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Hemp Club

Competent and Connected
Clusters Unfold the Hemp
Industry Potential for the
European Bioeconomy

European Cluster Excellence Programme with ClusterXchange scheme connecting ecosystem and cities

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D5.4 - CATALOGUE OF THE CLUSTER BEST PRACTICES TOWARDS HEMP- BASED BIOECONOMY DEVELOPMENT

IULIANA GAGEANU, CORNELIA MURARU-IONEL, TATIAN AONISEI,
SEBASTIAN-LUCIAN MURARU, VERGIL-MARIAN MURARU

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Authors:	Iuliana Gageanu, Cornelia Muraru-Ionel, Tatiana Onisei, Sebastian-Lucian Muraru, vergil-Marian Muraru
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Contact details:	Iuliana Gageanu (iuliadml@yahoo.com) Cornelia Muraru-Ionel (cornelia.muraru.ionel@gmail.com) Tatiana Onisei (tatianaonisei@yahoo.com) Sebastian-Lucian Muraru (sebi_muraru@yahoo.com) Vergil-Marian Muraru (virgil.muraru@gmail.com)

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1. Introduction

The **Competent and Connected Clusters Unfold the Hemp Industry Potential for the European Bioeconomy** (HempCluB) project is an EU COSME project coordinated by LGCA, bringing together 7 clusters and associations operating in the primary hemp production, bioeconomy, mechatronics and green chemistry sectors from Italy (Federcanapa, SPRING), Czech Republic (CZECHEMP), Romania (IND-AGRO-POL), Austria (SAT) and Portugal (PRODUTECH). HempCluB project works to unlock the potential of hemp by creating EU value chains for biobased applications and new business opportunities for primary producers and chemical companies. With its unique chemical properties, environmental benefits, high yield and wide range of applications, hemp is a valuable crop for the bioeconomy, contributing to achieving climate neutrality, although still representing a niche crop in Europe.

As a "European Strategic Cluster Partnership", HempCluB promotes collaboration and synchronised strategies and encourages innovative interregional investments to enhance cluster excellence. Through mutual learning and SMEs and other stakeholders' mobility, HempCluB aims to unlock the biomass exploitation potential by supporting the ClusterXchange scheme's implementation.

In the context of the HempClub project, the **Catalogue of the cluster best practices towards hemp-based bioeconomy development** report compiles best practices from clusters and also identifies the technologies, equipment, products or services offered by their members. The results of related research in the field will also be included in the catalogue.

Tree types of best practices are included in the catalogue:

BP1 - HempCluB best practices. Related to best practices implemented within the HempCluB project by the partners, based on the HempCluB specific tools or results (e.g. best practice related to the analysis of cluster member needs, the fact that cluster managers and staff were more skilled due to the training, the engagement of stakeholders through the participation to local fairs and conferences or something similar).

BP2 - Clusters best practices. Related to best practices from clusters, including our project partners and other clusters, in the hemp-based bioeconomy, already existing and not developed during the HempCluB project, but improved or in process to be improved from the HempCluB specific tools or results (e.g. the analysis of cluster member needs, the fact that cluster managers and staff were more skilled due to the training, the engagement of stakeholders through the participation to local fairs and conferences or something similar).

BP3 - Hemp best practices. Related to the technologies, equipment, products or services offered by the cluster members, the results of related research in the field will also be included in the catalogue. Also, the opportunities to improve these ones based on HempCluB specific tools or results could be mentioned.

This catalogue will be promoted and disseminated initially at the level of the project consortium and later to clusters, cluster associations and other stakeholders through the project website, social media, leaflets and events organized within the project, etc.

Disseminating best practice projects, initiatives, and business models that currently exist in distinct HempClub participating regions or beyond the consortium area is the final goal of the Best Practice Catalogue.

2. Definitions

Best practice	<p>a. A working method or set of working methods that is officially accepted as being the best to use in a particular business or industry, usually described formally and in detail¹.</p> <p>b. A procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption².</p> <p>c. A set of guidelines, ethics, or ideas that represent the most efficient or prudent course of action in a given business situation. Best practices may be established by authorities, such as regulators, self-regulatory organizations (SROs), or other governing bodies, or they may be internally decreed by a company's management team³.</p>
Bio-based economy	The bioeconomy encompasses the production of renewable biological resources and the conversion of these resources, residues, by-products and side streams into value added products, such as food, feed, biobased products, services and bioenergy ⁴
Bioeconomy	The bioeconomy is the production, utilization and conservation of biological resources, including related knowledge, science, technology, and innovation, to provide information, products, processes and services across all economic sectors aiming toward a sustainable economy ⁵ .
Cluster	Clusters should be considered as regional ecosystems of related industries and competences featuring a broad array of inter-industry interdependencies. They are defined as groups of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills. Clusters are referred to both as a concept and a real economic phenomenon, the effects of which, such as employment concentration, can be measured ^{6,7} .
Value chain	The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use ⁸ .

3. Context

With its contribution of food, feed, textiles, energy, and other goods, the bioeconomy sector is a crucial component of the global economy. It is therefore crucial for the circular shift that our world sorely needs. Unfortunately, due to their emphasis on short-term profit, globalized production, and logistics with disregard for externalities, global value chains frequently prevent the cyclical use of biomass or biometarials. As a result, it must alter and adapt the hemp sector's inherited linear value chains in order to achieve a circular bioeconomy.

¹ <https://dictionary.cambridge.org/dictionary/english/best-practice> (accessed on 06.10.2023)

² <https://www.merriam-webster.com/dictionary/best%20practice> (accessed on 06.10.2023)

³ https://www.investopedia.com/terms/b/best_practices.asp (accessed on 06.10.2023)

⁴ <https://www.biobasedeconomy.eu> (accessed on 06.10.2023)

⁵ <https://www.fao.org/forestry/48809-0fa08567d60a5c43d146a9333d10ab41f.pdf> (accessed on 06.10.2023)

⁶ Delgado, Mercedes/Porter, Michael E./Stern, Scott, 2013: Defining Clusters of Related Industries, Working Paper 20375 of the National Bureau of Economic Research.

⁷ <https://clustercollaboration.eu/cluster-definitions> (accessed on 06.10.2023)

⁸ <https://www.cisl.cam.ac.uk/education/graduate-study/pgcerts/value-chain-defs> (accessed on 06.10.2023).

