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Roadmap Report

Phytopharma Value Chain

WP3 Value Chain Mapping

Activity 3.4 Roadmapping

D 3.4.1 Roadmap reports for all three VC

***Cross-clustering partnership for boosting eco-innovation
by developing a joint bio-based value-added network for the Danube Region***

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For further information about the DanuBioValNet project, you will find a short description in the document. To learn more and to download additional resources please refer to the project website <http://www.interreg-danube.eu/approved-projects/danubiovalnet>.

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INTRODUCTION OF THE DanuBioValNet PROJECT

The DanuBioValNet project is a cross-clustering partnership for boosting eco-innovation by developing a joint bio-based value-added network for the Danube Region. DanuBioValNet stands for development of a joint bio-based industry cluster policy strategy, clusters connecting enterprises transnationally, new bio-based value chains in the Danube Region and eco-innovations for supporting regional development.

The DanuBioValNet project, launched in 2017 through a cross-regional partnership involving 17 partners from 10 Danube regions, will enhance transformation from a fossil-based economy towards an economy using renewable resources by creating bio-based value-added networks. The project will connect Danube actors in a bio-based industry to minimize greenhouse gases and to optimize biomass resource utilisation. These measures are intended to improve the sustainability and regional development through diversification of the local economy while positively affecting the workforce. The focus on emerging transnational cooperation of clusters should serve to foster the bio-economy and eco-innovations and should lead to a strengthening of the regional economies.

The development of new bio-based value chains from primary production to consumer markets needs to be done by connecting enterprises from different regions and industries. However, due to a missing holistic transnational approach, the Danube actors in the current bio-based industry still operate disconnected and cannot properly

benefit from their potential. Therefore, the aim of this project is to develop new methods, strategies and tools to connect enterprises transnationally. Clusters represent groups of industries that are closely linked by common products, markets, technologies and interests. They are chosen to organize and carry forward the needed industry cooperation for the creation of new value chains. Properly performing clusters can help to upgrade industrial practices, generate new knowledge and contribute to regional policy-making.

The partners of the DanuBioValNet agreed that phytopharma, eco-construction and bio-plastic/advanced packing (bio-based packaging) have a high potential for improvement of their respective value chains and hemp is considered as a raw material suitable for all the three value chains. Project efforts are designed to allow partners to connect SMEs, farmers, universities, and research institutes within a value-added DanuBioValNet network. The partners intend to develop and implement a long-term, industry-driven roadmap for such collaboration along the entire value chain based on cluster partnerships for these processes. Focusing on the selected high potential sectors, and harnessing the nature of regional clusters within wider cross-regional selected value chains, DanuBioValNet will implement pilot actions, involving SMEs, universities, research institutions, policymakers, and civil society among others. The pilot actions serve as the prerequisite for creating a blueprint for cross-regional cooperation.

LIST OF ABBREVIATIONS

AC	Academia
BSO	Business support organization
CI	Cluster
EC	European Commission
EU	European Union
IND	Industry
GACP	Guidelines on good agricultural and collection practices
NGO	Non-Governmental Organizations
MAP	Medicinal and aromatic plants
PPP	Public private partnership
R&D	Research and development
SME	Small and medium enterprise
TtT	The training of the future trainers "Train-the-Trainer"
VC	Value Chain
VET	Vocational education and training
WP	Work Package
WS	Workshop

