panel discussion featured experts and policymakers discussing the future of circular economy practices in agriculture. The conference concluded with an interactive Q&A session and provided ample networking opportunities. Dissemination materials such as brochures, flyers, and digital resources were distributed to attendees.

The workshop and conference successfully communicated the importance of circular economy practices in agriculture. Participants gained valuable insights and practical knowledge, empowering them to adopt sustainable practices and develop innovative business models. The SUSTAvianFEED project continues to advance sustainable agriculture by fostering collaboration, innovation, and education.

UNITO - Workshop with small farmers/ future farmers

Workshop Overview: Implementing Circular Economy in Small-Scale Agriculture

Location: University of Turin

Participants: 20 small-scale farmers and young individuals interested in starting agricultural ventures

Framework: SUSTAvianFEED project

1.1 Introduction:

The workshop at the University of Turin, conducted in the framework of SUSTAvianFEED project, aims to introduce 20 small-scale farmers and budding agricultural entrepreneurs to the transformative concept of circular economy. The SUSTAvianFEED project is a forward-thinking initiative dedicated to promoting sustainable practices in agriculture, particularly in the domain of feed production. This workshop represents a unique opportunity for participants to gain in-depth knowledge and practical skills that will enable them to adopt and implement circular economy principles within their agricultural ventures.

1.2 Understanding Circular Economy:

The circular economy is an innovative economic model designed to reduce waste and make the most efficient use of resources. Unlike the traditional linear economy, which operates on a 'take, make, dispose' basis, the

circular economy focuses on maintaining the value of products, materials, and resources in the economy for as long as possible. This is achieved through recycling, reusing, refurbishing, and remanufacturing, creating a closed-loop system that minimizes the need for new raw materials and reduces environmental impact.

In agriculture, the application of circular economy principles can lead to significant benefits, including enhanced sustainability, reduced costs, and increased resilience. By adopting circular practices, farmers can optimize resource use, minimize waste, and create value from agricultural by-products. This not only contributes to environmental sustainability but also strengthens the economic viability of farming operations.

1.3 Implementation in Agriculture:

Implementing a circular economy in agriculture involves several critical strategies and practices:

1. Resource Efficiency:

Efficient use of resources such as water, energy, and raw materials is essential. Techniques like precision farming, which uses data and technology to optimize field-level management, can significantly enhance resource efficiency. Advanced irrigation systems, renewable energy sources, and soil health management practices also play a crucial role in reducing resource consumption and improving productivity.

2. Waste Reduction:

Reducing waste is a fundamental aspect of the circular economy. In agriculture, this can be achieved through better management of inputs, improved storage and handling practices, and the adoption of sustainable farming techniques. For example, crop rotation, intercropping, and integrated pest management can reduce the need for chemical fertilizers and pesticides, thereby minimizing waste and environmental impact.

3. Recycling and Reuse:

Agricultural waste products, such as crop residues, manure, and food by-products, can be recycled and reused to create valuable products. Composting, anaerobic digestion, and bioenergy production are effective methods of converting agricultural waste into resources such as organic fertilizers, biogas, and animal feed. This not only reduces waste but also enhances soil fertility and reduces reliance on synthetic inputs.

4. Sustainable Inputs:

Using renewable and sustainable inputs is critical for maintaining the health of agricultural ecosystems. Organic fertilizers, natural pest control methods, and heirloom seed varieties contribute to soil health, biodiversity, and crop resilience. By integrating these sustainable inputs into their farming practices, farmers can reduce their environmental footprint and improve the long-term sustainability of their operations.

5. Innovative Business Models:

Developing innovative business models that incorporate circular economy principles is key to achieving sustainability in agriculture. Community-supported agriculture (CSA), cooperative farming, and agroecological

farming systems are examples of models that emphasize sustainability, community engagement, and economic viability. These models foster collaboration, resource sharing, and local food systems, creating resilient and sustainable agricultural communities.

1.4 Building a Successful Business Model:

To build a successful business model based on circular economy principles, small farmers need to undertake the following steps:

- Identify Opportunities:

Farmers should conduct a thorough assessment of their current operations to identify areas where circular practices can be implemented. This involves analyzing waste streams, resource use, and production processes to find opportunities for improvement. By identifying these opportunities, farmers can develop targeted strategies to enhance sustainability and efficiency.

- Collaborate:

Collaboration is essential for the successful implementation of circular economy practices. Farmers can work with other stakeholders, including fellow farmers, businesses, research institutions, and government agencies, to share knowledge, resources, and innovations. Such collaborations can lead to the development of cooperative networks that enhance the sustainability and resilience of agricultural systems. For example, farmers can form cooperatives to pool resources for renewable

energy projects or collaborate with researchers to develop new sustainable farming techniques.

- Invest in Innovation:

Investing in research and development of new technologies and practices is crucial for advancing circular economy principles in agriculture. This might involve adopting advanced agricultural technologies, exploring alternative farming methods, or investing in sustainable infrastructure such as renewable energy systems and efficient irrigation technologies. By investing in innovation, farmers can stay ahead of industry trends, improve their operations, and contribute to the overall sustainability of the agricultural sector.

- Educate and Engage:

Educating and engaging their communities about the benefits of circular economy practices is important for building support and creating a market for sustainable products. By raising awareness and promoting sustainable practices, farmers can build stronger relationships with consumers, increase market demand for sustainable products, and foster community support for their initiatives. This can be achieved through outreach programs, community events, and educational campaigns that highlight the benefits of sustainable agriculture.

1.5 Objective:

The primary objective of this workshop is to introduce small farmers to the concept of circular economy and demonstrate how it can be integrated

into their business models. By understanding and adopting circular economy principles, farmers can enhance their sustainability and profitability. This knowledge is crucial for developing resilient agricultural systems that can withstand economic and environmental challenges.

1.6 Added Value:

Participants will gain valuable knowledge about circular economy principles, enabling them to add multiple layers of sustainability to their business models. This added value comes in the form of increased efficiency, reduced costs, and a stronger market position due to their commitment to sustainable practices. Additionally, by adopting circular economy practices, farmers can differentiate their products in the market, attract environmentally conscious consumers, and potentially access new markets and funding opportunities.

The knowledge and skills gained from this workshop will empower participants to implement practical solutions that enhance their operational efficiency. For example, understanding how to recycle agricultural waste into compost or bioenergy can reduce input costs and generate additional revenue streams. Farmers will also learn how to create value-added products from by-products, further increasing their profitability.

1.7 Final Result:

By the end of the workshop, participants will have a solid understanding of circular economy principles and how to apply them within their

agricultural operations. They will be equipped with the knowledge and tools to develop potentially successful business models that incorporate circular economy practices. This will lead to long-term sustainability and resilience in their farming ventures.

The SUSTAvianFEED project, through this workshop, aims to empower small farmers and aspiring agricultural entrepreneurs with the skills and knowledge needed to transition to a circular economy. This approach not only benefits the environment but also enhances the economic viability and sustainability of small-scale agricultural businesses. By fostering innovation, collaboration, and education, the project seeks to create a community of practice that champions sustainable agriculture and contributes to a more resilient and equitable food system.

1.8 Session Breakdown:

1. Introduction to Circular Economy (30 minutes):

This session will provide an in-depth overview of the circular economy concept. Experts will explain the fundamental principles, contrasting it with the traditional linear economy. Participants will learn about the importance of transitioning to a circular economy and its potential impact on sustainability and economic resilience.

Key Topics:

- Definition and principles of the circular economy
- Differences between linear and circular economies
- Global and local examples of circular economy practices

2. Circular Economy in Agriculture (30 minutes):

Participants will explore how circular economy principles can be specifically applied in the agricultural sector. This session will cover various strategies and practices that enhance resource efficiency, reduce waste, and create value from agricultural by-products.

Key Topics:

- Resource efficiency in agriculture
- Waste reduction techniques
- Recycling and reuse of agricultural waste
- Sustainable inputs and farming practices

3. Developing Circular Business Models (60 minutes):

This interactive session will guide participants through the process of developing business models based on circular economy principles. Participants will work in groups to identify opportunities within their own operations and brainstorm innovative solutions.

Key Activities:

- Identifying opportunities for circular practices
- Collaborative brainstorming sessions
- Case studies of successful circular economy business models in agriculture
- Developing a business model canvas

4. Implementation Planning and Next Steps (30 minutes):

The final session will focus on creating action plans for implementing circular economy practices. Participants will develop detailed plans tailored to their operations, setting specific goals and milestones. Experts will provide guidance and feedback to ensure the plans are practical and achievable.

Key Activities:

- Developing action plans
- Setting goals and milestones
- Expert feedback and guidance
- Q&A session

1.9 Conclusions:

The workshop at University of Turin is a step toward promoting circular economy practices in agriculture. It offers small-scale farmers and aspiring entrepreneurs a comprehensive understanding of how to integrate these principles into their operations. By providing valuable knowledge, practical skills, and a supportive network, the workshop aims to foster a community of practice that champions sustainable agriculture. Participants will leave the workshop equipped with the tools and confidence to implement circular economy practices, enhancing the sustainability and profitability of their farming ventures. This will not only benefit their individual operations but also contribute to broader environmental and economic goals, creating a more resilient and sustainable agricultural sector.

The SUSTAvianFEED project, through this workshop and other initiatives, is committed to advancing sustainable agriculture by empowering farmers with the knowledge and resources they need to succeed in a rapidly changing world. By embracing the principles of the circular economy, farmers can build more resilient and prosperous futures for themselves and their communities.

UNITO - Conference on circular economy

Spreading the Word: Communicating the Circular Economy Workshop at the University of Turin through a Conference

The dissemination of information about the Circular Economy Workshop at the University of Turin, organized under the auspices of the SUSTAvianFEED project, was strategically carried out through a dedicated conference. This conference served as a critical platform to engage a broader audience, including small-scale farmers, agricultural entrepreneurs, researchers, policy-makers, and other stakeholders. Here's how the information about the workshop was effectively communicated:

1.1 Conference Overview:

Title: "Innovations in Sustainable Agriculture: Embracing the Circular Economy"

Location: University of Turin, Main Auditorium

Participants: Approximately 150 attendees, including 20 workshop participants, agricultural experts, industry representatives, researchers, and policy-makers

Objectives:

- To introduce the Circular Economy Workshop and its objectives.
- To highlight the importance of circular economy principles in agriculture.
- To provide insights into the SUSTAvianFEED project and its role in promoting sustainable agricultural practices.
- To engage stakeholders in discussions about the future of sustainable agriculture and the potential for circular economy practices.

1. Opening Remarks and Introduction:

The conference began with a welcome to the Department of Veterinary sciences of the University of Turin. Emphasizing the university's commitment to promoting sustainable agricultural practices and introducing the SUSTAvianFEED project. This set the stage for discussing the importance of the upcoming workshop and its relevance to current agricultural challenges.

Key Points:

- Overview of the university's sustainability initiatives.
- Introduction to the SUSTAvianFEED project and its goals.

- Importance of the Circular Economy Workshop for small-scale farmers and aspiring agricultural entrepreneurs.

2. Presentation on Circular Economy Principles:

The UNITO team delivered a comprehensive presentation on the principles of the circular economy. explaining the concept, its significance, and how it contrasts with the traditional linear economy. case studies and examples from around the world were used to illustrate successful implementations of circular economy practices in agriculture.

Key Topics:

- Definition and principles of the circular economy.
- Benefits of adopting circular economy practices in agriculture.
- Case studies and examples of successful implementations.

3. Detailed Overview of the Circular Economy Workshop:

The focal point of the conference was the detailed presentation of the Circular Economy Workshop, highlighting the topics to be covered, the interactive activities planned.

Key Topics:

- Workshop objectives and structure.
- Session breakdown and key topics.
- Interactive activities and expected outcomes.
- Expert speakers and their contributions.

4. Testimonials from Past Participants:

To give the audience a real-world perspective, results from the workshop were shared.

Key Points:

- Personal experiences and testimonials.
- Success stories and implementation of circular economy practices.
- Impact on their farming operations and communities.

5. Panel Discussion: Future of Circular Economy in Agriculture:

A panel discussion featuring agricultural experts, industry representatives, and policy-makers was convened to discuss the future of circular economy practices in agriculture. The panelists shared their insights on the challenges and opportunities, the role of policy and regulation, and the importance of innovation and collaboration.

Key Topics:

- Challenges and opportunities for circular economy in agriculture.
- Role of policy and regulation.
- Importance of innovation and collaboration.
- Future trends and developments.

6. Q&A Session and Interactive Engagement:

The conference concluded with an interactive Q&A session, allowing attendees to ask questions and engage directly with the speakers and panelists. This session provided an opportunity for deeper discussion and clarification on various aspects of the workshop and the circular economy.

Key Points:

- Open floor for questions and discussions.
- Direct engagement with experts and panelists.
- Addressing specific concerns and queries of attendees.

1.2 Networking and Collaboration Opportunities:

The conference also provided ample networking opportunities for participants. Breakout sessions and coffee breaks were strategically placed to encourage interaction and collaboration among attendees. This facilitated the exchange of ideas, experiences, and potential partnerships that could further the adoption of circular economy practices in agriculture.

1.3 Conclusion:

The conference at the University of Turin was a resounding success in spreading the word about the Circular Economy Workshop. By leveraging a comprehensive and engaging program, the conference effectively communicated the importance of circular economy principles and the valuable insights to be gained from the workshop. Attendees left with a

clear understanding of the benefits of adopting sustainable practices and were inspired to participate in the workshop to further enhance their knowledge and skills.

The SUSTAvianFEED project, through this conference and the upcoming workshop, continues to play a pivotal role in advancing sustainable agriculture. By fostering innovation, collaboration, and education, the project is creating a community of practice that champions the principles of the circular economy, contributing to a more resilient and sustainable agricultural sector.