An important part of Europe's response to the challenges ahead is the bioeconomy, which includes the sustainable production of renewable resources from land, fisheries, and aquaculture environments and their conversion into food, feed, fiber bio-based products, and bio-energy as well as the related public goods. The bioeconomy encompasses industries that use or process biological resources, such as the food and pulp and paper sectors, as well as portions of the chemical, biotechnological, and energy industries. It also includes primary production, such as agriculture, forestry, fisheries, and aquaculture.

Clusters are geographic concentrations of interconnected businesses, specialized suppliers, service providers, businesses in adjacent industries, and affiliated organizations (such as universities, standards organizations, and trade associations) in a certain industry that compete but also work together.

Best practices are defined as working methods or sets of working methods that are explicitly and in-depth explained as being the best to utilize in a specific firm or industry.

4. Methodology - Best practices questionnaire template

Best practices are the **working standards or ethical guidelines that provide the best course(s) of action** in a given situation. Companies, regulators, or governing bodies can all set best practices for businesses.

Best practices serve as a roadmap for a company on how to do business and provide the best way to deal with problems and issues that arise. Steps to setting best practices include researching the industry and competitors, communicating the standards to all employees, setting metrics, managing change, evaluating, and refining the best practices.

Best practices serve as a general framework for a variety of situations. For instance, in businesses that produce physical products, best practices that highlight efficient ways to complete tasks might be given to employees. Best practices lists may also outline safety procedures in order to minimize employee injuries.

Finding best practices means taking the time to research what your business or cluster is planning to do and finding the best way to go about getting it done. Establishing your own best practices for your own area of expertise or business is an important part of making everything work smoothly and efficiently. Best practices can keep evolving as new and better solutions are found or evolve from better awareness, new technology, or simply different ways of looking at things.

Seeking out and spreading best practices throughout a cluster or between clusters provides significant strategic advantages. The idea of identifying and sharing best practices is also a natural extension of organizational improvement approaches with widespread followings such as quality improvement and organizational learning. And yet, many attempts to propagate best practices across organizational boundaries meet with failure. Obstacles range from team-level protectionism to organizational structure and old habits of thought. But with the globalization of markets and the intense competition that it creates, organizations must continually seek efficient ways to improve—from any source, whether from close collaborators or from known actors in the same field.

The propagation of best practices helps everyone improve leverage, efficiency, control, and efficacy within the organization or cluster, as follows:

- Gaining leverage by multiplying the payoffs of a successful innovation and by tapping into the hidden asset of the knowledge base arising from having multiple units in operation under a single corporate banner.
- Efficiency improvement by avoiding unnecessary costs such as the duplication of effort in “reinventing the wheel.”
- Increasing control by standardizing operations around a best practice where appropriate.
- Raising the bar by drawing attention to high-performing practices increases efficacy by keeping the business current with the best ways of doing things.

The first hurdle to an organization or a cluster adopting best practices as a routine way of doing business may be adjusting how we think and speak about this concept. The words we use to describe embracing others' practices reflect our culture's deep ambiguity about doing so. The instinctive response to other groups, whether inside or outside one's company, is to compete. But to learn from each other, is needed to convert that impulse into a sense of internal collaboration.

In that sense, a best practices questionnaire template for gathering information on the best practices throughout the HempClub consortium and beyond related to bioeconomy was set and distributed for feedback.

The template is presented below.

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)				
Title of the practice				
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)				
Author(s) of the practice				
Location of the practice				
Start date of the practice (and if applicable, end date)	Start		End	
Description of the practice: <i>What was the starting point/challenge? What has been done? By whom (promoters, stakeholders, beneficiaries)? How (methodology)? Results achieved? Key success factors?</i>				
Lessons learned from this best practice				
Lessons learned from HempClub project				
Contact details to obtain further information on the practice				
Name				
Organisation				
E-mail				
Website				

The best practices questionnaire template was sent to all consortia members to gather the information needed.

5. Best Practices towards hemp-based bioeconomy development

The following best practices were collected based on the best practices questionnaire template:

5.1 BP1 category

LGCA 1st BP1:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP1			
Title of the practice	Strengthen a two-way communication towards cluster members			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Within the HempClub project, LGCA, supported by the activities carried out in WP1 and WP2, committed to develop new services that are more members-centered, based on their needs and expectations.			
Author(s) of the practice	Lombardy Green Chemistry Association Sara Daniotti (project manager)			
Location of the practice	Lombardy Region, Italy			
Start date of the practice (and if applicable, end date)	Start	2023	End	\
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>LGCA services and activities were for the majority aimed at internationalization and business development, with a large part of the cluster effort being devoted to implementing international R&I projects in collaboration with their cluster members. However, as analyzed in the HempClub project (mainly within the activities of WP1 and WP2), LGCA still misses a systematic activity to map members needs and interests and, thus, develop and provide tailored services; furthermore, LGCA's members do not seem very active in their interaction through mails and surveys.</p> <p>To cover this gap, LGCA, in collaboration with SPRING, discussed about the development of a new service for community building. LGCA committed to analyze systematically annually or biannually the needs, ambitions, and interests of their member and provide services dedicated to cluster members aimed to create synergies within these organizations for future business and project collaborations.</p>			
Lessons learned from this best practice	<p>Community building has a central role in clusters as it strengthens the collaboration and cooperation among members and among members and the management. This results in the cluster growth as new collaboration projects can arise from this activity, which is one of the main sources of income for the LGCA cluster and can also attract more members to the cluster. However, community building can only be effective if the cluster management knows the needs and expectations of its</p>			

	own members, making members matchmaking and the offering/developing of new services more effective. Systematical mapping of these needs through surveys or interviews can respond to this prerequisite..
Lessons learned from HempCluB project	In April 2023, the HempClub project organized a visit to a flagship entity – the Veegpolys Valley – in France. This innovation pole of competitiveness presented their cluster and its services, among which their strong commitment towards cluster members stood out. Indeed, they mentioned that each year they dedicate their time to each of their members to know more about their needs and eventually offer their services. The Veegpolys model represented a guide for LGCA to develop this best practice towards more members-centered services. This, thus, demonstrates the importance of knowledge and best practice sharing among clusters in different regions/countries aiming at strengthening cluster capacity.
Contact details to obtain further information on the practice	
Name	Sara Daniotti
Organisation	Lombardy Green Chemistry Association (LGCA)
E-mail	segreteria@chimicaverdelombardia.it
Website	https://www.chimicaverdelombardia.it/

CZECHEMP / FECERCANAPA 2nd BP1:

BEST PRACTICE INFORMATION	
Type of best practice (based on the classification in paragraph 1)	BP1
Title of the practice	Introducing the new technologies for hemp processing
Topic of the practice (What is the best practice about – 1 sentence)	CzechHemp, together with FedarCanapa, the Italian hemp association, were following the development of the processing line for industrial hemp developed by Ukrainian Hemp company, which grows, processes hemp in Ukraine and also produces machinery for processing of hemp stalks. Based on our experience and market knowledge we provided quality requirements for hemp materials - shives and fiber and Ukrainian hemp developed post processing machinery to deliver demanded products.
Author(s) of the practice	FederCanapa / CzechHemp / Ukrainian Hemp

Location of the practice	Ukraine / Czechia / Italy			
Start date of the practice (and if applicable, end date)	Start	2021	End	2023
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	Actual situation on the market with industrial hemp is facing underproduction and lack of investment in hemp infrastructure. Processing lines are very expensive to get and delivery time could be up to 18 months. This situation creates a big gap between actual production and market needs, and the actual production does not have enough capacity to cover all demand. Hempoint company (member of CzechHemp Cluster) became an affiliated partner of Ukrainian hemp company to share European market quality standards and incorporate them into Ukrainian production.This does not only provide the opportunity for European companies to source needed hemp materials but also to source the hemp machinery at affordable prices.			
Lessons learned from this best practice	Ukraine has been growing industrial hemp without stopping for decades and, contrary to many countries in the EU, was able to maintain knowhow related to machinery for processing and manufacturing hemp into traditional products, such as textile, or created modern production of hemp building materials. Output of this cooperation is still ongoing and can bring many opportunities for the businesses in Europe that are looking to build their own infrastructure for hemp production.			
Lessons learned from HempCluB project	At this moment Ukrainian Hemp is looking for partners in some EU country to place their infrastructure to create facility, which will be used not only for scale production but also for demonstration and training needs. HempCluB network could benefit from this business opportunity not only by gaining experience and creating partnership with already established partner but it can be used for development of their businesses thanks to the know-how obtained from the HempCluB project.			
Contact details to obtain further information on the practice				
Name	Hana Gabrielová			
Organisation	Czechemp / FederCanapa			
E-mail	prezidetnka@czechemp.cz			
Website	www.czechemp.cz			

SPRING 3rd BP1:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP1			
Title of the practice	Foster the interaction between cluster members: creation of a database to access their needs			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Creation of services for cluster members in order to foster internal cooperation			
Author(s) of the practice	SPRING – Italian Circular Bioeconomy Cluster Leonardo Gaiani (Project Manager)			
Location of the practice	Italy			
Start date of the practice (and if applicable, end date)	Start	2022	End	Ongoing
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>The SPRING cluster thought of taking the interaction between its members to a higher level than at present. It introduced during the board meeting the creation of a database, to which only members of the cluster have access, that encompasses different types of information. The database provides for the subdivision of members according to their areas of activity in order to facilitate the identification of the entity in which one is interested. In addition to the mapping process, access to the database will allow members to post different types of requests on a virtual notice board, such as:</p> <ul style="list-style-type: none"> • Ability to post and search for partnerships in projects, • Possibility to identify/involve speakers for events and sponsoring, • Possibility to show open job positions, trying to connect universities with companies for the creation of paid internships. <p>The database will enable all members of the SPRING cluster to realise in an organised way what topics are covered by other members and thus establish any kind of collaborations. Strengthening these interactions within the cluster is crucial to connect different stakeholders with positions on different value chains and expand the bioeconomy sector.</p>			
Lessons learned from this best practice	<p>The most important aspect learnt during this best practice is the impact such a service can have on attracting new members and retaining existing ones. The SPRING cluster identified this strategic line of implementation as necessary to strengthen its structure by providing tangible services that can bring added value not only to the cluster itself but also to its members.</p>			
Lessons learned from HempCluB project	<p>The application of this good practice was partly supported by the process of obtaining the ESCA label during the</p>			

	HempClub project. Within WP1, it was defined that the SPRING cluster should obtain the bronze ESCA label. During the application process and through the benchmark assessment, it became apparent that the SPRING cluster was lacking in the aspect of services offered to its members. Already being aware of this aspect, which was validated by the process of obtaining the ESCA label within the HempClub project, SPRING strongly learnt the importance of offering this kind of service and also the importance of including concrete objectives within European projects that enable the proactive expansion of clusters organization and structure in the bioeconomy field.
Contact details to obtain further information on the practice	
Name	Leonardo Gaiani
Organisation	SPRING – Italian Circular Bioeconomy Cluster
E-mail	leonardo@clusterspring.it
Website	https://www.clusterspring.it/

FEDERCANAPA 4th BP1:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP1			
Title of the practice	Hempcrete and Hempblocks Working Group			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Improvement of hemp use in building sector through a CE certification path			
Author(s) of the practice	FEDERCANAPA			
Location of the practice	Various			
Start date of the practice (and if applicable, end date)	Start	19/06/2023	End	Ongoing

Description of the practice: What was the starting point/challenge? What has been done? By whom (promoters, stakeholders, beneficiaries)? How (methodology)? Results achieved? Key success factors?	<p>The challenge is to reinforce the hemp market in building sector.</p> <p>A roundtable with the main Italian producers of hempcrete and hempblocks and university experts. Promoted by Federcanapa with its members operating in the sector and some experts.</p> <p>Developing a European strategy with some brainstormings and connections with EIHA and other foreign players (mainly France).</p> <p>Results: a first international network. but the true result to achieve still is a CE label.</p> <p>Key success factor: cooperation with international players and associations.</p>
Lessons learned from this best practice	The importance of knowledge exchange at international but also at national level between companies with the same problems and targets.
Lessons learned from HempCluB project	HempClub gave the chance to reinforce the network with Prague exchange (WP3 Matchmaking collaboration activities) and the next 14 November working group on building sector.
Contact details to obtain further information on the practice	
Name	Giuseppe Croce
Organisation	Federcanapa
E-mail	presidente@federcanapa.it
Website	www.federcanapa.it

5.2 BP2 category

LGCA 1st BP2:

BEST PRACTICE INFORMATION	
Type of best practice (based on the classification in paragraph 1)	BP2
Title of the practice	Vanguard initiative's bioeconomy pilot
Topic of the practice (What is the best practice about)	Bringing biobased products to market by shaping new interregional value chains