GLOSSARY

Bioeconomy	Bioeconomy is the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy. Its sectors and industries have strong innovation potential due to their use of a wide range of sciences, enabling and industrial technologies, along with local and tacit knowledge. (Source: European Commission (2012). <i>Innovating for Sustainable Growth: A Bioeconomy for Europe</i> , p. 3)
Cluster	Clusters are geographic concentration of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate. (Source: M. Porter (1998). <i>On Competition, Updated and Expanded Edition</i> . Harvard Business Review Book, p. 213)
Cluster initiative	Cluster initiatives are organised effort to increase the growth and competitiveness of a cluster within a region, involving cluster firms, government and/or the research community. (Source: Ö. Sölvell, G. Lindqvist and Ch. Ketels (2003). <i>The Cluster Initiative Greenbook</i> , p. 9)
Cluster organisation	By a cluster organisation one should understand organised efforts to facilitate cluster development, which can take various forms, ranging from non-profit associations, through public agencies to companies. (Source: PricewaterhouseCoopers (2011). <i>Uncovering excellence in cluster management</i> , p. 6) Cluster management can be defined as the organisation and coordination of the activities of a cluster in accordance with certain strategy, in order to achieve clearly defined objectives. (Source: PricewaterhouseCoopers (2011). <i>Uncovering excellence in cluster management</i> , p. 3)
Cluster Policy	Cluster policy is an expression of political commitment, composed of a set of specific government policy interventions that aim to strengthen existing clusters and/or facilitate the emergence of new ones. Cluster policy is to be seen as a framework policy that opens the way for the bottom-up dynamics seen in clusters and cluster initiatives. This differs from the approach taken by traditional industrial policies which try (and most often fail) to create or back winners. (Source: European Commission (2016). <i>Smart Guide to Cluster Policy, Guidebook Series: How to support SME Policy from Structural Funds</i> , p. 11)
Eco-innovation	Eco-innovation aiming at significant and demonstrable progress towards the goal of sustainable development. Eco-innovation projects will therefore aim to produce quality products with less environmental impact, whilst innovation can also include moving towards more environmentally friendly production processes and services. Ultimately, they will contribute towards the reduction of greenhouse gases or the more efficient use of various resources. (Source: European Commission (2015). <i>Eco-innovation, When business meets the environment. FAQ: What is Eco-Innovation? Online.</i>)
Smart Specialisation Strategies – S3	Smart Specialisation is a strategic approach to economic development through targeted support for research and innovation. It involves a process of developing a vision, identifying the place-based areas of greatest strategic potential, developing multi-stakeholder governance mechanisms, setting strategic priorities and using smart policies to maximise the knowledge-based development potential of a region, regardless of whether it is strong or weak, high-tech or low-tech. (Source: Foray (2015). <i>Smart Specialisation, Opportunities and Challenges for Regional Innovation Policy</i> , Routledge.)
Value Chain	The value chain describes the full range of activities that firms and workers do to bring a product from its conception to its end use and beyond. A value chain refers to the full lifecycle of a product or process, including material sourcing, production, consumption and disposal/recycling processes. This also includes activities such as design, production, marketing, distribution and support to the final consumer. (Source: University of Cambridge (2017). <i>What is a value chain? Definitions and characteristics. Online.</i>)

I. BACKGROUND AND RELEVANCE

IMPORTANCE OF SELECTED VALUE CHAIN - VC

The Phytopharmaceutical industry or Phytopharma is comprised of “health-related products derived from plant sources”. These include bio-active ingredients for pharmaceutical grade medicines, natural herbal medicines, cosmetics, cosmeceuticals, nutraceuticals, nutritional supplements and similar health-related natural products. The world market is worth about 250 billion Euros¹. European Union takes about 45% of world’s total share while United States holds about 20% and Japan around 11%. Annual growth of the market is about 7% mainly due to the increased perception that natural is healthier than synthetic products. The trend is also going along with more natural lifestyles and

the desire of people to be actively involved in their own health improvement. The reason for selecting Phytopharma as the one of the most promising value chains in Danube region stems from the advantages of the project partners’ regions and the potential for growth. Also of importance is the presence of the agglomerations of firms and actors that operate in Phytopharma sector along with cluster organizations as some of the key drivers of change. The partners of the DanuBioValNet project agreed that Phytopharma is a high potential value chain that allows partners such as SMEs, farmers, universities, and research institutes to connect within a value-added DanuBioValNet network.

RELEVANCE

A wide variety of productive activities relating to the cultivation, harvesting and transformative processing of medicinal and aromatic plants (MAPs) can be found throughout the countries of the Danube region. The DanuBioValNet partners

are interested in understanding how to support the creation and expansion of opportunities for value-added activities associated with Phytopharma industry.

PHYTOPHARMA CLUSTERS IN THE DANUBE REGION

The Danube region is among key players in the (Phyto)pharmaceutical industry in Europe. Almost half of all firms operating in the industry are based in the Danube Region (42.9 %). They employ a workforce of more than 1.5 million, representing 30% of all sector-specific jobs in Europe². Also, the region is home to a group of excellent

clusters as defined by the Cluster Observatory³. The industry is also boosting jobs in gazelles and has enabled the Danube region to become a hotspot of the Phytopharma in the global market⁴. The Composition of the Phytopharma value chain, developed within the DanuBioValNet project, is illustrated below.