1.4 Strengths, Weaknesses, Lessons Learned and Recommendations

The University of Turin contributed significantly to the project's capacity-building dimension through the organization of a workshop on circular economy principles targeted at small-scale farmers and agricultural entrepreneurs, coupled with a large dissemination conference. The key strength of these initiatives lay in their ability to combine knowledge transfer with direct engagement: participants were not only exposed to innovative concepts but also invited to reflect on their applicability to their own business models. The use of structured tools such as the business model canvas proved particularly effective in guiding participants from theory to practical planning.

However, the activities also revealed some limitations. Participation was restricted to a relatively small group of beneficiaries, which, while enabling close interaction, limited the broader outreach potential. Moreover, the initiatives were largely stand-alone events, with no

structured system of follow-up to assess whether participants effectively applied the circular economy principles in their farming operations.

From these experiences, an important lesson emerges: the combination of practical training and broader dissemination is a powerful driver of impact, but it needs to be sustained over time. Participants require ongoing support, whether in the form of mentoring, peer-to-peer exchanges, or online communities, to consolidate their learning and translate knowledge into practice.

Recommendation: UNITO should build on its strong methodological foundation by complementing workshops and conferences with structured follow-up mechanisms. Partnerships with farmers' associations, cooperatives, and local institutions could help expand participation and ensure that the knowledge gained translates into visible, measurable adoption of sustainable practices.

ALIA

The conference, held in Lorca, Murcia, Spain, was a pivotal gathering aimed at fostering knowledge exchange and collaboration among key stakeholders in the agricultural sector. It brought together 36 participants, including farmers, policymakers, academics, and organizations dedicated to biodiversity conservation. The event provided a platform to discuss pressing issues related to sustainable diets in agriculture, emerging trends and opportunities within the European context, and the innovative approach of the SUSTAvianFEED project.

The conference began with opening remarks from ALIA, which welcomed attendees and outlined the event's objectives. Representatives from various institutions and organizations, including the Technical University of Cartagena, the University of Murcia, and governmental bodies such as the Directorate General for Agriculture, Livestock, and Fishery Production of the Region of Murcia, shared their perspectives. These introductory remarks established a foundation for discussions, offering insights from industry, academia, and public administration on the necessity of sustainable farming practices.

A central component of the conference was the presentation on the SUSTAvianFEED approach. This session provided a detailed overview of the project's objectives, methodologies, and activities. Attendees gained a comprehensive understanding of the initiative's efforts to develop and implement alternative animal feed solutions that promote sustainability without compromising the quality and efficiency of livestock production. The presentation also highlighted the role of ALIA as the project coordinator, emphasizing the significance of managing a multi-organization consortium spanning four Mediterranean countries. The discussion underscored the

importance of effective collaboration in ensuring the project's success and achieving meaningful impact.

One of the most engaging segments of the conference was the presentation of the Spanish pilot study, conducted by the University of Murcia in collaboration with ALIA. This study examined the impact of different dietary formulations on poultry production, comparing a traditional diet with two alternative diets—one incorporating alternative ingredients and another including both alternative ingredients and insect-based components. The presentation detailed the findings of the study, covering aspects such as environmental sustainability, product quality, animal growth performance, and overall welfare. The results provided valuable insights into the feasibility of adopting alternative feeds in real-world farming scenarios.

Beyond the structured presentations, a significant portion of the conference was dedicated to networking and collaboration. The informal lunch session facilitated discussions among participants, allowing them to share ideas, experiences, and potential opportunities for cooperation. This interactive segment of the event enabled stakeholders from various backgrounds to explore synergies and identify ways to advance sustainable agricultural practices collectively.

In addition to the conference, ALIA organized a specialized workshop for smallholders in the Region of Murcia, reinforcing its commitment to capacity-building in sustainable farming. Held at ALIA's facilities in Lorca, the workshop convened 35 local farmers to explore practical solutions for enhancing sustainability through alternative diets. Recognizing that smallholders play a crucial role in local food production and environmental stewardship, the workshop aimed to equip them with the knowledge and tools needed to transition towards more sustainable practices.

The workshop began with an overview of the SUSTAvianFEED project, ensuring that all participants had a clear understanding of its objectives and relevance to their work. Following this, an in-depth session on the circular economy in agriculture examined strategies for resource efficiency, including water and energy reuse and the potential repurposing of by-products across different industries. The discussion focused on how smallholders can integrate circular economy principles into their farming operations to enhance sustainability and reduce costs.

A key highlight of the workshop was the discussion on alternative animal feed formulations. The session explored how different dietary strategies can contribute to environmental sustainability while maintaining or even improving livestock performance. By reducing dependence on imported feed ingredients and incorporating locally available alternatives, farmers can lower their carbon footprint and strengthen the resilience of their production systems. The workshop also emphasized the importance of quality control in these alternative diets to ensure consistency and nutritional adequacy.

To support smallholders in differentiating their products in the market, the workshop introduced the SUSTAvianFEED eco-labeling initiative. This initiative aims to provide farmers with a competitive edge by certifying their products as environmentally sustainable. The eco-label is designed to enhance consumer awareness and preference for sustainably produced livestock products, thereby offering an economic incentive for farmers to adopt alternative feeding strategies.

The final session of the workshop featured an interactive Q&A segment, where participants engaged in discussions with experts and peers, addressing concerns and seeking practical advice on implementing sustainable practices. The open

dialogue fostered a sense of community among the attendees, encouraging them to share their experiences and support one another in their transition towards more sustainable farming methods.

Both the conference and the workshop highlighted the growing importance of sustainability in the agricultural sector. The discussions underscored the necessity of adopting alternative diets, not only as a means to enhance environmental sustainability but also as a strategy to improve economic viability and comply with evolving regulatory frameworks. Participants expressed a strong interest in integrating these practices into their operations, recognizing the potential for increased market differentiation and long-term resilience.

Through initiatives like SUSTAvianFEED, ALIA continues to play a crucial role in advancing sustainable agriculture by equipping farmers, researchers, and policymakers with the knowledge and tools needed for a successful transition. By fostering collaboration, knowledge exchange, and practical implementation of innovative feeding strategies, the project is contributing to the development of a more sustainable and resilient agricultural sector in the Mediterranean region.

ALIA - Conference on circular economy

The national conference jointly developed by ALIA and the University of Murcia was an inspiring event developed in Lorca in which relevant agents took place and participated.

1.5 Conference Overview:

Title: "SUSTAvianFEED. Dissemination of results conference"

Location: Municipality of Lorca (Region of Murcia, Spain). It was organized in the facilities of CECLOR-Confederación Comarcal de Organizaciones Empresariales de Lorca

Participants: 36 attendees from the animal feeding sector, farmers, academia, policy makers and organizations for the preservation of biodiversity and local species.

Speakers:

- Juan Carlos Segura Ruiz. ALIA R&D manager.
- Manuel Moreno Nicolás. EuroVértice. R&D. Department and external support for ALIA within the project.

- Silvia Martínez Miró. University of Murcia. Faculty of Veterniary. Department of animal production.
- Josefa Madrid Sánchez. University of Murcia. Faculty of Veterniary. Department of animal production.
- Eva Armero. Technical University of Cartagena and board member of the Friends of the Murcian Hen Association (AGAMUR).
- Representative of Directorate General for Agriculture, Livestock and Fishery Production of the Region of Murcia. Subdirectorate General for Sustainable Livestock Production
- Respresentative of the Association of Origin of El Chato Murciano.

Conference main topics:

- The importance of sustainable diets in the agri-food sector.
- Trends in Europe and opportunities.
- The SUSTAvianFEED approach.

Opening Remarks and Introduction:

The conference began with a welcome from ALIA to all the attendees, contextualizing the event and presenting the main principles of sustainable feeding and SUSTAvianFEED project.

Then, ALIA gave the floor to representatives from Technical University of Cartagena and board member of the Friends of the Murcian Hen Association (AGAMUR), the Representative of Directorate General for Agriculture, Livestock and Fishery Production of the Region of Murcia. Subdirectorate General for Sustainable Livestock Production, the Respresentative of the Association of Origin of El Chato Murciano and the University of Murcia.

Each of them gave their point of view, opinion, and insights for a sustainable farming system, establishing the principles from the industry, academia, and association movement.

Presentation about SUSTAvianFEED approach:

After the first round of interventions, it was the time to go into detail in the project objectives and activities developed, for which a presentation explaining the whole project implementation was made. After it, participants had a clear idea of the project methodologies, results obtained and efforts made by partners.

In addition, the role of ALIA as project coordinator was highlighted, due to the importance not only in the efforts made from a technical perspective, but also from managing a consortium of 8 organizations from 4 Mediterranean countries, and preserving the good relationships and coordination of the team.

Presentation of Spanish pilot

Finally, a presentation of the Spanish pilot (UMU & ALIA) was done by the University of Murcia. During the presentation, the whole process was explained, from the diet formulation to the analysis of the results. The results explained covered the environmental evaluation, quality of the products, performance of the growing rates of the hens, or animal welfare, among other parameters. All the results were explained by considering the differences from the use of the three different types of diets: 1) control one (traditional diet), 2) alternative diet 1 (with the inclusion of alternative ingredients) and 3) alternative diet 2 (with the inclusion of alternative ingredients and insects).

1.6 Networking and Collaboration Opportunities:

The conference also provided ample networking opportunities for participants. After the event, an informal lunch was provided by ALIA to the participants. During these two hours, discussions continued and many synergies and possibilities for potential cooperation emerged.

1.7 Session breakdown:

5. Welcome by ALIA (10 mins)
6. First round of interventions (25 mins)
7. Presentation about SUSTAvianFEED approach (15 mins)
8. Presentation of Spanish pilot (30mins)
9. Conclusions (10 mins)
10. Networking (2h)


SUSTAVianFEED


Alimentación
Somos
Comarca,
Hacemos
Región.


Somos
Comarca.
Hacemos
Región.
SUSTAvianFEED
ceclor
neral 2024
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2024
ceclor


CONVENIO MARCO DE
COLABORACIÓN
INFO-CECLOR

	PROYECTO SUSTAvianFEED Jornada de Difusión de resultados			
	NOMBRE(S)	Invitación enviada	CONFIRMADA ASISTENCIA	Check
1	Silvia Martínez Miró	S	S	
2	Josefa Madrid Sánchez	S	S	
3	Ana Montalbán	S	S	
4	Fuensanta Hernández Ruipérez	S	S	
5	Cristian Jesús Sánchez Parra	S	S	
6	Lucía Ayala ~~López~~ García	S	S	
7	Eduardo Ruiz Herrero	S	S	
8	Antonio J. Vidal Gómez	S	S	
9	Lourdes M. Ibarra Miñarro	S	S	
10	Pedro López	S	S	
11	Salvador Navarro	S	S	
12	Martín Ros Olivares	S	S	
13	Jose Romera	S	S	
14	Agustín Mulero	S	S	
15	Ginés Rubio Reverte	S	S	
16	Antonio Rosique	S	S	
17	Ana Ballesta	S	S	
18	Maite ~~Martínez~~ Terrones	S	S	
19	Rocío Márquez	S	S	
20	Juan Carlos Segura	S	S	
21	Manuel Moreno	S	S	
22	Josmary	S	S	
23	Lahila de Sola	S	S	
24	José Ángel Ayala	S	S	
25	Irene Azorín	S	S	
26	Miguel José	S	S	
27	Eva Armero Ibáñez	S	S	
28	José Antonio Peñalver	S	S	
29	Ramón Quiñonero Bravo	S	S	
30	Salvador Escobar Sánchez	S	S	
31	Agustín Fernandez	S	S	
32	Conchi López	S	S	
33	Natalia López Palazón	S	S	
34	Diego Parra Parra	S	S	
35	Manolo Molina Reinaldos	S	S	
36	Juan Rodríguez Correas	S	S	
37	José Reverte	S	S	
38	Pepe Montanel	S	S	
39	Frutos Pérez Vilar	S	S	
40	Belinda Martín	S	S	

ALIA - Workshop with smallholders from the Region of Murcia

Workshop Overview: How to improve sustainability in the farming sector through alternative diets.

Location: ALIA's facilities. Lorca, Murcia, Spain.

Participants: 35 smallholders from Lorca.

Session Breakdown:

1. Presentation of SUSTAvianFEED general approach (10 mins)

During the first part of the meeting, the whole approach of SUSTAvianFEED was presented, in order to give context to participants, even though many attendees already knew the project.

2. Circular Economy in the farming sector (30 minutes):

During this session, three main aspects were explained:

- The opportunities of circular economy along the supply chain: fertilizers, water and energy reuse, by-products generated potential uses in other industries and activity sectors.
- Circular economy opportunities for the sustainability of animal feed. In this sense, the different diets elaborated in the project were explained and how the quality of the diets was preserved while reducing imported ingredients and the environmental sustainability.
- Co-creation methodology for the elaboration of the diets. This included the participatory activities in the LL methodology and the LCA methodology, as two key aspects to be able to elaborate a diet.

3. The eco-label (15 minutes):

Finally, SUSTAvianFEED eco-label was presented as a way to differentiate products and add them value to the traditional ones so they are an opportunity from the economic perspective.

4. Q&A (15 minutes):

Conclusions

ALIA's workshop advances circular economy practices in the farming sector by doting smallholders with the knowledge and skills to integrate these principles into their operations. The program fosters a supportive community that champions sustainable farming, enhancing both sustainability and profitability. Participants of the capacity building activity have acquired the tools and confidence to implement circular practices, benefiting their operations and contributing to broader environmental and economic goals. The SUSTAvianFEED project supports sustainable agriculture through this and other initiatives, empowering farmers to thrive in a changing world and build resilient, prosperous futures.

The interest showed by smallholders in project approach and the inclusion of alternative diets resides in two pillars:

- The volunteer to move towards more sustainable practices, and to differentiate products in a sector in which to gain added value is vital.
- To anticipate the legislation changes and the requirements of improving the sustainability and reduce imported ingredients. With approach such as SUSTAvianFEED, this will give smallholders a god position for the coming years.