– 1 sentence)				
Author(s) of the practice	Lombardy Green Chemistry Association Sara Daniotti (project manager)			
Location of the practice	Lombardy Region, Italy			
Start date of the practice (and if applicable, end date)	Start	2014	End	On going
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>Vanguard Initiative regions are committed to internationalise their cluster initiatives, support SMEs, develop joint roadmaps for building critical mass and complementary specialisations in emerging industries, and combine their research and innovation resources with European investments in priority areas through demonstrators and pilots. Since its launch in 2014, the Vanguard Initiative's bioeconomy pilot program has worked to bring biobased products to market by shaping new interregional value chains, shared innovation, and regional economic strengthening opportunities by unlocking the industrial potential of biobased resources.</p> <p>Led by the Randstad and Lombardia regions (technically coordinated by LGCA), the Pilot promotes the acceleration of demonstration projects (TRL 7-8) focused on the production and commercialization of chemical products (e.g. coatings, adhesives, glues, lubricants), biomaterials (eg resins, plasticizers, fibers, bitumen, biopolymers) and biofuels (Bio-LNG) deriving from the valorisation of biobased circular raw materials.</p> <p>Over 50 SMEs, large companies, research centers and universities from over 20 European regions have been involved in applied research and industrial development activities, mobilizing over 70 million euros of public and private investments.</p> <p>Thanks to the organization of seminars, workshops, exchanges, member companies of the cluster are involved in events, bilateral meetings, workshops with research groups and other companies, helping to generate new business opportunities.</p>			
Lessons learned from this best practice	<p>The engagement of SME intermediaries such as clusters and technology transfer agencies in many pilot projects is a key aspect to the success of the initiative, helping to identify relevant businesses and help modernise regional innovation systems as well as remove bottlenecks linked to technology transfer or commercialisation actions;</p> <p>A strong alignment with regional objectives (S3) makes it easier to create synergies with SMEs and other players in the innovation ecosystem as well as with structural funds and other EU funding sources.</p>			
Lessons learned from HempCluB project	Internationalization and support for the growth of competitiveness of the bioeconomy is one of LGCA's strategic development areas. Thanks to this activity, since			

	its foundation, LGCA has gained increasing recognition at a European level, becoming involved and coordinating cooperation projects for the improvement of the quality of the services offered to its members. In particular, thanks to the coordination of the HempClub project, LGCA has strengthened the managerial skills of its managers (over 70 hours of specialized training provided) and organized Cluster exchanges by mobilizing over 50 contacts with companies, experts, researchers in the bioeconomy sector. This resulted in an improved internal expertise for generating new projects for the cluster itself and its members.
Contact details to obtain further information on the practice	
Name	Sara Daniotti
Organisation	Lombardy Green Chemistry Association (LGCA)
E-mail	segreteria@chimicaverdelombardia.it
Website	https://www.chimicaverdelombardia.it/

STANDORTAGENTUR TIROL 2nd BP2:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP2			
Title of the practice	Project „Alpenhanf 360°			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Forcing innovations around the cultivation and utilization of the whole hemp plant, and redesigning of value chains in sense of circular economy			
Author(s) of the practice	Standortagentur Tirol Valentine Troi (project manager)			
Location of the practice	The ARGE ALP region [ARGE ALP = The Alpine Countries Working Community which includes 10 countries, provinces, regions and cantons of the states of Austria, Germany, Italy and Switzerland].			
Start date of the practice (and if applicable, end date)	Start	2021	End	Ongoing
Description of the practice: <i>What was the starting point/challenge? What has been done? By whom (promoters, stakeholders, beneficiaries)? How (methodology)? Results achieved? Key success factors?</i>	Alpine hemp is a sustainable, versatile, and holistically usable organic raw material, which is therefore well suited for regional alpine cycles. At the same time, however, there is still a lot of open potential for the cultivation, and holistic utilization and exploitation of hemp in the Alpine region, which is why ARGE ALP and the Standortagentur Tirol are involved here together with partners. Cross-border cooperation is essential, because the consequences of economic, ecological and social			

	<p>developments do not stop at national borders. As a member of the HempCluB, we are also working together on the further development of hemp use - from agriculture to high-tech applications.</p> <p>The project, which is funded by ARGE ALP, primarily pushes innovations around the cultivation and utilization of hemp plants, their fibers and ingredients. With a view to the entire life cycle of products, however, value chains are also to be redesigned in the sense of the circular economy in order to promote sustainable growth for the region. In the Alpine region, the aim is to establish a value chain for all the products that hemp has to offer, taking into account the dual harvesting system. Furthermore, the goal is to network the actors in the partner regions.</p> <p>Currently, several companies from the entire Alpine region are working on prototypes for examples for skis, ski poles, hard shell parts for backpacks, components for e-bikes and cargo bicycles, lightweight elements for salvage equipment, hybrid felts with sheep wool for clothing applications and as geotextiles, and hybrid yarns with sheep wool as recyclable, regionally available semi-finished products for the clothing industry, among other things.</p> <p>A major output of the project is the open network that has been created, which will be presented to the public in the form of a traveling exhibition. The individual actors are for the most part already networked. In part, however, the project also serves to improve networking even further, especially across national and language borders. The exhibition concept offers an insight into the possibilities of the various raw materials.</p> <p>Most of the contributions show projects that are in development or in the test phase. Based on the early stages of development, especially in the technical field, it can be seen that the topic of commercial hemp as a technical raw material has gained significant momentum in recent years.</p>
Lessons learned from this best practice	<p>The project shows that many different players at all levels of the value chain see great potential for the future in industrial hemp. Based on the early development stages of the projects, especially in the technical area, it can be seen that the topic of industrial hemp as a technical raw material has gained significant momentum in recent years.</p> <p>The networking of the players plays an important role in this and is also consciously pushed by the players. In this respect, our Alpine Hemp Network makes a significant contribution to strengthening the use of industrial hemp in the bioeconomy in general and in the circular economy in the Alpine region in particular.</p>
Lessons learned from HempCluB project	<p>The presentation of our network to a broad international audience was possible during the ClusterXchange -</p>

	<p>September 6-8, 2023 in Stuttgart, Germany), which was organized by the Standortagentur Tirol as part of the HempClub's task. Some actors of the network were even there themselves. This has led to a strengthening of our network.</p> <p>On the other hand, the HempClub network could also benefit from our network, as experiences could be exchanged, and the possibility was given to network on a larger scale and to establish partnerships.</p>
Contact details to obtain further information on the practice	
Name	Valentine Troi, Jasmin Baruck
Organisation	Standortagentur Tirol
E-mail	Valentine.troi@standort-tirol.at, jasmin.baruck@standort-tirol.at
Website	https://www.standort-tirol.at/cluster/internationale-projekte/alpenhanf360#hempclub