Figure 1: DanuBioValNet Phytopharma value chain



Source: Cluster Mapping Synthesis Report, Phytopharma, 2017

1) Source: Euromonitor International

2) http://www.interreg-danube.eu/uploads/media/approved_project_public/0001/14/c4ee467fd27c757629fc92025686fe15257952d6.pdf

3) Clusters of each EU region are being determined by giving a “Cluster Star”, 1-3, depending on the value of the following dimensions: specialization, absolute size, productivity and dynamism. 50% of all European regions with two or more Cluster Stars in the Phytopharmaceutical industry are located in the Danube Region.

4) Besides European frontrunner regions, like Prague region, many others show strong indicators in terms employment, number of enterprises, fast growing firms (Gazelles), or terms of regional specialization.

Challenges and Opportunities. To increase the impact of clusters on jobs and innovation in Danube region as well as to increase the performance of cluster firms, farmers/cultivators, significant improvements are necessary in the key dimensions of framework conditions that provide an overall supportive environment in which clusters may emerge and flourish. It is of critical importance for cluster management at the level of firms, academia and policy makers, to exert pressure on productive capabilities and on facilitation of vertical

and horizontal linkages along the emerging value chains. Without both, Phytopharma clusters will not be effective, innovation and jobs will not be created and market opportunities will be exploited with other regions. These are also necessary conditions for existing clusters to become excellent clusters and, at the same time, for new clusters to emerge. The main gaps, missing links and related regulations and legislation have been identified along the value chain.⁵

Table 1: Gaps, missing links and regulations of DanuBioValNet Phytopharma value chain

Gaps	Missing links	Regulation / Legislation
<ul style="list-style-type: none"> · Lack of Human resources · Lack of sufficient Technologies · Uncoordinated wild collection (mainly unemployed people, only partly organised by intermediaries) · Suitable machines for all steps connected to the farming and harvesting of the plant materials 	<ul style="list-style-type: none"> · Clusters · R&D capacity · Laboratories to provide compliance with EU regulations · Training / Technical assistance in terms of quality improvements 	<ul style="list-style-type: none"> · Standards · Stable high-quality standards regarding e.g. pesticide pollution, contamination of the plant material by false treatment, etc. · Better regulation on the EU level regarding use of phyto-based medicines and prevention of pesticide pollution

Source: Value Chain Mapping Synthesis Report: Bio-based packaging

Market. As the average age of consumers of MAP-related products continues to advance upward, the demand for Phytopharma-related dietary aids, nutritional supplements, skin care remedies products and related cosmetic and personal hygiene products has also grown proportionately. This advanced demographic age group is primarily evident in major Phytopharma markets like Europe, U.S. and Japan.

Regulation. Along with this market trend, growing attention is being given to the regulatory provisions that govern the sale of Phytopharma and other MAP derived products intended for human health care. Even though plant-based remedies have special legal status in many countries, they can be considered equal to synthetic drugs in terms of their quality, safety and efficacy standards. The special status of botanical medicines is due to their complex composition and the resulting challenges for analytical methodologies and activities tests. The DanuBioValnet Value Chain mapping shows that varying degrees of regulatory compliance apply to Phytopharma production cycles in accordance with the nature of the phyto-chemical compounds, their applications, safety profile and

health claims. In addition to regulatory specifications that affect the value-added activities and procedures all along the MAP value chain, the occasional incidence of “adverse events” is also part of the information cycle for effective regulation on behalf of the consumer.

The complex regulatory framework of the wide topic of phytopharmaceuticals is affected, among others, by the Herbal Directive (Directive 2004/24/EC⁶), Nutrition and Health Claim rules (Regulation (EC) No 1924/2006⁷) as well as the Novel Food legislation (Regulation (EU) 2015/2283⁸). The Phytopharma area might also be affected by the new regulations on medical devices (Regulation (EU) 2017/745 and Regulation (EU) 2017/746⁹) as well as other national regulations. The regulations are likely to increase mid- to long-term.