Strengths, Weaknesses, Lessons Learned and Recommendations

As project coordinator and a key implementing partner, ALIA has been able to leverage its close relationship with the farming sector in Murcia to deliver highly

relevant activities. Its main strengths have been its role as a bridge between scientific research and practical application, and its efforts to introduce market-oriented tools such as the SUSTAvianFEED eco-label. These efforts provided tangible incentives for farmers, linking sustainability not only to environmental benefits but also to economic opportunities through market differentiation.

At the same time, ALIA faced some challenges. A recurring issue was the strong dependence on regulatory frameworks that are still under development. Farmers expressed concern about the future policy environment, particularly regarding the use of alternative feeds such as insects. In addition, while the eco-label was enthusiastically received, its effective adoption requires stronger dissemination efforts and alignment with consumer preferences.

The lesson learned is that farmers are highly motivated to adopt sustainable practices if these practices are linked to concrete economic benefits and if they feel adequately supported in navigating regulatory and market uncertainties. The participatory approach adopted by ALIA – which included lively Q&A sessions and informal networking opportunities – demonstrated that acceptance of new practices grows when farmers are given the chance to voice concerns and co-create solutions.

Recommendation: ALIA should consolidate the eco-label initiative by developing robust communication strategies targeting consumers and distributors, while also producing practical toolkits for farmers to facilitate the implementation of sustainable diets. Close dialogue with policymakers is also recommended to anticipate regulatory developments and provide farmers with clear guidance.

UMU

The document details several conferences and workshops held at the University of Murcia (UMU) focused on sustainable practices in animal production, particularly in poultry farming. These events were organized under the framework of the SUSTAvianFEED project, which explores alternative and sustainable feed ingredients such as plant-based proteins and Hermetia illucens larvae to reduce reliance on traditional crops and decrease environmental impact.

One major conference centered around Sustainable Development Goal (SDG) 2: Zero Hunger, bringing together veterinarians, professionals, and students to discuss innovative solutions in food security and sustainable agriculture. It highlighted the project's potential to enhance agricultural productivity, promote circular economy models, and optimize feed conversion efficiency while reducing environmental harm.

Additional conferences targeted high school and technical education students, engaging them in discussions about sustainable poultry production and the importance of environmentally responsible farming. These sessions aimed to inspire younger generations and promote critical thinking on sustainable agricultural innovations.

Veterinary students also attended a presentation at the II Congress of Veterinary Students, where they learned about the global and national trends in sustainable animal production. The discussion focused on bridging the gap between academic knowledge and real-world applications by examining innovative feeding strategies and the circular economy's role in modern livestock farming.

A workshop with newly hired veterinary professionals emphasized SDG 12: Responsible Consumption and Production, educating participants on efficient resource use, waste reduction, and alternative feed sources. This session included a theoretical presentation, a debate, and a Q&A, where attendees discussed the feasibility, safety, and cultural acceptance of using insect-based feeds. The discussion highlighted food safety measures, legislative aspects, and global trends in sustainable consumption.

Finally, another conference further explored SDG 12, providing a comprehensive overview of SUSTAvianFEED's impact and alignment with the Horizon 2030 goals. Participants examined practical case studies and pilot programs demonstrating the feasibility of replacing conventional feed ingredients with more sustainable alternatives.

Overall, these initiatives reinforced the importance of sustainable innovations in poultry farming, environmental responsibility, and the integration of circular economy principles. They also encouraged cross-sector collaboration, fostering a deeper understanding among academics, students, and professionals about the future of sustainable animal production.

UMU - Conference for veterinarians, professionals, and students on Sustainable Development Goal Nº 2: “Zero Hunger”

Introduction

As part of the Sustainable Development Goal (SDG) 2, "Zero Hunger," celebrated in the Faculty of Biology, we held a talk in order to explore innovative solutions addressing global challenges related to food security, nutrition, and sustainable agriculture. This conference emphasized the importance of promoting sustainable and resilient food systems that not only ensure sufficient and nutritious food for all but also uphold environmental and social sustainability principles.

- Conference Overview: Implementing concepts of SDG number 2 (zero hunger) in professionals of the veterinary sector, scientific community and students at the University of Murcia in general.
- Date: 18th November 2022
- Duration: 1 hour
- Location: Graduation Hall (Assembly Hall) of the Faculty of Biology at the University of Murcia.
- Participants: Around 60 people, including academics, students, and industry professionals.
- Framework: SUSTAvianFEED project

Conference Overview:

As part of the Sustainable Development Goal (SDG) 2, "Zero Hunger," celebrated in the Faculty of Biology, we held a talk in order to explore

innovative solutions addressing global challenges related to food security, nutrition, and sustainable agriculture. This conference emphasized the importance of promoting sustainable and resilient food systems that not only ensure sufficient and nutritious food for all but also uphold environmental and social sustainability principles.

In this context, the SUSTAVianFEED approach was presented as a case study, showcasing its model of using alternative, sustainable ingredients for animal feed, such as alternative plant-based ingredients (sunflower meal, peas and corn DDG´s) and *Hermetia illucens* larvae. This innovative strategy aligns with several core objectives of SDG 2 by tackling issues such as increasing agricultural productivity, enhancing environmental sustainability, and fostering responsible supply chains.

SUSTAVianFEED principles contribute significantly to these goals by reducing dependence on non-renewable resources, utilizing by-products and organic waste as a basis for producing alternative proteins, and promoting a circular economy model that minimizes waste. Also improving agricultural sustainability by decreasing reliance on traditional resources like soy and corn for animal feed; and strengthening food security by optimizing feed conversion efficiency in animals. Moreover, the project drives technological innovation in agriculture through the integration of tools such as Life Cycle Assessment (LCA), continuously evaluating and improving the environmental impact of its practices.

Conclusion:

This talk on SDG 2 highlighted the role of sustainable innovations in transforming global food systems. SUSTAVianFEED project showcased

how alternative and innovative ingredients reduce the reliance on traditional crops, decrease environmental impacts, and promote a circular

economy. By fostering sustainable technologies, responsible models, and cross-sector collaboration, we can build a fairer, more resilient food system that ensures food security and sustainability for current and future generations.


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UMU - Conferences for High School/ Postsecondary Technical Education Students

Introduction

As part of Science Week, two consecutive talks were held in April of both 2023 and the current year 2024 at the IES Ingeniero de la Cierva high school in Murcia. Both presentations were held as part of the school's Cultural Week, an initiative aimed at enriching students' learning experiences by exploring relevant and thought-provoking topics. The events brought together an audience of approximately 100 students in each session, aging 16–17 years in the first one and 20-24 years in the second one (as technical education students) and their teachers, providing an excellent platform for fostering awareness about sustainable agricultural practices.

- Conference Overview: Implementing concepts of sustainability in students at high school.
- Date: April 2023, April 2024
- Duration: 1 hour (each one)
- Location: Graduation Hall (Assembly Hall) of the Highschool IES Ingeniero de la Cierva (Murcia)
- Participants: First conference: around 100 high school students aged 16-17 years. Second conference: around 100 technical education students aged 20-24 years).
- Framework: SUSTAvianFEED project, Cultural Week.

Conferences Overview:

The sessions focused on innovative approaches to poultry production, emphasizing the importance of integrating environmentally friendly solutions into modern farming systems. The SUSTAVianFEED project was introduced, highlighting its objectives, key participants, and the innovative measures implemented to reduce the environmental impact of poultry production. In both events, the students were also introduced to the cutting-edge alternatives to traditional animal feed, which contribute to reducing the environmental footprint of poultry farming and emphasizing the urgent need for more sustainable products and production methods in the poultry industry. By discussing real-life examples and actionable strategies, the talks aimed to demonstrate how the sector can transition to environmentally responsible practices. The presentations also explored the broader implications of adopting sustainable practices, including the preservation of natural resources and the mitigation of environmental challenges posed by conventional agriculture.

Conclusion:

Both talks emphasized to the students the significance of sustainable practices in poultry production and the potential of such innovations to inspire the next generation of environmentally conscious individuals. The activity not only informed the audience but also encouraged critical thinking about the role of science and innovation in addressing current agricultural challenges. The students showed significant interest in the concepts discussed, actively engaging by asking questions about these

new production systems and their practical implications. This enthusiasm underscored the importance of fostering awareness among younger generations about the role of innovation and science in addressing environmental challenges.

Conference nº 1 (April 2023)

Conference nº 2 (April 2024)


Participantes

UMU - Conference for Veterinarian Students: SUSTAVianFEED: A Model of Sustainable Poultry Farming

Introduction

On Saturday, April 29, the SUSTAVianFEED project was presented at the II Congress of Veterinary Students, held at the Faculty of Veterinary Sciences in the University of Murcia. The presentation, titled "SUSTAVianFEED: A Model of Sustainable Poultry Farming", provided attendees with a depth look at the innovative strategies and principles of the project, which aims to reduce the environmental impact of poultry farming through sustainable practices.

- Conference Overview: Implementing concepts of sustainability in students of Veterinary science
- Date: 29th April 2024
- Duration: 1 hour
- Location: Graduation Hall (Assembly Hall) of the Faculty of Veterinary Science at the University of Murcia.
- Participants: Around 20 people, including academics and students
- Framework: SUSTAvianFEED project, II Congress of Veterinary Students

Conference Overview:

This activity, following a prior presentation at a high school in the Region of Murcia earlier that month, demonstrated the project's versatility in

engaging diverse audiences. In the talk, the key aspects of the project were outlined, including its goals, participants, and the implementation of groundbreaking practices.

This talk was carefully designed to provide veterinary students, regardless of their academic year, with a thorough understanding of new practices in the livestock sector, addressing not only developments in Spain but also global trends related to sustainability and the circular economy (having the examples of the rest of the pilots involved, with the differences in legislation and productive tendences). The presentation aimed to bridge the gap between academic knowledge and practical applications by highlighting the innovative approaches currently shaping the future of animal production.

The key aspects of the SUSTAVianFEED project were thoroughly discussed, including its focus on reducing environmental impact and promoting resource efficiency through sustainable practices. Emphasis was placed on the importance of students acquiring a solid foundation in these emerging concepts, ensuring they are well-prepared for the challenges and opportunities they will face in their professional careers. Furthermore, the talk underscored the pivotal role of these new trends in shaping the future of animal production, an area that represents a fundamental pillar within the veterinary profession in Spain. By fostering an awareness of these advancements, the session aimed to inspire students to actively contribute to the ongoing transformation of the livestock sector, ensuring its alignment with sustainability goals and the principles of the circular economy.

Conclusion:

The session highlighted the project's key initiatives and their potential to transform animal production, both in Spain and globally, into a more environmentally responsible and efficient system. The students demonstrated great interest in the project's innovative approach, engaging actively with the concepts and expressing curiosity about how these practices could shape their future professional roles.

UMU - Workshop with newly hired veterinary professionals

Introduction

At the University of Murcia, a series of talks, workshops, and activities are currently being held to raise awareness about a series of goals as part of the 2030 Agenda. These events aim to educate students and the

community on the importance of adopting sustainable practices in daily life. More precisely, the Sustainability Development Goal (SDG) 12, which is the main framework of the activities, focuses on Responsible Consumption and Production, aiming to ensure sustainable consumption and production patterns. This goal addresses the environmental, economic, and social aspects of production and consumption, encouraging countries, businesses, and individuals to reduce waste, use resources efficiently, and promote sustainable lifestyles. Through these educational initiatives, the University of Murcia supports the development of a sustainable mindset among future professionals, fostering the understanding of how small actions contribute to global sustainability. By implementing SDG 12, we can help create a circular economy that not only protects the planet but also ensures a fair and just economy for future generations.

- Workshop Overview: Implementing concepts of SDG number 12 (responsible consumption and production patterns) in professionals of the veterinary sector.
- Location: University of Murcia (Assembly Hall of the veterinary teaching farm at the University of Murcia).
- Date: 3rd November 2024
- Duration: 80 minutes
- Participants: 12 newly hired veterinary professionals and 2 professionals of the sector (totaling 14 people).
- Framework: SUSTAvianFEED project

Workshop organization

The workshop session consisted of two parts. The first, lasting 30 minutes, involved a theoretical presentation of the data. During this segment, the SUSTAvianFEED project was outlined in detail, with each aspect framed within the context of Sustainable Development Goal 12. This introduction clarified how the project aligns with and supports responsible consumption and production practices.

The second part, also approximately 30 minutes, was a Q&A session. In this segment, attendees were encouraged to discuss and raise questions about the topics presented, addressing any doubts and exploring additional issues related to the project and the themes of sustainability in animal production. This interactive portion allowed for deeper engagement and provided participants with the opportunity to clarify concepts, further reinforcing the relevance of SDG 12 in their professional context.

The concept of Sustainable Development Goal 12: responsible consumption and production patterns

Sustainable Development Goal 12, "Responsible Consumption and Production," aims to promote production and consumption patterns that reduce negative impacts on the environment and human health by encouraging efficient use of natural resources and minimizing waste. This goal calls for a fundamental shift in the way we produce and consume goods and services, urging both businesses and consumers to adopt

sustainable practices that contribute to the planet's preservation. SDG 12 acknowledges that economic growth and social well-being cannot be achieved at the expense of the environment; rather, they must be balanced through strategies that reduce the ecological footprint and promote responsible resource use, thereby fostering a circular economy model. Through collaborative actions and inclusive policies, the goal seeks to drive a shift toward more sustainable production and consumption models, aligned with the needs of present and future generations. Key targets within SDG 12 include reducing food waste, minimizing waste generation through prevention and recycling, and promoting sustainable management of natural resources. It also calls for companies to adopt sustainable practices and for governments to develop policies that support sustainable production. Additionally, SDG 12 encourages individuals to make informed choices, highlighting the importance of consumer awareness in driving sustainable change.