SPRING 3rd BP2:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP2			
Title of the practice	Foster the interaction between cluster members: creation of a database to access their needs			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Creation of services for cluster members in order to foster internal cooperation			
Author(s) of the practice	SPRING – Italian Circular Bioeconomy Cluster Leonardo Gaiani (Project Manager)			
Location of the practice	Italy			
Start date of the practice (and if applicable, end date)	Start	2022	End	Ongoing
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>The SPRING cluster thought of taking the interaction between its members to a higher level than at present. It introduced during the board meeting the creation of a database, to which only members of the cluster have access, that encompasses different types of information. The database provides for the subdivision of members according to their areas of activity in order to facilitate the identification of the entity in which one is interested. In addition to the mapping process, access to the database will allow members to post different types of requests on a virtual notice board, such as:</p> <ul style="list-style-type: none"> • Ability to post and search for partnerships in projects, 			

	<ul style="list-style-type: none"> • Possibility to identify/involve speakers for events and sponsoring, • Possibility to show open job positions, trying to connect universities with companies for the creation of paid internships. <p>The database will enable all members of the SPRING cluster to realise in an organised way what topics are covered by other members and thus establish any kind of collaborations. Strengthening these interactions within the cluster is crucial to connect different stakeholders with positions on different value chains and expand the bioeconomy sector.</p>
Lessons learned from this best practice	<p>The most important aspect learnt during this best practice is the impact such a service can have on attracting new members and retaining existing ones. The SPRING cluster identified this strategic line of implementation as necessary to strengthen its structure by providing tangible services that can bring added value not only to the cluster itself but also to its members.</p>
Lessons learned from HempCluB project	<p>The application of this good practice was partly supported by the process of obtaining the ESCA label during the HempClub project. Within WP1, it was defined that the SPRING cluster should obtain the bronze ESCA label. During the application process and through the benchmark assessment, it became apparent that the SPRING cluster was lacking in the aspect of services offered to its members.</p> <p>Already being aware of this aspect, which was validated by the process of obtaining the ESCA label within the HempClub project, SPRING strongly learnt the importance of offering this kind of service and also the importance of including concrete objectives within European projects that enable the pro-active expansion of clusters organization and structure in the bioeconomy field.</p>
Contact details to obtain further information on the practice	
Name	Leonardo Gaiani
Organisation	SPRING – Italian Circular Bioeconomy Cluster
E-mail	leonardo@clusterspring.it
Website	https://www.clusterspring.it/

FEDERCANAPA 4th BP2:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP2			
Title of the practice	CanapaForum / HempForum			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Involvement of national and international stakeholders in conferences			
Author(s) of the practice	FEDERCANAPA			
Location of the practice	Naples, Italy			
Start date of the practice (and if applicable, end date)	Start	6/09/2022	End	10/09/2022
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>The challenge was to show all the best industrial hemp state-of-the-art in the world.</p> <p>A 3 days conference on the various application fields of industrial hemp, 3 training courses at Federico II University on cultivation, medical hemp and hemp building techniques, a guided tour to a construction site with hempblocks and hempcrete.</p> <p>By Federicanapa with the support of Federico II University, EIHA (European Industrial Hemp Association), and various private companies sponsorship – beneficiaries: business companies and researchers.</p> <p>Calling flagship experiences from 5 UE countries and from Canada, Usa, Australia, South Africa.</p> <p>Results: new knowledge exchanges about innovation in almost 3 fields: collecting and decorticating techniques – aromatherapy – hempcrete and hempblocks building.</p> <p>Key success factor: cooperation with international associations and scientific centers.</p>			
Lessons learned from this best practice	The importance of knowledge exchange at international but also at national level (many players make the same innovation efforts in different regions but they don't even know).			
Lessons learned from HempCluB project	HempClub gave the chance to reinforce international network.			
Contact details to obtain further information on the practice				
Name	Giuseppe Croce			
Organisation	Federicanapa			
E-mail	presidente@federicanapa.it			
Website	www.federicanapa.it			

5.3 BP3 category

IND-AGRO-POL 1st BP3:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP3			
Title of the practice	Best practices of service for placing on the market of botanical food supplements			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	The topic of the service offered by one of IND-AGRO-POL cluster members to the other cluster members but not only consists in notification of food supplements, including the food supplements based on hemp, evaluation of the documents from the dossier, product compliance with legal requirements, legal trade (delivery of the Certificate of notification).			
Author(s) of the practice	National R&D Institute for Food Bioresources (IBA) - National Office for Medicinal and Aromatic Plants (member of IND-AGRO-POL cluster) Tatiana Onisei (Head of the office), Radu Stoianov, Adina Raducanu, Manuela Rascol, Anca Popescu			
Location of the practice	Romania, Bucharest, National R&D Institute for Food Bioresources as provider of notification services			
Start date of the practice (and if applicable, end date)	Start	2014	End	Ongoing
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>The previous service of notification the food supplements based on hemp was in use by IBA, member of IND-AGRO-POL cluster, since 2005.</p> <p>In 2007 Romania joined EU, thus the procedure had to be put in accordance with needs of IND-AGRO-POL cluster members, but not only, to respect the new legal requirements (mainly for food safety criteria and labelling). An updated and improved specific service was proposed in 2012, by IBA, member of IND-AGRO-POL cluster, to the Ministry of Agriculture and Rural Development (the Competent Authority) for the approval. It was discussed with stakeholders, including members of IND-AGRO-POL cluster, (food business operators/FBO etc.), , feed-back and comments received were taken into account. By Ministry Order no. 1946/2014, the new service was approved. As result, the compliance of Romanian products for entering on the Romanian market became similar to the other EU states, respecting the same legal requirements. In the main time, the consumers are beneficiary of safety botanical food supplements, while through the content of the label and warnings, they receive the necessary information to protect their health. Regarding the specific case of hemp derived food supplements and CBD oils from Romanian market, an increase of the number of legally sold products was observed, mainly due to the implementation of the mutual recognition (Reg. UE 515/2019).</p>			

	The key success factor could be considered the successful cooperation between the competent authority (as policy maker), R&D institute (as high-quality service provider) and responsible FBOs (as beneficiaries, who understood to respect the EU regulations) including the members of IND-AGRO-POL cluster.
Lessons learned from this best practice	An added value was obtained for this service offered by one of the IND-AGRO-POL cluster member, related to food supplements notification by involving scientists/researchers, including employees of IND-AGRO-POL cluster members, in such activity which required to be informed and to have access to the latest scientific results, but also to know how to apply the law and regulation requirements, especially in a specific category of products, such as botanical food supplements, that are not harmonised in EU.
Lessons learned from HempCluB project	As results of analysing the hemp successful practices of each project partners, IBA, cluster member of IND-AGRO-POL, together with other Romanian clusters and stakeholder (e.g. Caneparo cluster which participated, together with one of its cluster member, in the HempClub CXC "Canapa Forum – Business Exchange, 5-10 September 2022, Naples, Italy) is in process to improve the service described through lobby at the Romanian policy makers and specific authorities in the aim to harmonize the Romanian practices in hemp with the successful EU ones, identified during the HempCluB project period.
Contact details to obtain further information on the practice	
Name	Tatiana Onisei
Organisation	National R&D Institute for Food Bioresources (IBA), member of IND-AGRO-POL cluster
E-mail	tatianaonisei@yahoo.com
Website	www.bioresurse.ro