Phytopharmaceuticals are competing on the market with synthetically-derived products. In comparison to those products, phytopharmaceutical products are under increasing demand. This is partially due to growing sustainability standards promoted by consumers and legislative bodies¹⁰. To ensure sustainability, the compliance and

5) http://www.interreg-danube.eu/uploads/media/approved_project_public/0001/14/98156d92f0c112aaa1de3a5ba30888cde23ff671.pdf

6) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:136:0085:0090:en:PDF> (status as of 02/2018)

7) <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1924-20141213> (status as of 02/2018)

8) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015R2283> (status as of 02/2018)

9) <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2017:117:TOC> (status as of 02/2018)

10) DECHEMAe.V. 2017, Phytoextracts – Proposal towards a new comprehensive Research Focus; ProcessNet-Subject Division Plant Based Extracts – Products and Processes

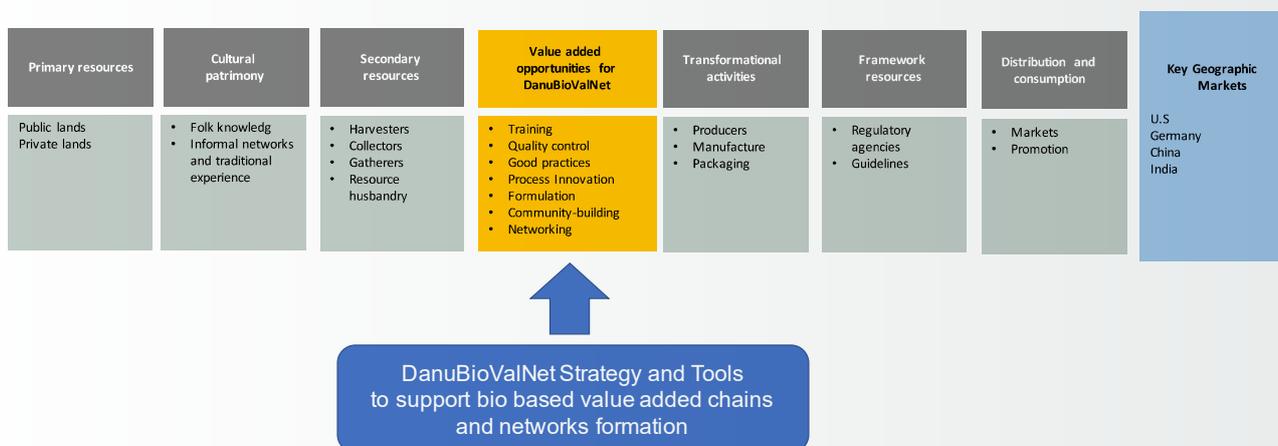
surveillance of “Good Agricultural and Collection Practice (GACP)”¹¹ and the Nagoya protocol¹² will be of increasing interest. Businesses in the sector have a core understanding of developing these standards due to intrinsic business motivation as well as the need for obtaining high quality of the raw materials.

Technology. Technological innovation associated with the extraction of active ingredients from harvested plant materials has been subject to important advancements in reducing or altogether eliminating the use of chemical solvents in this process. From the consumer standpoint, any improvements or refinements instituted along the MAP value chain can eventually be reflected in the authorized label at the point of purchase. An increasingly educated consumer base has growing expectations relating to quality, safety, transparency and traceability of the Phytopharma products made available to them. A serious lack of R&D facilities is one of several missing links in the Phytopharma value chain in the Danube region. However, the sector itself is highly technologically intensive and will continue to demand

high-tech solutions for harvesting and drying technologies, compound identification, traceability of the product with genetic markers, and more. This need is also reflected by the Bioeconomy strategy of the EU, which is scheduled to be readjusted by autumn 2018. The intention is to strengthen R&D for accelerating applications as well as to strengthen the agricultural and forestry sector.

Value - added opportunities along value chain. The Phytopharma DanuBioValNet value chain challenge is considerable. Regional strategies aiming to further develop the phytopharmaceutical industry and related value chains are not currently part of any regional strategies of the DanuBioValNet partners. Cluster programs to support Phytopharma Cluster development do not currently exist. Farmers, cultivators, pickers have not been considered as a part of any cluster initiatives or industrial strategy. In some regions these groups have been part of the agriculture-related policies and actions. Existing clusters are challenged to adapt to very different modes of collaborative arrangements involving both vertical and horizontal relationships.