Implementation of SDG 12 in the production system and their relevance

The implementation of SDG 12, Responsible Consumption and Production, within production systems is a vital step toward achieving sustainable resource use, reducing environmental impact, and ensuring long-term viability in various industries, including agriculture and food production. In production systems, implementing this trend involves adopting practices that promote resource efficiency, waste minimization, and circular economy principles. In animal production, for example, this might mean prioritizing sustainable sourcing of feed ingredients, reducing

dependence on environmentally intensive resources, and integrating alternative, renewable inputs, such as insect-based or plant-based proteins that nowadays remain underused. The relevance of SDG 12 in production systems also extends to waste management. Through practices like recycling organic waste and utilizing by-products as secondary resources (for example, the substrate administered to the larvae, composed of industrial leftovers of the agricultural market), producers can limit waste outputs and create a system that maximizes the utility of each input. Additionally, promoting responsible consumption—encouraging consumers to choose sustainably produced goods—aligns market demand with sustainable practices, incentivizing producers to adopt eco-friendly methods.

Debate, questions and answers

After the initial presentation and the introduction of all the new concepts, a debate session was organized, which included questions and answers on the topics and concepts covered during the presentation. First, immediately after the main presentation concluded, the speaker posed the following open question to the audience to initiate the Q&A session:

- ***What are your thoughts on the use of alternative ingredients in poultry feed?***

In response to this initial question, the consensus among participants was positive regarding the inclusion of both alternative plant-based ingredients and insects in poultry feed. Some participants individually

expressed that they saw no issue with incorporating these alternative ingredients into the diet of poultry, since these types of birds typically exhibit feeding behaviour that include the consumption of insects in natural environments. The group noted that it is common for hens and chickens, when given free-range access, to ingest insects as part of their natural diet. Consequently, the addition of insects into the diets of both laying hens and broiler chickens was seen not only as a logical progression but also as something that aligns with the birds' natural feeding habits. Participants generally agreed that this practice would not negatively impact consumer perception or acceptance of the final product, as it simply replicates natural behaviour in a controlled feed environment, and therefore, it did not raise any concerns of rejection.

The questions raised by the participants following the first main question were as follows:

- ***Is the use of insects in animal feed truly sustainable?*** *(This question was done after the explanation of the life cycle of Hermetia illucens)*

This question is particularly interesting, as it highlights some participants' interest in understanding whether cultivating larvae or other insects for poultry feed is truly safe. Previous studies in animal health have led them to infer that the way insects are fed could be a significant source of contaminants, posing a potential chemical and/or biological risk. It was explained to the participants that, although comprehensive research is ongoing, in the case of our project, the *Hermetia illucens* larva underwent strict food safety controls, both in the breeding substrate and in the subsequent heat treatment for drying. These measures ensured that the

risk to the animals was minimal. Nonetheless, the importance of continued research in this area was emphasized, as the inclusion of these novel ingredients and their legislative approval require thorough consideration of food safety concerns.

- ***Are there any religions that prohibit the consumption of insects by animals?***

It was concluded that there is no widespread prohibition in major religions explicitly forbidding the feeding of animals with insects if those animals are later to be consumed by humans. While some religions and traditions establish dietary guidelines that may indirectly influence the use of certain feeds for animals, the major religions do not have direct prohibitions on feeding insects to animals intended for consumption. However, in some cultural practices or personal traditions, there may be a preference for specific feeding practices that avoid foods perceived as impure.

- ***Will European trends in sustainable and responsible consumption be applied worldwide in the future?*** *(In relation to SDG 12 and all the SDG in general, in the framework of Horizon 2030)*

The question was considered both complex and highly relevant. As Europe has been at the forefront of environmental policies and sustainability initiatives, its practices and regulatory frameworks serve as models that may be followed by other regions. However, the global application of these new trends depends on various factors, including economic viability, cultural acceptance, and policy adaptation. Developing countries, for

example, may face challenges in adopting this trend due to resource limitations or different priorities. However, as awareness of climate change and environmental degradation are growing worldwide, elements of Europe's sustainable consumption practices will influence global markets, leading to a gradual alignment with sustainable production and consumption standards, supported by international agreements and environmental policies. The continued collaboration between nations and the development of globally relevant frameworks will play a crucial role in determining the extension of this transition.

- ***How was it determined that alternative ingredients, such as insects, are suitable and safe for poultry consumption? Are there previous studies supporting this?***

To determine the suitability and safety of this kind of alternative ingredients involves rigorous process supported by scientific research and trials performed worldwide. Studies examining new ingredients like insects have investigated (and continue doing so) many parameters to assess not only their nutritional value, but also their digestibility, and safety when incorporated into livestock feeds. These studies generally involve laboratory analysis to ensure all these questions. Of course, safety assessment is crucial and critical, focused on the potential for contaminants or pathogens, however, research has shown that insects can be a safe protein source as protocols are established to minimize risks from this kind of pathogens or substances.

Moreover, field trials (as those performed in this project) are conducted to observe poultry performance, health indicators, and product quality

(like egg and meat characteristics), providing practical evidence of these alternative ingredient's effectiveness. Numerous studies from many research institutions support the use of specific insect species in animal feed, providing a foundation for regulatory bodies to evaluate and approve these ingredients. This growing body of evidence underscores the potential of insects as a viable and sustainable feed source in modern poultry production.

- ***What measures are taken to ensure that new ingredients do not introduce contaminants or pathogenic microorganisms into the poultry production system?***

To ensure that new ingredients don´t introduce contaminants or pathogenic microorganisms into the poultry production system, safety protocols and quality control measures are implemented throughout the production and processing phases. For insects as a supplement (in the case of this project), these controls begin with the breeding substrate, which is strictly monitored to prevent exposure to potential contaminants or pathogenic microorganisms. Only substrates that meet regulatory standards are used and carefully selected to avoid introducing foreign pathogens. During processing, insects also receive treatments such as sterilization or pasteurization, which are designed to eliminate microbial risks and deactivate potential pathogens. Additionally, frequent laboratory testing is conducted to screen contaminants, including heavy metals, pesticides, mycotoxins, and antibiotic residues, ensuring that the final feed ingredient is safe for poultry consumption.

It has been observed that the use of alternative plant-based ingredients has not raised as many questions or garnered as much interest, likely because, although their use is limited, it is already somewhat familiar. These ingredients are generally attributed with similar characteristics to conventional poultry feed ingredients, making them less controversial. Participants seemed to view plant-based alternatives as a natural extension of existing feed formulations, given their compatibility with standard nutritional requirements and their established history within the industry. As a result, discussions around plant-based ingredients were less focused on safety and sustainability concerns and more on their availability and cost-effectiveness in large-scale production.

Objective

The primary objective of this workshop is to raise awareness and equip professionals in the agri-food sector with the knowledge needed to implement sustainable practices in animal production, in alignment with Sustainable Development Goal 12: Responsible Consumption and Production. This event is designed to explore how professionals of the veterinary sector can integrate production models that would face in their career that minimize environmental impact and promote efficient resource use, fostering sustainability throughout the value chain. Through the main presentations and the subsequent debate, the workshop will provide the participants with a comprehensive overview of the potential of alternative ingredients, such as plant-based and insect proteins, in poultry feed, addressing both their benefits in terms of

sustainability and the challenges related to food safety and acceptance. By the end of the event, we expect attendees will have gained some understanding of the relevance and applicability of these principles to their own professional practices.

Results

The workshop yielded valuable insights and positive response among the participants. The principal key outcomes included a strong consensus on the acceptance of insect-based and alternative plant-based ingredients in poultry feed, reflecting a positive view to sustainable practices that align with natural feeding behaviours of the animals. Participants left with an enhanced understanding of SDG 12's application within the production system regarding the poultry sector, and a reinforced commitment to advancing sustainable, responsible practices in line with evolving consumer and regulatory expectations.

Conclusions

As part of the University of Murcia's commitment to advancing the Sustainable Development Goals (SDGs) of the 2030 Agenda, this workshop marked an important step in preparing new veterinary professionals to adopt sustainable practices within animal production. Focused on Sustainable Development Goal 12, Responsible Consumption and Production, the workshop highlighted innovative approaches to reduce the environmental impact of poultry feed by introducing participants to

the European project SUSTAvianFEED. Through both theoretical and practical debating sessions, participants gained experience with these alternative diets, examining their potential to improve the sustainability of poultry production while maintaining high standards of nutritional and sensory quality in products like eggs and meat. Additionally, the workshop underscored the need for veterinary professionals to engage with the principles of a circular economy and sustainability, while also understanding the relevant legislative frameworks that they will face in their work. By familiarizing professionals with these aspects, the session provided insights into evolving industry standards and expectations.


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SUSTAvianFEED
Alternative animal feeds in Mediterranean poultry breeds to obtain sustainable products
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UMU - Conference for veterinarians, professionals, and students on Sustainable Development Goal No. 12: Responsible Consumption and Production

Introduction

This conference served as a platform to underscore the foundational values of the SUSTAvianFEED project, providing an in-depth overview of its scientific basis, objectives, and the significant results achieved so far. Attendees had the opportunity to explore how SUSTAvianFEED aligns with the Horizon 2030 goals, particularly in advancing SDG 12. This alignment showcases the project as a pioneering effort in sustainable practices, encouraging a shift towards more responsible production processes within the animal industry. Through these discussions, the conference succeeded in fostering a deeper understanding of SUSTAVianFEED potential impact, building moments for further understanding across the academic, professional, and the student communities.

- Conference Overview: Implementing concepts of SDG number 12 (responsible consumption and production patterns) in professionals of the veterinary sector, scientific community and students at the University of Murcia in general.
- Date: 5 November 2024
- Duration: 20 min
- Location: Graduation Hall (Assembly Hall) of the Faculty of Veterinary Science at the University of Murcia.

- Participants: Around 20 people, including academics, students, and industry professionals.
- Framework: SUSTAvianFEED project

Conference Overview:

This conference provided a comprehensive overview of the SUSTavianFEED project, highlighting its principles and their integration into society to foster more sustainable practices in poultry production. The discussions centered on fundamental concepts of circular economy, the utilization of alternative ingredients such as underutilized raw materials, by-products and co-products, and insects as an innovative way to reduce the reliance of imported ingredients and reduce the environmental impact derived from the poultry feed-manufacturer industry. In addition to theoretical discussions, the conference emphasized practical applications of these principles. For example, it showcased specific pilot programs where innovative, sustainable feed ingredients replaced conventional components, particularly focusing on diets developed for the Spanish program. These examples demonstrated measurable improvements in environmental performance, offering evidence of how the project's criteria can positively influence the sustainability of poultry feed.

Conclusion:

By combining in-depth discussions with real-world applications, the conference equipped participants with a clear understanding of how

adopting these sustainable practices can contribute to a more environmentally responsible poultry industry. It underscored the potential of projects like SUSTAvianFEED to advance global efforts toward a greener future.


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Strengths, Weaknesses, Lessons Learned and Recommendations

The University of Murcia implemented one of the broadest and most diverse sets of activities within the consortium. Its initiatives ranged from high school outreach to advanced workshops with veterinarians, always framed within the Sustainable Development Goals (SDG 2 “Zero Hunger” and SDG 12 “Responsible Consumption and Production”). This multi-layered approach is one of UMU’s greatest strengths, as it ensured that the project’s messages reached different levels of society: students, young professionals, academics, and practitioners.

Nevertheless, some weaknesses emerged. Certain events attracted relatively small audiences, reducing their impact in terms of scale. Additionally, several activities were perceived as highly academic, focusing more on theoretical

frameworks and scientific insights than on practical tools for immediate application. Discussions around the cultural and religious acceptability of insect-based feeds highlighted the importance of addressing non-technical barriers to adoption, which, if left unaddressed, may slow down the mainstreaming of sustainable practices.

UMU's activities yielded several lessons. Firstly, young people represent an important vehicle for the long-term dissemination of innovation, as they will shape the farming practices of the future. Secondly, workshops that included debate and open discussion were the most successful in stimulating engagement, showing that active participation is a key condition for impact.

Recommendation: UMU should reinforce the practical dimension of its workshops by integrating case studies, simulations, and concrete examples of adoption. In addition, future initiatives should include structured discussions on cultural and regulatory issues, thereby equipping participants not only with technical knowledge but also with the tools to address societal and policy-related challenges.

ISA-CM and RAYHANA

The document describes a conference and a series of training sessions organized by ISA-CM and RAYHANA as part of the SUSTAvianFEED project, with a focus on sustainable poultry farming through the use of insect-based feed alternatives.

The conference took place on November 17, 2023, bringing together over 70 participants, including academicians, researchers, students, entrepreneurs, feed manufacturers, poultry farmers, and policymakers. The discussions centered on the role of insects in poultry diets, highlighting their nutritional benefits, sustainability potential, and the challenges of integrating them into existing farming systems. Keynote speakers from ALIA, UNITO, and ENTOMO presented research and insights into the use of Black Soldier Fly larvae as an alternative protein source for poultry feed. They discussed the nutritional composition of insect-based feed, its impact on poultry welfare, and the advancements in insect farming techniques that could make the process more efficient and scalable. The conference sessions were interactive, allowing participants to engage with experts and ask questions about the feasibility, regulatory considerations, and market acceptance of insect farming as a sustainable feed solution.

Following the conference, RAYHANA conducted a series of training sessions aimed at supporting farmers, particularly women, by providing them with practical skills and knowledge to implement sustainable farming practices. These training sessions included technical field training that covered essential topics such as pilot maintenance, disease management, breeding processes, and the environmental impact of poultry farming. The program benefited 122 farmers directly, with an estimated reach of 2,000 people, including local communities, private enterprises, and civil society organizations. Additional training focused on

gender equity and aimed to raise awareness about the importance of integrating gender equality into agricultural work. This session provided both theoretical and practical knowledge to encourage more inclusive participation of women in farming.

Further training sessions addressed the commercialization of poultry products and the integration of circular economy principles into farming practices. Conducted in February 2024, these sessions helped farmers develop effective strategies for marketing Fayoumi chickens while promoting sustainable production methods. Another critical component of the capacity-building initiative was the training on larvae production. Conducted in December 2022 and September 2023, in collaboration with ENTOMO, this training introduced farmers to the methods and benefits of insect farming. The sessions covered all phases of larvae production, from breeding to feed formulation, and included a hands-on workshop for constructing pilot production models. A comprehensive guide was developed as a resource for farmers to replicate the process and expand their knowledge.