IND-AGRO-POL 2nd BP3:

BEST PRACTICE INFORMATION	
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP3
Title of the practice	Best practices of equipment for harvesting hemp green stalks
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	The topic of the service offered by one of IND-AGRO-POL cluster members to the other cluster members but not only consists in notification of food supplements, including the food supplements based on hemp, evaluation of the documents from the dossier, product

	compliance with legal requirements, legal trade (delivery of the Certificate of notification).			
Author(s) of the practice	National Institute of Research – Development for Machines and Installations designed for Agriculture and Food Industry – INMA (member of IND-AGRO-POL cluster) Ancuta Nedelcu, Lucretia Popa, Ciuperca Radu			
Location of the practice	Romania, Bucharest, National Institute of Research-Development for Machines and Installations designed for Agriculture and Food Industry – INMA, as a provider of technologies and equipment for agriculture.			
Start date of the practice (and if applicable, end date)	Start	2020	End	Ongoing
Description of the practice: <i>What was the starting point/challenge?</i> <i>What has been done?</i> <i>By whom (promoters, stakeholders, beneficiaries)?</i> <i>How (methodology)?</i> <i>Results achieved?</i> <i>Key success factors?</i>	<p>The challenge to develop the equipment came from the need in the market (from farmers and farmer associations) and from the desire at national level to revitalize the industrial hemp crop in Romania. Therefore, to increase hemp cultivation at national level, it became mandatory to provide the necessary technologies and technical equipment for the whole chain (from sowing, to harvesting and processing).</p> <p>With the Academy of Agricultural and Silvicultural Sciences supporting hemp crop in the sense that new varieties that were in line with Eu regulations have started to be developed in Romania in two different Research Stations, the stage was set for industrial hemp cultivation and INMA, being the only Research Institute in Romania focused on Developing Agricultural Machinery saw that as an opportunity and as well as a challenge to help develop this sector, coming with new equipment specifically designed for industrial hemp crops.</p> <p>Starting from 2018, following a series of collaboration opportunities with actors in the hemp sector, INMA, member of IND-AGRO-POL cluster, started focusing its research efforts on hemp crop throughout the entire crop cycle (sowing, crop maintenance, harvesting for fibers or for seeds, decortication, etc.). The needs in the market were discussed with stakeholders, including members of IND-AGRO-POL cluster (farmers, associations, companies in the field of building agricultural machinery, etc.) and feed-back and comments received were taken into account when coming up with the technical solutions.</p> <p>The equipment for harvesting hemp green stalks can cut hemp stalks in two fractions as follows: the first cutting device, placed in the front part of the equipment, cuts the stalk in its upper fraction, at a variable height, between 1500-2500 mm, and the second device cuts the other fraction of the stalk at a height of approx. 70-100 mm from ground level.</p> <p>The key success factor could be considered the successful cooperation between the competent authorities (as grant awarder), the R&D institute (as research and equipment provider) and the interested parties (as beneficiaries of</p>			

	the research results, who represents the actual users of the equipment) including some members of IND-AGRO-POL cluster.
Lessons learned from this best practice	An added value was obtained for this equipment offered by one of the IND-AGRO-POL cluster member, related to hemp crop valorisation by involving scientists/researchers, the majority being employees of IND-AGRO-POL cluster members, in an activity that needs both theoretical and practical approaches and required the persons involved to be informed and to have access to the latest scientific achievements, to know how to approach hemp crop in terms of national and European laws and regulation regarding the cultivation and use of industrial hemp.
Lessons learned from HempCluB project	As results of analysing the activity in the hemp sector conducted by the project partners, INMA, cluster member of IND-AGRO-POL, together with other Romanian stakeholders (SCDA Lovrin, SCDA Secuieni, local farmers) is in process to improve the prototype of equipment described above, through experiments on different types of hemp, and also to come up with some new solutions for industrial hemp growers, but also aims at engaging with local and national authorities in the aim bring the Romanian practices within hemp sector with the successful European ones, identified through the HempCluB project.
Contact details to obtain further information on the practice	
Name	Gheorghe Gabriel
Organisation	National Institute of Research – Development for Machines and Installations designed for Agriculture and Food Industry – INMA Bucharest
E-mail	icsit@inma.ro
Website	www.inma.ro

CZECHEMP 3rd BP3:

BEST PRACTICE INFORMATION	
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP3
Title of the practice	Really Hempful! Approved project by Erasmus plus funds focuses on adapting vocational education and training according to the labor market needs and contributing to innovation in vocational education and training
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	The cooperation aims to empower and equip the next generation of farmers and vocational education students with the knowledge and proficiency they need to excel in hemp cultivation. The project supports creation of a

	<p>specific vocational education and training program, through a permanent training platform. This platform will provide students and new farmers with the knowledge and skills they need to be successful in hemp cultivation and the business opportunities that come with it. The education and training program will integrate different fields of education, such as agriculture, botany, and business. The project brings together partners from academia, industry, and civil society, who are going to share their diverse sets of skills, knowledge, and experiences. The project's focus on a comprehensive training program, its multidisciplinary approach, its mentorship program, its digital handbook and podcasts, and its dissemination activities make it highly suitable for creating synergies between different fields of education and training and for having a strong impact on the education and training sector.</p>			
Author(s) of the practice	<p>EIHA, University of Hohenheim (Germany) and CzechHemp (Czechia) / implementation partners - ART+INN (Lithuania), VET School "Stefan Tsanov" (Bulgaria), VET School Ergasia (Greece).</p>			
Location of the practice	<p>Bulgaria, Czech Republic, Lithuania, Greece</p>			
Start date of the practice (and if applicable, end date)	Start	2023	End	2025
<p>Description of the practice: What was the starting point/challenge? What has been done? By whom (promoters, stakeholders, beneficiaries)? How (methodology)? Results achieved? Key success factors?</p>	<p>The knowledge of farmers to grow and harvest hemp nowadays is very limited and this project gives an opportunity to improve the education of not only farmers but also those who study farming.</p> <p>The project aims to strengthen the knowledge and proficiency of students and potential new farmers about hemp cultivation to raise awareness of the advantages and opportunities by emphasising the potential provided by the multiple uses in different sectors (such as construction, textile, etc.) The specific training program, through a permanent training platform, will be created. Cooperation between VET schools and other sectors' local professionals, empowering vet schools and new farmers to serve as the engine for a local value chain is going to be supported. They will become more knowledgeable about the resources and possibilities available to the hemp business in Europe. The network of vet schools and new farmers focused on hemp cultivation is going to be established.</p>			
Lessons learned from this best practice	<p>Output of this project is going to be translated in 4 different EU languages and if there is interest from other parties, it could also serve for other countries. The project proposal was created by a student who put all the partners together. The lesson learned is to engage more students in developing the hemp value chain as they are very enthusiastic about the opportunities hemp could</p>			