Figure 2: Value Added Opportunities



Source: Phytopharma day Stuttgart, Follow-up memo December 5, 2017

The Danube Region has an opportunity to further enable its “branding” for Phytopharma cluster excellence and products in line with the above-mentioned qualities and standardization of value-added activities and related conditions. Forming strong alliances will help the whole value chain in attracting investors and cooperation-building to achieve common goals, and to strengthen the sector.

Currently, the value chain has several non-contributing intermediaries. Minimizing the dependency on these by developing new databases, networks and payment methods will help to ensure increased profits for both cultivators/collectors and sales. New markets on the local and global level will likely be developed as the overall market increases on the global and local level. The development of new databases and knowledge networks is of critical importance for staying informed about the market tendencies and opportunities.

11) http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2009/09/WC500003362.pdf (status as of 02/2018)

12) <https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf> (status as of 02/2018)

II. WORKSHOP RESULTS

OBJECTIVE OF ROADMAPPING WS

A roadmap is a specialised type of strategic plan that outlines activities that an organisation can undertake over specified timeframes to achieve stated goals and outcomes. It provides clear linkages among tasks and action priorities for the near, medium and long term. The Phytopharma Roadmapping workshop was held in Belgrade on the 17th of April, 2018 in the organization of project partner from Serbia, Innovation Centre of the Faculty of the Mechanical Engineering - ICME. The event had the support from the partners from Bulgaria, ABC, and Baden-Württemberg, BIOPRO.

The objectives of the Phytopharma workshop were to:

- Discuss the challenges and opportunities already identified in the preparation phase - future trends and upcoming legislation, gaps in provision of services, missing links associated with knowledge development related to Phytopharma in the Danube region;

- Exchange and share of experiences among the participants, including the representatives from industry, academia and government;
- Elaborate activities, time frame, and responsible person-authority that will address the challenges and opportunities identified.

In organizing the Roadmapping workshop, the partners intended to collect information and ideas from the “real world”. The workshop participants were encouraged to bring up ideas that will serve as inputs for the strategic actions in supporting the creation and expansion of opportunities for value-added activities associated with the Phytopharma VC.

The outcome of the workshop is intended to provide the input for the Joint Bio-based Industry Cluster Policy Strategy (WP4), new cluster management services (WP5) and the identification of feasible pilot actions (WP6).

APPROACH AND METHODOLOGY

The Roadmap Phytopharma Value Chain workshop was a four-hour's interactive event that included two plenary sessions and three parallel sessions. The languages of the workshop were English and Serbian with the services of an interpreter.

During the first plenary session, introductory papers and case studies were presented. The presentations served to frame the discussion in three working groups. The three working groups, organized in parallel sessions, were focused on 1) Gaps in provision of services related to Phytopharma, 2) Missing Links and knowledge development and 3) Future Trends and Upcoming Legislation.

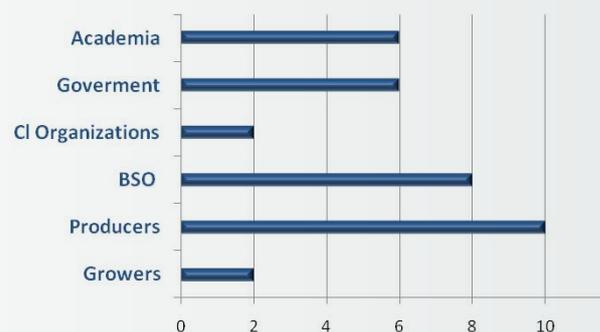
The participants were asked to join one of the groups depending on their competences and interest. They were encouraged to be active in developing the roadmap and, at the end, to present the results to the rest of the groups. An experienced moderator was appointed to conduct each of the parallel sessions, introducing the methodology to the participants, doing the introductory presentations, leading the discussions and stimulating the group to work together and record the proceedings.

At the final plenary session, the working group representatives were presenting the findings of the parallel sessions of each group. The feedback from the other groups contributed to encompassing different perspectives.

Parallel Session Topics

- 1) Gaps in provision of services related to Phytopharma
- 2) Missing Links and knowledge development
- 3) Future Trends and Upcoming Legislation.