The initiatives outlined in the document reflect a strong commitment to promoting sustainability in the agricultural sector through research, education, and hands-on training. By integrating alternative feed solutions, empowering farmers with innovative techniques, and fostering gender inclusivity, the SUSTAvianFEED project is contributing to a more resilient and sustainable poultry farming system. The combination of expert-led conferences and field training ensures that farmers are well-equipped to adopt new practices that enhance productivity while addressing environmental challenges.

ISA-CM and RAYHANA - Conference Overview:

With increasing concerns about the production and supply of protein for the poultry sector, ISA-CM organized on November 17, 2023 a conference which focused on discussing the benefits, challenges, and future perspectives of incorporating insects into poultry diets. The conference was open to academicians, researchers, students in animal management and production program, future startuppers, feed manufacturers, poultry farmers, policy makers and other actors from the agricultural sector. More than 70 peoples were in attendance.

Pr. Madiha HADJ AYED, coordinator of ISA-CM pilot, opened the conference. The keynote speakers were:

- Mr. Manual Moreno Nicolás, from ALIA, Coordinator of the SUSTAvianFEED project
- Pr. Achille Schiavone, Coordinator of UNITO pilot
- Dr. Valentina Bongiorno, member of UNITO pilot team
- Mr. Juan Cortés, representative of ENTOMO

Objectives:

The objectives of the conference were:

- To give insights into the SUSTAvianFEED project and its commitment to promote sustainable agricultural practices.

- To demonstrate innovative poultry farming systems by the inclusion of sustainable feed resources.

- To spotlight on the role of insects in avian nutrition to improve animal health and welfare.

- To share knowledge about innovative practices for insects farming which aligns with circular economy principles.
- To foster constructive interactions with stakeholders from agricultural sector.

Opening and Introduction:

The conference sessions started with welcoming the attendees and introducing the project partners and members to the audience by Pr. Madiha HADJ AYED, coordinator of ISA-CM pilot.

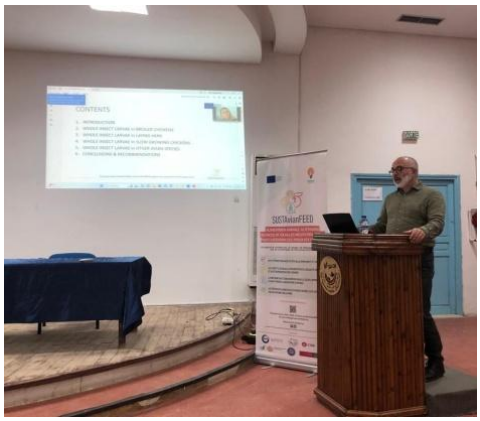
Presentation of the project

A comprehensive overview of the SUSTAvianFEED project was provided by Mr. Manuel Moreno Nicolás from ALIA, Coordinator of SUSTAvianFEED project. Mr. Moreno highlighted the project's significance, objectives, and anticipated impact and emphasized that the SUSTAvianFEED project is a pioneering initiative led by a multidisciplinary consortium of partners from different Mediterranean regions, aiming to

revolutionize sustainable agricultural practices in poultry farming.

The first conference session: UNITO presentations

At the first instance, Pr. Achille Schiavone made the first presentation entitled: "**The use of whole insect larvae to improve poultry welfare**". He underscored the significant potential of Black Soldier Fly (**BSF**) larvae as a sustainable and nutritious feed ingredient for poultry. Then, he illustrated the effect of insect-based feeds on the performance, health and welfare of broiler chickens, laying hens and other avian species.



Afterwards, the speech was delivered to Dr. Valentina Bongiornoto to give a talk entitled "**Chickens' welfare: the core element for farmers' wealthy**" in which she showcased some results from her recent research work on insect-based feeds for poultry. She presented encouraging results on the growth and slaughter performance as well as welfare, behavior, health and immune system of alternative chicken hybrids supplemented with live BSF larvae. Dr. Bongiorno findings suggest that

live BSF larvae in poultry feeding can be a satisfying environmental enrichment for organic and free-range rearing systems.

The two interventions culminated in an interactive and fruitful Q&A session where participants had the opportunity to ask questions and interact with the speakers. This session facilitated in-depth discussion and brought further clarification on various issues raised during both presentations.

The second conference session: ENTOMO presentation

Mr. Juan Cortés, from ENTOMO, provided a detailed look at advanced rearing techniques for different insects, focusing on optimizing growth rates, enhancing feed conversion efficiency, and improving overall

resilience. He highlighted innovative practices such as selective breeding, controlled rearing environments, and genetic improvements that contribute to more sustainable and scalable insect farming operations.

The speaker emphasized that insects, particularly BSF larvae is rich in high-quality proteins, essential amino acids, and beneficial fats. These nutrients support better poultry health, growth, and egg production, presenting a valuable alternative to traditional feed ingredients. Thus, he underscored how insect farming could revolutionize feed production and illustrated how insects can address pressing challenges such as resource scarcity, environmental sustainability, and waste management, positioning insect farming as a key player in the future of sustainable agriculture

The conference wrapped up with a second interactive Q&A session, where attendees were very interested about the practical applications of the technologies discussed and sought further clarification on the challenges and opportunities of insect farming.

Conclusion

The conference marked a significant step toward transforming poultry nutrition through insect-based solutions. BSF larvae were highlighted for their strong nutritional profile, capacity to improve poultry performance, and alignment with sustainability goals by reducing reliance on resource-intensive feed ingredients. Despite challenges related to production costs,

regulations, and consumer acceptance, insects remain a promising alternative protein source for poultry feed.

Key strengths included the diverse expertise of participants, the innovative sustainability focus, and strong attendance (72 participants). Weaknesses were also noted, including regulatory barriers, high production costs, and limited consumer acceptance. Lessons emphasized the value of interdisciplinary collaboration, practical demonstrations, and feedback loops between researchers and practitioners.

Recommendations focused on strengthening stakeholder engagement, expanding farmer training, investing in R&D, advocating for supportive policies, and raising consumer awareness to accelerate adoption and industry growth.

RAYHANA - Farmers 'Training sessions:

All training sessions have an estimated duration of 4 hours (half a day). The themes covered during the various training sessions were validated in advance with the Rayhana association, partner of the SUSTAvianFEED project. The targets of these training are the women empowerment and the farmers' support in the pilots' implementation as a new experience. The first beneficiaries are the responsible of the 16 pilots. The direct beneficiaries are 122 farmers. The indirect beneficiaries are the inhabitants of the 5 target regions, civil societies, administration, private enterprises which reach 2000 person.

1- **Four technical field training for the 16 pilots:** the first in pilot maintenance and other three training in October about disease, breeding process, environmental impact. These training are doing according to the needs of each pilot.

2-Equity & Gender Training

This training was carried out in a single half-day session (from 9 a.m. to 1 p.m.). This training aims to raise awareness among the actors and actresses concerned about issues of equality between men and women, to strengthen their skills in

this area and to help them promote the objectives of gender equality in their work at all levels. It is both a tool and a process to help policy makers integrate gender equality issues into all policies and programs.

This course aims to develop and/or deepen knowledge and understanding regarding gender equality and women's empowerment, as a first step towards changing attitudes and integrating a gender perspective gender in the daily work of the participating women.

The training offers informed theoretical and practical content, corresponding as closely as possible to the social and family realities and practices of the women beneficiaries.

3-Training in commercialization and circular economy

This training was carried out in two sessions (one session per day) of half a day each (from 9 a.m. to 1 p.m.) the 16th and 17th febrary 2024 .The first session was dedicated to commercialization; the second session was dedicated to the circular economy.

Training aims:

1. Strengthen marketing and commercialization capacities: Develop effective strategies for the sale of Fayoumi chickens.

2. Promote the circular economy: Integrate circular practices into production and marketing.

3. Encourage economic empowerment: Increase the income of rural women through better management of their agricultural activities.

4- Technical training laerves production:

A visit from Entomo to make a participatory learning workshop of law tech pilot. The ENTOMO mission accomplished from December 13 to 18 at the Rayhana Association in Jendouba: three visits to farmers from different area of Jendouba . The workshop for the construction of the law pilot of producing laerves is accomplished the 17 th December 2022, 25 participants are present, a great interest and reactivity was noted. The training was attended by 17 farmers, 76.5% of whom are women. The participants are farmers from the region of Jendouba. Some them are members of GDA (groupement de développement Agricole) and practice the activities of production of poultry.


5- Training with ENTOMO about larvae production:

The training period: from the 1st of september to 10 september

Local of training: Entomo local

We have see with deep expanation all the phase of larvae production

We have buy and construct the pilot model for the guide

The output: Guide of larvae production as a tool of farmers' training duplication.


Strengths, Weaknesses, Lessons Learned and Recommendations

ISA-CM and RAYHANA contributed a particularly strong capacity-building component, with conferences and training sessions that mobilized a large number of farmers, including a significant proportion of women. Their key strengths lie in their ability to translate complex scientific concepts into

hands-on learning opportunities, such as the construction of pilot insect larvae production units. These highly practical sessions proved extremely effective in sparking enthusiasm and confidence among participants, as they could directly experience the feasibility of the innovations proposed. One of the main challenges was the organizational and logistical complexity of maintaining continuity across such large-scale initiatives. While initial engagement was strong, it remains unclear to what extent participants were able to apply what they learned in their everyday farming practices, as no systematic monitoring mechanisms were put in place.

Important lessons were learned from these experiences. First, hands-on training is far more effective than classroom-style teaching when it comes to fostering adoption. Second, empowering women farmers as active drivers of change has a multiplier effect, as they often play key roles in family farms and community networks.

Recommendation: ISA-CM and RAYHANA should complement their highly successful training programs with robust post-training monitoring systems, allowing the project to capture long-term impacts. Establishing local support networks – potentially involving farmer cooperatives or women's associations – could further reinforce adoption and ensure that the knowledge shared during training translates into sustainable change on the ground.

EGE

The EGE workshop on alternative feed resources in sustainable poultry diets was held at the University of Ege as part of the SUSTAvianFEED project. It brought together 14 young professionals and 9 experienced stakeholders from the agricultural and poultry production sectors. The primary goal was to introduce participants to alternative feed resources within a circular economy framework and equip them with practical tools to integrate these sustainable practices into their work.

Throughout the workshop, participants gained insights into sustainable poultry feeding, particularly in small-scale poultry meat and egg production. They explored the use of alternative local feedstuffs in broiler production and examined how these could contribute to both sustainability and profitability. They also learned about the partial replacement of conventional soybean-based feeds with alternative feedstuffs, evaluating its impact on broiler performance and consumer acceptance. A hands-on session on circular economy business model development allowed them to explore ways to utilize poultry production by-products sustainably.

The workshop was structured around informative presentations and interactive activities. Experts introduced key topics such as the role of small-scale poultry producers, the benefits of alternative feed resources, consumer perspectives on sustainable poultry products, and the principles of circular economy and business model development. Participants were then divided into teams and tasked with developing their own circular economy business models using the Business Model Canvas. Each group identified poultry industry by-products and waste materials, analysed potential market opportunities, and designed a sustainable business model focused on waste valorisation.

The workshop resulted in the development of four distinct business models. The first group focused on the use of black soldier fly larvae as a sustainable poultry feed, aiming to reduce both feed costs and environmental impact by repurposing waste. The second group proposed cultivating black soldier fly larvae using food waste from supermarkets, with the dual purpose of producing an alternative protein source for poultry and generating nitrogen-rich fertilizer. The third group explored the potential of repurposing olive production waste, such as olive mill wastewater and pomace, for bioenergy and food flavour enhancement, emphasizing the environmental benefits of reducing pollution. The fourth group developed a model based on the cultivation of jojoba on non-arable land, integrating solar energy production while generating valuable products for the animal feed, cosmetics, and biofuel industries.

Following these business model presentations, the workshop concluded with an engaging Q&A session, where participants discussed the practical applications of these ideas, the challenges in implementing alternative feed sources, and the potential for financial and policy support for small-scale farmers. The discussion also addressed the economic benefits of reducing dependence on conventional feed ingredients and how government policies could facilitate the adoption of circular economy principles in agriculture.

In addition to the workshop, a satellite symposium was held on February 29, 2024, in conjunction with the 4th International Animal Nutrition Congress in Turkey. This event brought together more than 100 participants, including feed industry representatives, policy makers, researchers, farmers, and veterinarians. The symposium aimed to strengthen collaboration between universities, industry, and government in promoting sustainable poultry nutrition and to disseminate key findings from the SUSTAvianFEED project.

The symposium focused on breaking barriers in the use of insect-derived feed products, increasing acceptance of alternative sustainable feed ingredients, and discussing future eco-labeling for poultry products fed with alternative diets. Opening remarks emphasized the importance of university-industry collaboration in promoting sustainable poultry farming. Experts presented findings from pilot studies conducted in Spain, Italy, Turkey, and Tunisia, showcasing the potential of insect-based feed and agro-industrial by-products in poultry nutrition.

One of the key topics addressed was the role of insects in poultry diets, particularly their benefits in enhancing bird welfare and nutrition while reducing environmental impact. EU research projects and regulations regarding insect-based feeds were also discussed. Another presentation highlighted consumer perceptions of sustainable poultry products, revealing that while many consumers had limited knowledge of commercial poultry diets, they were generally open to alternative feeding approaches and willing to pay a premium for eco-labeled products.

Additional research findings were shared, demonstrating that replacing soybean meal with alternative feedstuffs, including black soldier fly larvae and agro-industrial by-products, had no adverse effects on broiler growth performance. Alternative diets were also found to improve gut microbiome health without negatively affecting bird behavior. Discussions on the circular economy emphasized the need for sustainable waste management strategies and business models that integrate alternative feed production into existing agricultural systems.

The symposium concluded with a discussion panel featuring animal nutritionists, feed industry representatives, and policy makers. Participants examined the

opportunities and challenges of scaling up alternative feed production, the need for regulatory frameworks to support sustainable poultry diets, and the role of innovation and collaboration in advancing these efforts. The event ended with a dynamic Q&A session, allowing attendees to engage directly with experts and gain deeper insights into the future of sustainable poultry farming.