	bring and are motivated to work on projects to help hemp scaling up.
Lessons learned from HempCluB project	The large network that HempClub created and opportunities we do share within the project would be shared in the Hempful project, especially the hemp value chain analysis and shared knowhow about the farming from our events and partners we've been visiting during cluster exchanges. The hemp value chain starts in the field and without good education farmers are not able to understand its potential. For this reason this knowledge is absolutely crucial. Additionally, the project's focus as HempClub was on building networks and promoting cooperation between partners. This will create synergies between different fields of education, training, and research, resulting in a more integrated and cohesive approach to the development of the European hemp industry so that the already existing network created under HempCluB would be used in additional project to make impact on education and training at a European level.
Contact details to obtain further information on the practice	
Name	Hana Gabrielová
Organisation	Czechemp cluster
E-mail	prezidentka@czechemp.cz
Website	www.czechemp.cz

PRODUTECH 4th BP3:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP3			
Title of the best practice	BIO4PLAS biocomposites			
Topic of the best practice (<i>What is the best practice about – 1 sentence</i>)	Develop alternatives to fossil-based raw materials, adding value from biological resources. As such, industrial hemp fiber plays a fundamental role in this concept, and Bio4Plas' mission is to give a new purpose to waste from this crop, based on the foundations of the circular economy.			
Author(s) of the best practice	Bio4plas			
Location of the practice	Portugal			
Start date of the practice (and if applicable, end date)	Start	2021	End	
Description of the practice:				

<p><i>What was the starting point/challenge?</i></p> <p><i>What has been done?</i></p> <p><i>By whom (promoters, stakeholders, beneficiaries)?</i></p> <p><i>How (methodology)?</i></p> <p><i>Results achieved?</i></p> <p><i>Key success factors?</i></p>	<p>The starting point of this practice began from the first moment of the creation of Bio4Plas, having subsequently been included as an activity within the scope of Be@t project (https://bioeconomy-at-textiles.com/), involving a consortium of portuguese companies, focusing on the bioeconomy in the textile industry. Through our innovative plastic composite materials, we sought to meet the needs of the current market, which recognizes a growing demand for novel, more sustainable, and ecological materials. This demand has increased more recently following the regulatory measures imposed by the European Union due to the environmental concerns that currently plague us. Furthermore, these materials align with the needs of customers looking for light, resistant and ecological materials for various applications ranging from the automotive industry to household consumer goods.</p> <p>Incorporating hemp within composite materials offers a range of distinct advantages. Notably, hemp is distinguished by its sustainability, owing to its rapid growth and minimal pesticide requirements. Moreover, the remarkable strength-to-weight ratio of hemp fibers positions them as an attractive choice, particularly in industries like automotive and aerospace, where weight reduction is of paramount importance. The innate biodegradability of hemp-based composites further underscores their eco-friendly profile. Additionally, the low toxicity inherent to hemp fibers enhances safety considerations for both production personnel and end-users. These fibers also exhibit noteworthy thermal and acoustic insulation characteristics, adding to their value proposition. However, it is essential to acknowledge certain associated challenges, including limited availability in specific regions, specialized processing requirements, variable fiber quality contingent on factors like cultivation practices and climate, potential market resistance, and, in some instances, initial cost considerations when compared to traditional materials. Our commitment at Bio4Plas lies in harnessing these advantages while proactively addressing the associated challenges, thus advancing the adoption of hemp-based composites across diverse industries.</p> <p>The good adaptability and performance of our hemp-based composites enable them to be applied in a wide range of applications in different sectors. The composites that are being developed can be used in different scientific areas. These are integrated into the automotive sector, improving the production of several components. In this application, our composites contribute to a lightweight design while ensuring structural resilience.</p>
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	<p>Furthermore, they are being used to create sustainable building materials that provide efficient insulation and serve as lightweight and reliable structural elements, thus promoting more environmentally conscious practices in the construction industry. In addition to these sectors, our composites have ventured into the field of consumer goods, exemplified by their incorporation into household products or sports equipment. Furthermore, our foray into the furniture and shoe industry has yielded innovative designs that combine aesthetic appeal, functionality, and sustainability.</p> <p>To this date, Bio4Plas has achieved substantial progress by focusing on research, development, manufacturing optimization, and quality assurance. We've fine-tuned hemp-based composite formulations, streamlined our manufacturing processes, and rigorously tested our products for performance and reliability. These achievements underscore our commitment to innovation and sustainability.</p> <p>Bio4Plas stands at the forefront of the development and application of hemp-based composites. As the driving force promoting this transformative technology, Bio4Plas employs a multifaceted approach that includes a team dedicated to rigorous research and development, continuous manufacturing optimization, and unwavering adherence to stringent quality assurance standards. The network of strategic partners is instrumental, including hemp farmers who provide the raw material, suppliers of processing equipment, and esteemed research institutions. These alliances shape the evolution of hemp-based composites, while a diverse client base spanning various industries guides research and development efforts to tailor sustainable materials for myriad applications.</p> <p>Our journey has yielded substantial results, marking significant milestones in the production and commercialization of hemp-based composites. Our dedication to innovation has borne fruit in the form of improved material performance, which enabled us to penetrate diverse market sectors where the demand for sustainable solutions is rapidly growing. As a testament to our commitment to eco-conscious practices, we have garnered recognition and trust from clients and partners who value our dedication to sustainability, solidifying our position as a reliable and influential leader in the field.</p>
<p>Lessons learned from this best practice</p>	<p>Over the course of our journey, we've learned the importance of flexibility and adaptability, as markets and regulations can change rapidly. We've also recognized the value of continuous innovation and the need to invest in</p>

	educating clients and stakeholders about the benefits of hemp-based composites. Additionally, we've found that collaboration and knowledge sharing within the industry are essential for sustainable growth.
Lessons learned from HempCluB project	As member of PRODUTECH we were able to give visibility within the HempCluB network to our work and products as well as be informed of different initiatives within the hemp value chain across Europe.
Contact details to obtain further information on the practice	
Name	António Martins (Board Member)
Organisation	BIO4PLAS
E-mail	info@bio4plas.com
Website	www.bio4plas.com