Figure 3: Workshop Participants Composition



THE PARTICIPANTS OF THE WORKSHOP

A proper mix of participants coming from different areas ensured a high quality of discussion. Besides the proper expertise, the balance of organisational representation is ensured within and across the industry, government, academia and NGO communities. The total number of the participants was 34 from 4 countries: Germany (Baden-Württemberg),

Bulgaria, Serbia and Slovenia. There were 6 participants from academia, 6 from government, 8 from business support institutions, 2 from cluster organizations, 2 growers and 10 producer companies. The participating persons had a good knowledge of the regional structure of the industry, as well as of the principal actors in the industry.

WORKSHOP RESULTS

The participants were engaged in discussions in three parallel sessions. The findings of the sessions are presented below.

Parallel session 1: Gaps in provision of services, elaborated on current gaps and future needs for the Phytopharmaceutical sector. The Session was chaired by Dr. Angel Konakchiev, from Bulgarian Academy of Science, Centre for Phytochemistry,

and Mr. Nedelcho Belichev from the company Naturebase, Bulgaria. The participants of the Session coming from three countries, Serbia, Bulgaria and Slovenia, were mainly plant growers, entrepreneurs, advisors and researchers. The Session was facilitated by Darja Osvald, Anteja ECG. The findings of the discussion in Session 1: Gaps in provision of services related to Phytopharma are presented in table below.

Table 2: Findings - Gaps in provision of services related to Phytopharma

Identified gaps	Activities	Responsible	Time frame
Skills development	<ul style="list-style-type: none"> Specialized training programs on new methods for cultivation, cutting and collecting, drying and storage of plants Train the trainers programmes for collecting plant material New skills development related to new technologies 	<ul style="list-style-type: none"> Employers/big companies Agricultural advisory services VET institutions 	Ongoing short term
Visibility of Phytopharma	<ul style="list-style-type: none"> Awareness raising Clusters and cluster initiatives development Trust building; Networking 	<ul style="list-style-type: none"> Chambers of commerce Associations Clusters 	Mid-term, 2-3 years
Quality of plant material / Quality Control	<ul style="list-style-type: none"> Folk medicine revival Standardization; documentation Assuring adequate infrastructure for herbal material quality control Traceability of herbal plants Meeting the requirements of monographs 	<ul style="list-style-type: none"> Farmers/owners Associations Clusters Support institutions (laboratories, testing bodies) Related Ministry 	As soon as possible, 1 year
Data and information gaps	<ul style="list-style-type: none"> Introduction of IT services – traceability Web platform with related information and networking /communications tools Information for consumers of herbal products 	<ul style="list-style-type: none"> Related Ministry Chambers of commerce Statistical office Clusters 	Mid-term, 2-3 years

Parallel session 2: Discussions on missing links and knowledge development addressed the need for supporting R&D infrastructure for farmers and cultivators including high-tech applications and linkages within business networks. The Session was introduced and chaired by Dr. Slobodan Petrović, Faculty of Technology and Metallurgy and Ms. Vanja Tadić, Ph.D., Institute for Medicinal Plant Research, Serbia. The participants came from

three countries, Germany (Baden-Württemberg), Bulgaria and Serbia, and represented the research community, government, clusters and business support institutions. The Session was facilitated by Zorica Marić, ICME, Serbia.

The findings of the discussion in Session 2: Missing links and knowledge development were the following:

Table 3: Findings - Missing links and knowledge development

Identified gaps	Activities	Responsible	Time frame
Mismatch in industry/academia communication and cooperation	<ul style="list-style-type: none"> • Data base of scientific potential: tracking the interest of business; • Topic identification for cooperation-regular thematic WS; follow up • Support to project development • Dedicated funding schemes; evaluation and monitoring of the results • Promotion and lobbying; customer education 	<ul style="list-style-type: none"> • Researches have to be proactive • Cluster organizations, NGO • Government/national and regional/EU • Joint effort of NGO/IND/AC 	Immediate start; permanent activity Short term Permanent activity
Support the transfer of inventions towards innovations	<ul style="list-style-type: none"> • Cluster organizations initiation • Regional online platform 	<ul style="list-style-type: none"> • PPP/EU programs • Cluster organizations and BSO, funded by Gov. or privately • National/Regional/EU 	Mid term
Supporting Infrastructure	<ul style="list-style-type: none"> • Folk medicine revival • Standardization; documentation • Assuring adequate infrastructure for herbal material quality control • Traceability of herbal plants • Meeting the requirements of monographs 	<ul style="list-style-type: none"> • National/regional NGO/AC/IND/ GOV 	Short term to Mid term
Horizontal and vertical integration	<ul style="list-style-type: none"> • New cluster services • Regional online platform 	<ul style="list-style-type: none"> • Cluster organizations; BSO 	Short term to Mid term