Both the EGE workshop and symposium provided valuable platforms for knowledge exchange, collaboration, and innovation in sustainable poultry production. Participants left with a greater understanding of circular economy principles, practical business models for integrating alternative feed resources, and a clearer vision of how policy, research, and industry partnerships can drive sustainability in agriculture. The findings from these events reinforced the potential of alternative feed ingredients, particularly insect-based proteins and agro-industrial by-products, in reducing costs, minimizing waste, and promoting environmentally responsible poultry farming.

EGE - Workshop with young professionals and experienced stakeholders

Workshop Overview: Alternative Feed Resources in Sustainable Poultry Diets

Location: University of Ege

Participants: 14 young professionals and 9 experienced stakeholders working in public and private institutions relating to agricultural and poultry production.

Framework: SUSTAvianFEED project

Objective

The workshop at the University of Ege, conducted as part of SUSTAvianFEED project, aimed to introduce young professionals engaged in diverse roles within the agricultural and poultry sectors to the concept of Alternative Feed Resources in Sustainable Poultry Diets using a circular economy and business model framework. The ultimate goal was to enable them to apply these sustainable approaches in their respective fields. The workshop also facilitated knowledge exchange and interaction between young and experienced stakeholders by including, as well, participants who were familiar with the SustAvianFeed project and had been involved in its various activities before.

Added Value:

After attending the workshop on Alternative Feed Resources in Sustainable Poultry Diets, participants have gained significant added value in multiple areas. They developed a deeper understanding of sustainable poultry feeding practices, specifically the importance of small-scale poultry meat and egg producers in the agricultural sector. Through the workshop, they learned about alternative local feedstuffs, particularly in broiler production, and how these resources can contribute to sustainability and profitability in their operations.

Participants also gained knowledge about the practices of partial replacing alternative feedstuffs with soybean and its effect on broiler performance. They received insights into the effects of using these alternative feedstuffs, including the consumer acceptability of meat from chickens fed alternative feedstuffs, which can be important for developing effective marketing strategies.

Furthermore, participants engaged in an interactive session on Circular Economy Business Model development, where they experienced hands-on exercises. These practical activities provided them with the tools to create their own circular economy business models, helping them explore how to utilize wastes and by-products from poultry production in a sustainable and valuable manner.

In addition to knowledge and practical skills gained, the workshop offered valuable opportunities for collaboration and networking. By interacting with both young professionals and experienced stakeholders, participants had the chance to exchange ideas and foster potential partnerships for future sustainability projects in the agricultural and poultry sectors.

Lastly, by the end of the workshop, participants were equipped with practical tools and models that they could apply to their own work, enabling them to implement circular economy principles. This empowered them to contribute to a more sustainable and efficient poultry production system, enhancing both economic and environmental outcomes in their respective operations.

Session breakdown of the workshop

During the workshop, participants were first introduced to the agenda and objectives, followed by an overview of the SUSTAvianFeed project. The project team then delivered presentations on topics

1. "The Role and Importance of Small-Scale Chicken Meat and Egg Producers in a sustainable agricultural production system" and
2. "The Use of Alternative Feed Resources in Broiler Compound Feed" and "Consumer Acceptability of Chicken Meat Produced with Alternative Feed Sources."
3. “The concepts of the Circular Economy and the Business Model Canvas”

Following the informative sessions, the 23 participants were divided into four teams. Each team was given a blank Business Model Canvas (Osterwalder and Pigneur, 2010) and tasked with completing it based on discussions surrounding the following steps:

Step 1: Residue Analysis (10 minutes):

Group discussion on “What resources, outputs, by-products, and wastes exist around poultry production cycle that could be utilized within a circular economy framework?” Classification of the resources based on their availability, sustainability, and potential for use in other processes.

Step 2: Opportunity Identification (15 minutes):

Each group selects one waste stream from the list and brainstorms alternative uses for it, focusing on how it can be transformed into a valuable product.

They evaluate the market potential, technical feasibility, and environmental benefits of the identified opportunities.

Step 3: Identifying a Longer Loop or Larger Cycle (15 minutes):

From the groups’ previous ideas, they select which ones could be integrated into a value chain or identify what waste streams would be generated within their existing chain.

Step 4: Business Model Design (15 minutes):

Using the Business Model Canvas, each group develops a model or model improvement focused on waste valorization.

This included the Value Proposition, Customer Segment, Distribution Channel, Cost Structure, Revenue Streams, and circular logic.

Step 5: Suggestions and Feedback (10 minutes):

Each group presents their Circular Economy Business Model (CEBM) to the other participants.

Feedback is gathered from others to discuss improvements, collaboration opportunities, and implementation challenges.

Informative presentations

The Role and Importance of Small Scale Chicken Meat and Egg Producers (15 min)

The presentation, delivered as part of the SUSTAvianFEED project, underscores the important role of small-scale poultry meat and egg producers in promoting sustainable agricultural systems. In the context of a rapidly growing global population—expected to surpass 9 billion by 2050—the presentation argues that current agricultural practices may prove insufficient to meet future food demand, thus necessitating a shift towards more sustainable and regenerative agricultural models.

Key points highlighted in the presentation include:

1. The Role and Importance of Small Farmers/Small Scale Enterprises in Agriculture
2. Their Role in Adopting Sustainable Practices
3. Benefits of Sustainable Feed Ingredients for Smallholder Farmers

4. Sample Applications

The presentation concludes by emphasizing the necessity of greater investment and policy support for small-scale farmers. Their role in ensuring food security and fostering sustainable agricultural systems makes them indispensable actors in both local and global food production.

Use of alternative feed resources in broiler compound feed and results (20 dk)

The title was discussed in detail with the use of sustainable alternative feedstuffs in broiler diets from two strains (a slow-growing local and a fast-growing commercial line). It was concluded that the substitution of soybean meal with alternative agro-industrial by-products (sunflower meal, dried brewers' grain, wheat middlings) and dried BSF larvae (5%) did not result in an adverse effect on growth performance of both local (Anadolu-T) and commercial (Cobb500) strains. The addition of BSF larvae meal had a positive effect on the d10 body weight of chicks from both genotypes. Microbiome profile results showed that alternative agro-industrial by-products and BSF improved the gut flora. Compared to the control group, the alternative diets had no statistically significant effect on the behavior of broilers of both genotypes. The proportion of clean feathered birds was lowest in the alternative agro-industrial by-products diet group, but this negative effect was eliminated by the addition of BSF to agro-industrial by-products in the Cobb genotypes.

Key points:

- As the poultry sector grows, important issues arise regarding dietary protein sources.

- Alternative feed resources: agro-industrial by-products, insects in animal nutrition
- The impact of alternative diets on broiler performance, health and welfare

Consumer acceptability of chicken meat produced with alternative feed sources (15min)

The EGE team also made a presentation on the findings of the SustAvianFeed project Consumer Survey in İzmir. The survey aimed to investigate the attitudes towards and willingness to pay for poultry products obtained from animals fed with sustainable diets used in the project. In summary, consumers were found to have little knowledge about the content of commercial chicken diets. It was also found that they did not have clear negative prejudices about alternative diets for chickens. Due to this situation, it seems that they are undecided about the options offered to them. On the other hand, the same reason also makes them open to new information and a consequent change of attitude. After being briefly informed about the reported effects and potential of alternative diets, they do not show a negative attitude towards them. They are also willing to pay a price premium for products produced using alternative diets.

Key Topics:

- Objective and methodology of the SustAvianFeed project consumer survey
- Characteristics of the consumers included in the sample
- Chicken meat consumption and purchasing habits of the consumers

- Level of knowledge on the ingredients of conventional poultry diet
- Attitudes towards chicken meat obtained using alternative diets
- Preferences for various sustainability indicators on an eco-label
- Willingness to pay for chicken meat produced using alternative sustainable diet formulations and labeled with an eco-label.

Circular Economy and its implementation in Agriculture (15 min)

The circular economy presents a regenerative system that directly challenges the unsustainable "take-make-dispose" approach of the linear economic model. While the linear model contributes to resource depletion and environmental damage, the circular economy minimizes waste by keeping resources in use for as long as possible. This is achieved through principles of recycling, reuse, and designing products for continuous cycles. This approach not only benefits the environment but also stimulates economic growth (Velasco-Munoz et al, 2021).

The urgency for adopting a circular economy is underscored by the alarming rate of resource consumption, which is projected to triple by 2050 under the current linear model. The circular economy offers a solution by emulating natural systems where waste is nonexistent, and outputs from one process seamlessly become inputs for another (Velasco-Munoz et al, 2021).

The agricultural sector presents a significant opportunity for implementing circular economy principles. Traditionally a linear system, agriculture can transition towards a closed-loop model by adopting practices such as (Kimura et al., 2022):

- Composting and Anaerobic Digestion: Transforming organic waste, like crop residues and manure, into valuable fertilizers reduces reliance on synthetic inputs and closes nutrient loops (Åkerman et al., 2020).

- Livestock Integration: Integrating livestock and crop production allows for efficient nutrient cycling, with animal manure serving as fertilizer for crops, and crop residues used as livestock feed (Swastika, et al, 2024; Ramirez et al, 2020).
- Precision Agriculture: Utilizing technology for precise application of inputs, such as fertilizers and pesticides, minimizes waste and optimizes resource use (Sinha, et al, 2024).
- Water Management: Implementing efficient irrigation systems, water recycling and rainwater harvesting techniques reduces water consumption and promotes sustainable water management (Owen, 2024).

By embracing these practices, the agricultural industry can minimize its environmental impact, enhance resource efficiency, and contribute to a more sustainable food system.

Circular Economy Business Model Development (15 min)

A business model provides a framework for how a business creates, delivers, and captures value. It encompasses a company's resources, target customers, revenue streams, and resource management strategies. The circular economy business model builds upon this foundation by integrating principles of sustainability and efficiency.

While sustainability and the circular economy are interconnected, the latter takes a more holistic approach. By maximizing the lifespan of materials and minimizing waste, the circular economy provides a practical roadmap for achieving comprehensive sustainability goals.

Several compelling reasons drive the adoption of a circular economy, including:

- Resource Scarcity: The depletion of essential resources like oil, minerals, and water necessitates the exploration of more efficient operational methods.
- Environmental Concerns: The environmental damage caused by the linear model necessitates a shift towards sustainable practices.
- Economic Opportunity: The circular economy presents opportunities for cost reduction, price stabilization, and job creation.

Businesses that address resource inefficiencies through a well-designed circular business model can unlock significant economic benefits. These include reduced costs, stabilized raw material prices, and the creation of new jobs, ultimately enhancing competitiveness and sustainability.

To build a successful business model using the provided Business Model Canvas, particularly in the context of applying circular economy principles to poultry farming, one can follow the structured approach below. Each section of the canvas is essential for creating a well-rounded and sustainable business model.

1. Key Partners:

- Identify the essential partners and collaborators who will help your business succeed.

2. Key Activities:

- Highlight the critical activities that your business needs to perform to create and deliver value:

3. Key Resources:

- List the primary resources your business will require:

4. Value Propositions:

- Define what unique value your business offers to customers:

5. Customer Relationships:

- Specify the type of relationship you will establish with your customers:

6. Channels:

- Determine how you will reach and communicate with your customers:

7. Customer Segments:

- Identify your primary customer base:

8. Cost Structure:

- Outline the most significant costs involved in operating your business:

9. Revenue Streams:

- Define how your business will generate income:

Final Result:

Business Model Canvas of Group 1:

The study addresses a business model created in the context of using black soldier fly larvae as feed, with the goals of sustainable waste management and reducing feed costs. The group identified feed suppliers, poultry farmers, and companies that produce significant amounts of waste during production processes as key stakeholders. It was stated that these actors have the potential

to create an ecosystem that recycles waste and provides environmental benefits through collaboration within a sustainable waste management model.

In terms of key activities, the employment of experts with the necessary knowledge and skills to implement this initiative is of great importance. The need for technical personnel to manage waste processing, logistics operations, and efficient production is seen as critical for the sustainability of the activities. Additionally, enhancing the knowledge base and maintaining effective communication with stakeholders during these activities is essential for the success of the process.

From the perspective of value propositions, the primary goals of this business model include contributing to environmental sustainability through waste management, reducing feed imports, and thereby decreasing the country's external dependency. Furthermore, a significant reduction in feed costs is expected using black soldier fly larvae as feed. This presents a substantial advantage, particularly for the poultry farming sector, where feed costs account for a large proportion of expenses.

Regarding customer relationships, pilot project applications and rural site visits are planned to engage effectively with the target audience. This strategy aims to introduce the business model to both farmers and feed producers and ensure its wider acceptance by allowing it to be evaluated through tangible results.

The customer segments consist of poultry farmers and feed companies. Given the sustainability and cost advantages, it is thought that these segments will prefer feed derived from black soldier fly larvae. Additionally, the government’s zero waste support, expected as a result of the effective utilization of waste, holds a significant place among the expectations of these actors.

The key resources are identified as logistics vehicles, machinery required for production, storage facilities, and technical personnel. Investments in logistics and equipment are emphasized as inevitable for successful operations. It is also noted that the equipment used in the waste management and feed production processes will be costly, and thus these investments need to be carefully planned. Distribution channels are primarily feed companies, through which black soldier fly-based feeds are expected to be introduced to the market. This way, the goal is to ensure that sustainable and low-cost feeds reach a broader audience.

When examining the cost structure, equipment investments, personnel expenses, and building operational costs stand out as the primary items. It is emphasized that while the machinery and related infrastructure required for production will have high costs, these investments will provide returns in the long term. Effective planning of process management and workflows will also play a crucial role in controlling the cost structure.

In terms of revenue streams, it is planned that the feed produced from black soldier fly larvae will be marketed as processed or concentrated feed, and that support from the government under the zero waste policy will be utilized. Thus, by offering feed at more competitive prices compared to other types, sustainability will be ensured, and market expansion will be supported.