FEDERCANAPA 5th BP3:

BEST PRACTICE INFORMATION				
Type of best practice (<i>based on the classification in paragraph 1</i>)	BP3			
Title of the practice	SEMinCANTA			
Topic of the practice (<i>What is the best practice about – 1 sentence</i>)	Organization and Guidelines for a high quality hempseed food short value chain			
Author(s) of the practice	Molino Crisafulli			
Location of the practice	Caltagirone, Sicily			
Start date of the practice (and if applicable, end date)	Start	2023	End	Ongoing

Description of the practice: What was the starting point/challenge? What has been done? By whom (promoters, stakeholders, beneficiaries)? How (methodology)? Results achieved? Key success factors?	<p>The challenge is to develop and reinforce a high quality hempseed food short value chain.</p> <p>The author created 2 years ago with Federcanapa first quality hempfood guidelines for farmers and transformers and in the same time built slowly a local value chain.</p> <p>Promoted by Molino Crisafulli, already manyfolds prized for his very good hempseed oil. The main beneficiaries are the Sicilian farmers.</p> <p>Developing guidelines for hempseed food from the cultivation (crucial for the final products quality) to transformation and conservation techniques and training and supporting beneficiaries on field.</p> <p>Results: Molino Crisafulli has already obtained a high quality product and tries to develop it reinforcing the network local farmers.</p> <p>Key success factor: Cooperation with scientific centers as CREA Acireale, Milan State University, Bologna University and Federico II University with “Best Hempseed Oil” annual prize in Frattamaggiore;</p>
2.7 Lessons learned from this best practice	<p>The importance of interaction with scientific centers and of contests as “Best Hempseed Oil” annual prize to transfer knowledge.</p>
2.8 Lessons learned from HempCluB project	HempClub gave the chance to reinforce international network.
2.8 Contact details to obtain further information on the practice	
Name	Francesco Sammartino
Organisation	Molino Crisafulli
E-mail	f.sammartino@molinocrisafulli.com
Website	https://www.semincanta.it/

6. Conclusions, main lessons learned and future prospects

6.1. Conclusions

After gathering the best practices from all the partners involved, a series of conclusions can be drawn:

- The need for more integrated, long-term policy approaches is reflected in the effort for the EU and its MS to establish sustainable, circular bioeconomies, as indicated by the best practices recognized.
- There are a number of actors outside the EU that are interested in a collaboration with EU countries in order to develop technologies and for scaling up production or demonstration and trainings.
- In the best practices identified, the obtaining or improvement of the ESCA label for clusters was found among the drivers for improving services or general activity of clusters involved.
- The importance of knowledge exchange at national and international level has been found to have a great importance, helping tackle the same problems or targets in a more comprehensive manner. Exchanges organized by clusters were proven to be very useful in this respect.
- Trainings and exchanges have helped strengthened the managerial skills for clusters, have mobilized contacts with companies, experts, researchers in the hemp and bioeconomy sector, resulting in an improvement in cluster internal expertise, better collaborations and better possibilities for generating new projects for the clusters and their members.
- The promotion of industrial hemp and the use of the whole plant, as well as the technologies for establishing, maintaining, harvesting and processing was found to be very important for changing the general perspective on the benefits and importance of this plant for various industries.
- Improved and updated databases with cluster members and stakeholders, with details on the activities and expertise are an important instrument to improve collaboration.
- Providing services for cluster members for internal and external collaboration are a good tool for members to realize in an organized way what topics are covered by other members and thus establish any kind of collaborations.
- The involvement of stakeholders in events such as conferences, exchanges, knowledge transfers, etc. is important for boosting collaboration and for getting to know what innovations and activities are being performed at the moment.
- Services for the placement on the market of hemp products are also a good tool to improve the perception on hemp and promote its benefits.
- Technologies and equipment for industrial hemp crop and sought after and are of great interest for cluster members and stakeholders. A better promotion of these technologies is needed.
- The promotion of hemp materials as alternative to fossil-based ones contributes to circular economy.
- The importance of the interaction between the academic sector and the industrial sector was highlighted.

6.2. Main lessons learned

- Speaking the same "language," or achieving a shared knowledge of issues, objectives, and cluster vision that takes into account the opinions of various stakeholders still require a lot of work.
- There are other issues than financing, such as those related to the environment, employment, education, shifting public opinion, etc.
- A cluster can add value for its members by:
 - Helping to make hemp resources more valuable, which benefits businesses.
 - Establishing connections and uniting individuals.
 - Reaching out to policymakers, which can be challenging for individual businesses, particularly SMEs.
- The bioeconomy is a new field that is forming links between industries that do not typically collaborate. To begin and organize cross-sectoral collaboration, the cluster concept is essential.
- Industrial hemp needs extensive promotion and this can be achieved through the means of a cluster.
- All actors starting from primary sectors, researchers, equipment builders, businesses, farmers, users, need to be involved in the "hemp discussion".

6.3. Future prospects

From the lessons learned through this instrument, a series of activities needed and future prospects were identified:

- Improvement of technology transfer for the whole hemp crop chain.
- Improvement of knowledge transfer for the whole hemp crop chain.
- Improvement of communication between members in the clusters, between clusters and with stakeholders.
- Better promotion of hemp crop and the benefits it offers for a variety of sectors.
- Better involvement of academia and research in activities and projects.
- Better lobby for harmonizing and regulations in the EU for the cultivation and use of hemp.

Funding and knowledge can be vital resources for cluster activity and the bioeconomy's advancement. Thus, having enough money and easy access to financing should be top priorities for clusters. Professionals should be trained, people should be taught, and industrialized and developing nations should share knowledge. Updates could be made to fossil fuel subsidy programs, and export-promoting or biobased procurement regulations ought to be accessible as needed.

Consultancy services can become a good tool for boosting the attracting of funding for many cluster members, can help them better promote their activity and expertise and can help them find suitable collaborators for the future.

Matchmaking events, conferences, workshops, working groups and other such events should become the focus of clusters in order to bring to the same table all actors involved in the value chain and become the setting for new or improved collaborations, knowledge exchange, new ideas, etc.