Parallel session 3: This session focussed on Future Trends and Upcoming Legislation. It dealt with the need to have a better understanding of the business environment and future perspectives. The keynote for the Session was given by Prof. Dr. Ralf Kindervater, BIOPRO Baden-Württemberg GmbH, and Prof. Dr. Rainer Luick, University of Applied Forest Science, Rottenburg, Germany. The participants represented the research community,

government, industry, clusters and business support institutions from three countries, Germany (Baden-Württemberg), Bulgaria and Serbia. The Session was facilitated by Ana Aleksić Mirić, Faculty of Economy, Serbia.

The findings of the discussion in the Session 3: Future Trends and upcoming Legislation are presented in the table below.

Table 4: Findings - Future Trends and upcoming Legislation

Opportunities and Challenges	Activities	Responsible	Time frame
Sustainability: balancing economy, environment and social issues, holistic approach	<ul style="list-style-type: none"> · Regulations · Incentives · Taxes · Awareness raising · Support to the development of green technology and biotechnology 	<ul style="list-style-type: none"> · Political elites · Business · Expert groups · National/Regional/EU policies; PPPs 	Mid to long term
Demographic change: Aging population; Depopulation of villages	<ul style="list-style-type: none"> · Building health consciousness · Supporting going back to villages 	<ul style="list-style-type: none"> · Expert groups, NGOs, Media · Political elites · Urban planners/ Business/NGOs 	Mid to long term
Complex Legislation	<ul style="list-style-type: none"> · Information · Online platform 	<ul style="list-style-type: none"> · National/regional NGO/AC/IND/ GOV 	Short term to Mid term

III. RECOMMENDATIONS AND INPUTS FOR WP4, WP5 AND WP6

WP4 JOINT BIO-BASED INDUSTRY CLUSTER POLICY STRATEGY

The analyses previously carried out under the Project activities WP 3.2 and WP 3.3, along with the insights and views of the Phytopharma community during the Roadmapping sessions, revealed that there are great opportunities for this fast-growing sector. While said opportunities can be better exploited on a regional Danube level, there are also

great challenges that have to be addressed in a comprehensive manner through a Joint Bio-based Industry Cluster Policy Strategy. The main recommendations from the Roadmapping sessions that can serve as inputs for the Strategy are presented in the table below.

Table 5: Recommendations for the Bio-based Industry Cluster Policy Strategy

Topics / Issues	Recommendations/ Solution Proposals
Visibility and promotion of the sector	<ul style="list-style-type: none"> · It is recognized that all stakeholders, political elites together with business elites and vocational experts should be involved in a promotion/media coverage and lobbying for the Phytopharma industry, also in customer education as a permanent activity. · The knowledge about plant-based ingredients and active agents, once widely applied by broad public, should get in the focus again by promoting the science-based advantages of phytopharmaceuticals. · Involving main actors and supporting the cluster initiatives and strengthen cluster management. · Development of an ecosystem of Phytopharma stakeholders and consumers and use local "champions" to convey the message. · Translation of important documents and best practices into national languages and vice versa. · Development of a web-platform with related information, databases and networking /communications tools.