Business Model Canvas of Group 2:

This business model is structured around the cultivation of black soldier fly (BSF) larvae through the utilization of food and produce waste from supermarket chains. The larvae are intended to be used both as an alternative protein source in poultry farming and to produce nitrogen-rich fertilizer. The model aims to offer a significant solution to environmental sustainability, waste management, and the fight against climate change.

The group has identified key partners as stakeholders who will ensure the regular continuation of the workflow within a sustainable system. It is considered critical that these stakeholders adopt environmentally friendly approaches and be involved in recycling-based systems.

In terms of key activities, the goal is to conduct sustainable business processes through digital platforms, increase R&D activities, and share innovative solutions at scientific congresses and symposiums. This is important for both increasing the knowledge base in the sector and integrating technology and innovation into the business model. At the same time, these platforms are considered effective tools for optimizing waste management processes and expanding collaboration opportunities.

Regarding value propositions, the business model offers multi-dimensional benefits. These include environmental benefits, the promotion of waste recycling, the production of nitrogen-rich fertilizer, the development of an alternative protein source, and a solution to the waste problem. Additionally, the goal of reducing greenhouse gas emissions, which contribute to the fight against climate change, stands out as one of the most important environmental contributions of this business model.

Customer relationships will be managed through digital platforms via protocols that cover waste-feeding processes. These platforms will enhance communication and collaboration among stakeholders and standardize processes for waste utilization. This will increase both the applicability and efficiency of the model.

For customer segments, it is anticipated that food and product waste from supermarket chains will be used for the production of BSF larvae. This waste will provide an important resource for the agriculture sector and poultry farmers.

Particularly in the agricultural sector, the nitrogen-rich fertilizer produced by BSF larvae can be used in vegetable and fruit farming. In this way, food production waste can be reused within a circular economy framework.

Key resources include human resources experts for managing production and marketing activities. Additionally, infrastructure, transfer processes, and relevant technical resources necessary for the efficient execution of the production process are among the critical elements. The optimization of human resources and production processes will play a significant role in the success of sustainable business models.

Distribution channels will be managed through digital platforms that connect companies seeking waste disposal with relevant stakeholders. These platforms will facilitate access to a broader customer base in waste management and recycling processes and increase collaboration opportunities.

When examining the cost structure, labor, transportation, electricity, and water are highlighted as the primary operational costs. Particularly for the production of BSF larvae, managing the infrastructure and operational processes will require optimizing energy and water consumption. Cost control is emphasized as a critical factor in ensuring sustainability.

In terms of revenue streams, it is planned to use food and product waste collected from supermarket chains to produce BSF larvae, which will be used as an alternative protein source in poultry farming. Additionally, nitrogen-rich manure from BSF production? that can be used as fertilizer in vegetable and fruit farming are expected to make a significant contribution to the agricultural sector. These processes are designed in a way that promotes both economic and environmental sustainability.

Business Model Canvas of Group 3:

This group has developed a business model focused on utilizing waste products from the olive production process (olive mill wastewater and pomace). This model, involving key partners such as olive oil factories and poultry farms, aims to promote environmental sustainability and create economic value. By processing olive mill wastewater and leaves for energy, heating, and flavor enhancement, the model seeks to prevent the environmental harm caused by these wastes.

The main partners include olive oil factories and poultry farms, which serve as the primary suppliers and consumers for this business model. Olive mill wastewater and pomace form the raw materials for the model, while poultry farms are considered potential customers and partners.

The core activities focus on processing olive mill wastewater (pomace) and leaves. This waste processing provides a significant opportunity for bioenergy production and meeting heating needs in facilities. Additionally, this process is integrated with efforts to prevent environmental pollution and promote sustainable energy production.

In terms of value propositions, the business model emphasizes waste utilization, wastewater recycling, the use of pomace for bioenergy, and the reduction of environmental pollution. These activities aim to create both economic value and environmental sustainability. Moreover, products derived from this process are positioned as offering flavor enhancements in the food industry.

Customer relationships will be developed through field visits, content creation, and tagging strategies via social media. Social media will be a critical tool for reaching both farmers and the general public. In addition, eco-labeling will be used to highlight sustainable production practices, aiming to establish long-term trust relationships with customers.

The customer segments include poultry farmers, essential oil and amino acid users, and white-collar consumers. Products generated from the waste recycling process are particularly targeted at the livestock and agriculture sectors, while sustainability-conscious white-collar consumers may also demand these products.

Key resources consist of social media platforms, sectoral associations and chambers, and logistics companies. Social media will play a crucial role in customer relationship management and information dissemination, while associations and chambers will serve as important networks for expanding cooperation within the sector. Logistics companies will play a vital role in the collection and transportation of olive mill wastewater and pomace.

Distribution channels are based on direct relationships and eco-labeling strategies. Direct relationships aim to enhance collaboration and customer satisfaction, while eco-labeling will emphasize sustainable production processes, helping the business differentiate itself in the market.

The cost structure includes investments in facilities required for the collection, transportation, and processing of olive mill wastewater, as well as the processing costs of pomace. Optimizing these costs is critical for the sustainability of the business model. Specifically, efficiently managing the waste collection and processing processes will help control expenses.

Revenue streams will come from product sales and a customer base attracted by competitive pricing. Additionally, as awareness of sustainability grows, the model is expected to expand into a broader market and increase consumer demand.

Business Model Canvas of Group 4:

The other group aims to develop a production model based on jojoba, a low-cost and environmentally friendly plant suitable for non-arable lands. This model,

which relies on an innovative and unique approach that produces valuable products for the animal feed, cosmetics, and energy sectors, seeks to evolve through collaboration with key stakeholders such as cooperatives, universities, and investors. Jojoba is a drought-resistant plant with high oil content. In this context, it is considered as a potential feed ingredient for black soldier fly larvae. Additionally, solar panels can be installed on marginal agricultural lands. The goal is to achieve both energy production and agricultural production on the same land.

Key partners include investors, cooperatives, institutes, and universities. Investors provide the necessary financial support to enhance the development and feasibility of this model, while cooperatives and universities will contribute to information dissemination and outreach activities in collaboration. Institutes will provide scientific knowledge and technological support to optimize processes.

Key activities include information, education, and outreach efforts in collaboration with Agricultural Chambers and cooperatives. These activities aim to educate farmers and sector stakeholders about innovative agricultural techniques and introduce new technologies. Additionally, there is an intention to reach a broad audience through media channels such as social media and agricultural TV channels and programs.

In terms of value propositions, the most notable aspects of the model are its low investment cost, no water requirement, almost absence of land and facility issues, and the integration of energy production. The model is noteworthy for its potential to be applied sustainably even on non-arable lands, thus promoting environmental sustainability. Moreover, the integration of renewable energy sources enhances the model's economic and environmental performance.

Customer relationships will be managed through digital and traditional media channels such as social media and agricultural television channels/programs. Social media aims to directly reach potential customers to raise awareness and provide information, while agricultural television programs will inform a wider audience about the business model.

Customer segments include customers of products that can be sold as animal feed (for single-hoofed animals, ruminants, and poultry), the cosmetics sector, and the energy sector. A wide customer base across these different sectors increases the economic potential of the model. In particular, sectors with high demand such as animal feed and cosmetics contribute to creating a sustainable source of income for the model.

Key resources are identified as non-arable lands and olive oil processing facilities. These resources enable production without land issues and minimize costs by utilizing existing facilities. Olive oil processing facilities, in particular, will be considered an important resource in the processing stages.

Distribution channels include the jojoba institute (for seed and seedling acquisition), feed dealers, and cooperatives. These channels will facilitate both the acquisition of seeds and seedlings and the effective marketing of the produced products. Cooperatives will play a significant role in the distribution of products and reaching the customer base.

The cost structure comprises costs of labor, seeds/seedlings, and plant protection applications. Minimizing these costs is one of the most crucial factors for the sustainability of the model. Additionally, production on non-arable lands contributes to further reducing costs.

Revenue sources are based on low-cost production and strategies to persuade customers. This business model aims to gain a competitive price advantage by

producing at low costs. Furthermore, increasing customer awareness and persuasion is expected to boost sales. With the growing awareness of sustainability, the model is anticipated to expand to a broader customer base and increase revenues.

The results from the four groups highlighted a variety of innovative approaches to implementing circular economy principles in sustainable poultry feeding and agricultural practices. Group 1 focused on utilizing black soldier fly (BSF) larvae as a sustainable feed source, reducing both waste and feed costs. Their model emphasized the importance of collaboration between feed suppliers, poultry farmers, and waste-producing companies to create an ecosystem that recycles waste efficiently. Group 2 built their business model around the cultivation of BSF larvae using supermarket food waste, aiming to produce both an alternative protein source for poultry and nitrogen-rich fertilizer. This model provided a comprehensive solution to waste management and environmental sustainability. Group 3 introduced a model for repurposing waste from olive production (such as olive mill wastewater and pomace) into bioenergy and flavor enhancement for food production, highlighting the environmental benefits of reducing pollution and enhancing energy production. Finally, Group 4 developed a business model around jojoba cultivation on non-arable lands, integrating energy production through solar panels and providing valuable products for the animal feed, cosmetics, and energy sectors. Each group demonstrated the potential of circular economy approaches to foster sustainability, reduce costs, and enhance collaboration across sectors, providing valuable insights for future agricultural practices.

- Q&A session

During the Q&A session, participants engaged with the facilitators and experts on various aspects of sustainable poultry feeding and the circular economy. Discussions centered around the practical application of the business models developed during the workshop, challenges in implementing alternative feed sources like black soldier fly larvae, and potential funding opportunities for small-scale farmers adopting circular economy practices. Additionally, participants explored the long-term economic benefits of reducing reliance on traditional feed sources and discussed how government policies could support the broader implementation of these sustainable practices. This interactive session allowed for idea exchange, clarification of doubts, and a deeper understanding of how circular economy principles could be practically integrated into agricultural operations.

Conclusions:

The workshop held at Ege University has been a crucial step in advancing the application of circular economy practices within the context of sustainable poultry feeding and agricultural production. By bringing together young professionals, farmers, and other experienced stakeholders, it fostered a collaborative environment where participants explored innovative solutions to reduce waste, improve resource efficiency, and lower feed costs. The diverse business models developed during the workshop, such as using black soldier fly larvae and repurposing agricultural by-products, demonstrated the significant potential of integrating sustainability into everyday agricultural practices.

Through hands-on activities and knowledge exchange, participants gained valuable insights and practical tools to implement these circular economy strategies in their own operations. The skills and confidence gained during the workshop will empower them to enhance the environmental sustainability and economic viability of their farms and businesses. Moreover, this collaborative effort will contribute to addressing broader environmental challenges while supporting the growth of a more resilient and sustainable agricultural sector.

The SUSTAvianFEED project, by hosting workshops like this, remains committed to driving innovation and sustainability in agriculture. By continuing to promote

the principles of the circular economy, the project supports farmers and agricultural stakeholders in building a future where environmental stewardship and economic prosperity go hand in hand.

EGE - Satellite Symposium, February 29, 2024 Thursday

"Linked to the 4th International Animal Nutrition Congress, Turkey"

Spreading the word: Communicating University-Industry-Ministry Collaboration and Added Value through Information and Technology Development

Dissemination of information on the use of alternative sustainable ingredients for the welfare and nutrition of poultry (laying hens and broilers), sharing the survey and workshop results of the SUSTavianFEED project in conjunction with the 4th International Animal Nutrition Congress (organised by the Animal Nutrition Science Association, Türkiye). The Animal Nutrition Science Association plays an important role in contributing to the development of the livestock sector by solving problems related to feed and animal nutrition. This satellite symposium served to promote the use of alternative sustainable feed materials and to disseminate the information on these topics to relevant individuals, institutions and organisations (including smallholder farmers, agribusinesses, researchers, policy makers and other stakeholders). Here's how information about the symposium was effectively disseminated:

Symposium Overview

Title: Alternative Animal Feeds In Mediterranean Poultry Breeds To Obtain Sustainable Products, Concorde Deluxe Resort Hotel Lara-Antalya, Türkiye

Participants: Approximately 100 participants, feed sector representatives, animal nutritionists, policy makers, feed suppliers, farmers, academics, veterinarians.

Objectives:

- To break barriers in the use of insect derived products for poultry welfare and nutrition.
- To increase acceptance and willingness to use alternative sustainable ingredient feeds for broiler breeds
- To provide an insight into the SUSTavianFEED project and its role in promoting sustainable chicken meat and eggs.
- To engage stakeholders in discussions about the future of eco-labelling for insect-fed poultry products.

Opening Remarks and Introduction:

The symposium was chaired by Prof. N. Şenköylü, the President of the Animal Nutrition Science Association, Ankara. The University's commitment to promoting sustainable poultry nutrition was highlighted and the results of the pilot studies of the SUSTAvianFEED project (Spain, Italy, Turkey, Tunisia) were presented. This set the stage for a discussion on the importance of the symposium and its relevance to current challenges.

The satellite symposium began with Manuel Moreno's a welcome speech introducing the project.

Key Points:

-Introduction to the SUSTAvianFEED project and its objectives.

- The use of alternative diets with sustainable feedstuffs in local chickens' diets

- The use of agricultural industrial by-products and insect derived products for poultry welfare and nutrition.
- Importance of future eco-labelling of insect-fed poultry products

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Satellite symposium program:

1. 3. 1. Breaking Boundaries: Insects' Derived Products for Poultry – A Sustainable Approach to Welfare and Nutrition (30 min.) Achille SCHIAVONE, Valentina BONGIORNO, Edoardo FIORILLA, Eleonora CAPPONE, Rodrigue Takumbo TAKAM, Marta GARIGLIO, Annelisse CASTILLO. Turin University, Department of Veterinary Science, Italy

The title was presented by the Italian partner of the project. Participants were informed about the importance of using live and/or dehydrated whole insect larvae to attract birds and trigger natural behaviors that can improve bird welfare. In addition, EU research projects and legislation on insects were presented to the participants.

Key Topics:

- The need to develop socially responsible models to meet evolving societal needs
- Solutions for alternative protein sources in animal diets
- The benefits of insects for the environment with low impact production, lower energy costs and reduced carbon footprint.

1.3.2. A Preliminary Survey on Acceptance and Willingness to Use Alternative Sustainable Ingredients Feeds for Slow Chicken Breeds in

Tunisia (15 min.) Mediha AYED , Université de Sousse, Institut Supérieur Agronomique de Chott-Mariem, Tunisia

The title was presented by the Tunisian partner. The participants were informed about the situation of the extensive or semi-extensive poultry system in Tunisia, its current problems and perspectives for the future.

Key Topics:

- The perception and willingness of small poultry farmers to use alternative diets consisting of local crops, by-products and insects.
- The use of local poultry populations and other slow grown breeds such as Red Rode Island, Fayoum or Géant and Génoise, which are crosses of SSASSO strains.

1.3.3. Effect of Introducing Hermetia Illucens Larvae Into 23-Week-Old Mediterranean Laying Hen Diet on Production Performance (15 min). Ana MONTALBÁN, Josefa MADRID, Fuensanta HERNÁNDEZ, Achille SCHIAVONE, Eduardo RUIZ, Edoardo FIORILLA, Cristian J. SÁNCHEZ, Lucía AYALA, Silvia MARTÍNEZ-MIRÓ, Murcia University, Department of Animal Medicine and Surgery, Spain

The title was presented by the Spanish partner. The pilot study evaluates the effect of supplementing the diets of laying hens with whole dehydrated black soldier fly larvae (BSFL, 5%) on performance parameters.

Key Topics:

- Insect species to convert organic waste into valuable biomass

- Investigating the potential use of defatted BSFL meal in poultry feed formulation

1.3.4. Is It Possible to Produce Sustainable Chicken Meat With Alternative Feedstuffs To Soybean Meal? (15 min.) Muazzez CÖMERT ACAR, Sezen ÖZKAN, Servet YALÇIN

Ege University, Faculty of Agriculture, İzmir, Turkey

The title was presented by the Turkish partner. The participants were informed to determine the effects of sustainable alternative diets on performance and some blood biochemical parameters in a local line (Anadolu-T) and commercial (Cobb) broiler chickens.

Key Topics:

- The effects of using alternative agricultural industrial by-products alone and with BSF larvae (5%) on broiler diets.
- The benefits of sustainable alternative feedstuffs on broiler performance

1.3.5 Beyond Nutrition: Enhancing Poultry Wellbeing through Insect-Enriched Diets, (15 min). Edoardo FIORILLA,Turin University, Department of Veterinary Science, Italy

The title was presented by the Italian partner (University of Turin, Department of Veterinary Science). Participants were informed that the nutrition of chickens goes beyond physiological requirements and influences physical health, growth and behavioral aspects that are crucial for overall well-being.

Key Points:

- The complexity of environmental factors in poultry behaviour
- The role of behavioral aspects in shaping farming practices
- Behavioral evaluation of sustainable alternative feedstuffs for broiler diets.

1.3.6 Ecolabelling of Black Soldier Fly-Fed Poultry Products: Results of a Co-Creative Stakeholder Workshop (15 min) Berna TÜRKEKUL, Özlem KARAHAN UYSAL, Sezen ÖZKAN, Muazzez CÖMERT ACAR, Servet YALÇIN Ege University, Faculty of Agriculture, İzmir

The title was presented by the Turkish partner. Participants were informed that concerns about environmental sustainability, animal welfare and food safety have led to the need for innovative and environmentally friendly practices in the industry.

Key Points:

- Elements such as an eco-label to promote sustainable poultry products
- The outcome of the group discussions on the pre-defined topics.

Symposium Discussion

The discussion, which brought together animal nutritionists, feed industry representatives and policy makers, was convened to discuss the future of alternative feed ingredients, including BSF, in the diets of sustainable poultry products. Speakers shared their insights on the challenges and

opportunities, the role of regulation and the importance of innovation and collaboration.

Key topics:

- Challenges and opportunities for sustainable alternative feedstuffs and diets
- The importance of innovation and collaboration
- Future trends and developments

Q&A Session:

The symposium concluded with an interactive question and answer session, allowing participants to ask questions and engage directly with the speakers and symposium panelists. This session provided an opportunity for in-depth discussion and clarification of various aspects of sustainable poultry products in Mediterranean poultry breeds fed alternative feeds.

Key Points:

- Open floor for questions and discussions.
- Direct interaction with the experts and panelists of the symposium
- Address specific concerns and questions from participants.

Networking and Collaboration Opportunities:

The symposium also provided exemplary networking opportunities for attendees. Breakout sessions and coffee breaks were strategically placed

to encourage interaction and collaboration among participants. This facilitated the exchange of ideas, experiences and potential partnerships that could promote the importance of sustainable poultry products in Turkey and globally. Pictures show project partners participating in the SUSTavianFEED satellite symposium, participants, and speakers.

Pictures of satellite symposium.

Conclusion:

In conclusion, the SUSTavianFEED pilot studies demonstrate a significant positive impact of introducing agro-industrial by-products and BSF larvae could be used to partially replace soybean meal in chicken diets. Chickens fed insect-enriched diets showed an increased tendency to approach the operator, with a consistent reduction in distance over time, indicating potential sustainable benefits.

The use of live and dehydrated BSF larvae was discussed in detail with the participants. It can be said that live larvae can be labor intensive and costly, especially in systems with large flocks. Dehydrated larvae are more manageable and don't require complex procedures before being fed to the birds. Opting for dehydrated larvae can have several benefits, including more efficient storage and transport, and improved on-farm biosecurity. The inclusion of dehydrated BSF larvae in the diets of laying hens did not adversely affect their production parameters. However, the use of dehydrated BSF larvae requires further research to better understand the delivery methods and acceptance in different poultry species. In terms of social and environmental sustainability, it can be said that smallholders would like to use the sustainable diets, provided that they guarantee the same production and price of poultry. In addition, the sustainability label should primarily include environmental and social sustainability criteria. Traceable and reliable information on the sustainability impact of the product is also very important for future prospects.

Strengths, Weaknesses, Lessons Learned and Recommendations

Ege University's contribution centered on scientific visibility and networking through the organization of events linked to international academic conferences. This provided significant strengths, including strong legitimacy, visibility within the scientific community, and opportunities for international networking among both senior stakeholders and young professionals.

However, the events were largely academic in nature, which limited their practical relevance for farmers and small-scale stakeholders. The dissemination

of results remained primarily within the academic sphere, with relatively little adaptation for practitioners or local communities.

The lesson learned is that while high-profile academic events are vital for credibility and international impact, they need to be complemented by more accessible outputs in order to reach the broader farming community.

Recommendation: EGE should build on its strong academic base by developing simplified dissemination materials – brochures, guides, or short videos – that make the project's findings accessible to non-specialist audiences. Future events could also include side sessions explicitly targeted at local farmers or small agribusinesses, bridging the gap between academia and practice.

General Overview

Through its multifaceted approach to training and conference organization, the SUSTAvianFEED project demonstrates how coordinated efforts can promote sustainable agriculture—particularly in poultry—across various Mediterranean regions. By drawing on interdisciplinary expertise and engaging a broad network of stakeholders, the project illustrates the tangible application of circular economy principles and innovative feed solutions. Below is an expanded summary of the key outcomes and findings:

Spreading Circular Economy Concepts in Poultry Farming

Resource Efficiency:

Workshops and conferences highlighted techniques to reduce dependence on non-renewable resources, such as efficient water and energy use. By showcasing examples like precision irrigation, renewable energy, and optimized feed formulations, participants learned how small operational changes can yield both cost savings and tangible environmental benefits.

Waste Reduction and Upcycling:

Sessions often focused on repurposing agricultural by-products—such as manure, crop residues, and even kitchen scraps—into valuable resources for compost production or bioenergy. Besides illustrating an integrated

approach to resource management, these upcycling models potentially offer new revenue streams for small-scale farms.

Collaboration and Partnerships:

A cornerstone of the circular economy approach was building synergy among farmers, research institutions, and industry stakeholders. By sharing knowledge, technology, and resources, participants developed collective solutions to environmental challenges, strengthening local economies in the process.

Advancing Sustainable Agricultural Practices

Alternative Feed Sources:

Promoting non-traditional protein sources—such as insects (e.g., Black Soldier Fly larvae) and local plant-based by-products—was a central theme. These options can partially replace conventional feeds (like soy and corn) and provide both economic and environmental benefits.

Pilot Studies and Real-World Validation:

Data from field trials, presented at conferences and seminars, showcased how these alternative feeds can be integrated while maintaining quality, safety, and performance. Comparative analyses with conventional diets provided concrete insights into costs, animal growth, and the quality of meat and eggs.

Links to Sustainable Development Goals (SDGs)

Each initiative was tied to objectives like Zero Hunger (SDG 2) and Responsible Consumption and Production (SDG 12), underlining how farm-level actions can significantly contribute to a more sustainable food system overall.

Knowledge Sharing and Cross-Sector Collaboration

Engaging Diverse Audiences:

Activities reached a wide array of participants, from smallholder farmers and women's cooperatives to industry professionals and academic researchers. Open Q&A sessions, panel discussions, and practical demonstrations allowed for direct exchange and mutual learning.

Multi-Level Impact:

Programs ranged from targeted workshops for young entrepreneurs or newly hired veterinary professionals to conferences featuring policymakers and established industry leaders. This multi-layered approach ensures that sustainability solutions are integrated at both local and broader policy levels.

Practical Outcomes:

To translate theory into practice, many events included hands-on activities and case study analyses. Participants left with concrete tools—such as guidelines and prototypes for insect rearing—that they could test in their own farms or organizations.

Empowering Small-Scale Producers and Women Farmers

Technical Training and Capacity Building:

Recognizing small-scale farmers as key actors in local food systems, the project offered practical field-based training on disease management, breeding, pilot maintenance, and poultry product marketing.

Gender Equity:

Dedicated workshops and awareness-raising sessions ensured that female farmers gained access to leadership skills, technology updates, and emerging market opportunities. By explicitly addressing gender disparities, women's entrepreneurial potential was brought to the fore.

Improving Livelihoods:

Introducing higher-value products—such as poultry raised on organic or eco-certified feed—creates opportunities for market differentiation. Reduced reliance on expensive inputs, combined with more efficient waste management, often translates to higher profit margins for small producers.

Demonstrating Real-World Impact and Scalability

Data Analysis and Tangible Results:

Ongoing monitoring—covering animal growth, environmental impact assessments, and consumer acceptance—provided reliable feedback on how these new feeding systems performed. This data-driven approach helps build stakeholder confidence in the proposed solutions.

Market Acceptance and Consumer Trust:

Through taste tests, eco-labels, and focus groups, the project evaluated consumers' responses to meat and eggs from alternative feeds. Findings revealed encouraging acceptance levels, particularly when novel ingredients are paired with transparency and credible certification.

Wider Replicability:

By sharing business models and best practices, other farmers and organizations can replicate these strategies with predictable outcomes. Scaling up is crucial for transitioning the broader poultry sector toward more sustainable practices.

Raising Awareness and Engaging Policymakers

Schools and Universities:

Presentations aimed at high school students, technical courses, and universities help increase early awareness of environmental challenges and agricultural innovation. These initiatives foster the next generation of knowledgeable professionals.

Informing Policy Decisions:

The presence of policymakers at conferences—alongside robust data—plays a key role in guiding legislation and investment plans that support alternative feeds and circular economy approaches.

Public-Private Synergies:

Facilitating collaborations among academia, private sector, and government ensures supportive regulatory and funding frameworks, from research grants to supply-chain partnerships to regional and national training programs.

Conclusion

SUSTAvianFEED successfully combines theory, hands-on training, and multi-level outreach to demonstrate a viable path toward more resilient, inclusive, and eco-friendly poultry farming. By uniting a range of stakeholders, the project highlights how economic profitability and environmental stewardship can be pursued in tandem. The momentum generated by these capacity-building initiatives and conferences provides a solid foundation for replicating and scaling up sustainable practices both within poultry and other agri-food sectors ultimately contributing to a greener future and more secure food systems for all.

Strengths, Weaknesses, Lessons Learned and Recommendations

Across the consortium, the capacity-building and conference activities represented a rich and diverse portfolio of initiatives. Taken together, they demonstrate the project's ability to reach multiple audiences, from

farmers and women's groups to academics, policymakers, and students. The strengths of the collective effort lie in its multi-actor and multi-level nature, its alignment with the Sustainable Development Goals and circular economy principles, and its coverage of different geographic and socio-economic contexts across the Mediterranean.

Yet, the analysis also highlights some weaknesses. Most notably, there was no unified system for monitoring and evaluating the long-term impact of the activities. Methodological heterogeneity with some partners adopting highly practical, hands-on approaches and others focusing on academic or theoretical content sometimes resulted in uneven impacts across contexts. Moreover, the lack of structured follow-up meant that the project could not fully capture the outcomes of its capacity-building work, such as the adoption rates of alternative feed practices or improvements in farm-level sustainability.

The lessons learned suggest that the combination of practical workshops with larger conferences is a highly effective model, but one that must be supported by continuous engagement and monitoring. Young people and women emerged as particularly important vectors of change, highlighting the importance of targeting these groups systematically. Finally, the discussions around cultural, social, and policy barriers demonstrate that technical innovation alone is insufficient: for adoption to take place, these dimensions must also be addressed.

General Recommendations: Going forward, the consortium should develop a shared monitoring framework with measurable indicators, enabling the collection of comparable data across countries. Follow-up mechanisms, such as digital platforms and mentoring programs, should

be introduced to sustain learning over time. Cross-cutting dimensions gender, policy, financial access should be systematically embedded into capacity-building activities. Finally, dissemination efforts should be diversified: while academic conferences remain important, simplified materials and targeted communication to consumers and policymakers are essential to ensure that project results translate into real-world, long-term impact.