Topics / Issues	Recommendations/ Solution Proposals
Lack of skilled workforce	<ul style="list-style-type: none"> • Review and benchmark of the existing training programs and VET needed for farmers and pickers in the Danube region, align it with current needs; • Development and availability of on-site trainings for them; define the incentives for businesses to engage in provision of such trainings.
Lack of service provisions for farmers, intermediaries, SMEs	<ul style="list-style-type: none"> • There is a need to interlink actors/stakeholders with related support institutions: laboratories, certification bodies, advisory services on national level and Danube wide; appropriate modality to be discussed. • The support to the establishment of Cluster organizations where they do not yet exist; Capacity building of cluster organizations to be able to provide relevant services to their members, including linking to other support institutions. • Commit all stakeholders at the national and Danube level to develop support environment for sustainability and quality assurance of plant material. • Nationally and internationally harmonized procedures for quality plant material and simplification of administration for compliance is needed.
Industry/ academia communication and cooperation	<ul style="list-style-type: none"> • A central Danube-wide as well as national contact points, e.g. in form of a database for a specific region should be developed. The database could provide basic and expert knowledge on cultivation/harvesting and processing strategies, pests and adjustments of machinery for harvesting, knowledge about plant and soil ecology, etc. • The database could further serve as a technology/knowledge offer and request portal, science and business-related matchmakings and a follow up on project development, funding identification. It is suggested that the time frame for the development of the central contact point should be determined as soon as possible. • Dedicated governmental national/Danube region/EU funding schemes, in support of the transfer of inventions towards innovations, e.g. support to pilot schemes, commercialization strategies of technology driven start-ups, etc.
Holistic approach to economy, environment and social issues	<ul style="list-style-type: none"> • Consistent and logically developed regulatory framework which should serve to promote and support highly ethical and economically justifiable business. Tax incentives as well as other forms of incentives should be introduced (where they do not currently exist) to promote Phytopharma. Political elites should promote sustainability in the phytopharmaceutical industry, together with business elites and vocational experts. • Incentives for the technologies that should help in bringing sustainability issues in front, especially the development of green technology and biotechnology.
Demographic change: Aging population; Depopulation of villages	<ul style="list-style-type: none"> • Aging population has several important implications for phytopharmaceutical business: (1) elderly population is becoming an important issue for traditional healthcare systems in various ways; (2) elderly population has high health consciousness, which turns them into users of not only conventional healing remedies but also of the growing market of phytopharmaceutical products and services. • Depopulation of villages in South Eastern Europe is evident and represents a great obstacle for the development of phytopharmaceutical input base – among others, plant cultivation, collection, harvesting and many more. • General consciousness about healthy life styles and the advantages of living in non-urban areas is of key importance in meeting this challenge. The political elites, urban planners, and also, business and NGOs should be called upon for building an adequate infrastructure to support high-quality life standards in rural areas as they are in urban areas – road infrastructure and Internet access, new job possibilities as the most important, among others. That would be the task of a long-term strategy.
Complex legislation	<ul style="list-style-type: none"> • Spreading the information • Lobbying

WP5 OPEN SPACE INNOVATION ARENAS AND NEW CLUSTER MANAGEMENT SERVICE

During the Roadmapping workshop, the participants pointed out the need for several cluster services:

- Networking and matchmaking - topic identification for the cooperation
- Networking and matchmaking - regular thematic WS with follow up
- Support for project development
- Support for commercialization of cross-sectoral innovation including funding opportunities, finding partners, project development
- Matching suppliers-buyers
- Internationalization of cluster services

WP6 PILOT ACTIONS

The proposed pilot actions could address the main issues, challenges and opportunities that were discussed during the workshop, such as visibility, industry/academia communication and cooperation gap, holistic approach to economy, environment and social issues.

A central Danube-wide CONTACT POINT, in the form of a Phytopharma knowledge/exchange platform should be developed. The Phytopharma CONTACT POINT could provide basic and expert knowledge on cultivation/harvesting and processing strategies, pests and adjustments of machinery for harvesting, knowledge about plant and soil ecology, legislation, regulatory, and other issues. Already existing national organizations on the Danube level should be interlinked and also supported in the development of national contact points where they do not yet exist.

The CONTACT POINT could further serve as a technology/knowledge offer and request portal for companies and research institutes that are in need of cooperation along the value chain. As many SMEs do not have the abilities to formulate projects on their own, the CONTACT POINT along with the manager of the national/local contact point could help in identification of current science- and business-related matchmakings. Additionally, the CONTACT POINT could support a follow-up on the joint project development, including funding identification, with partners who want to cooperate in forming new project partnerships.

Informational and matchmaking events for fostering the cooperation and know-how on the Danube level could be an additional service on the part of this CONTACT POINT. Also, e-learning

courses could be developed for presentations of lectures on topics of interest to the cluster participants.

The organizational structure of the Danube-wide as well as the national platform should be a cluster or non-governmental organization that acts as a central point for national/regional organizations in contact with regional stakeholders. The managers should proactively work together with national and regional stakeholders. The companies and research institutes need to be proactive on behalf of their own interests.

The system should be built in different languages, as well as different levels of knowledge should be introduced: level 1 with general information, level 2 and level 3 with upgraded services. The content should be collaboratively modified.

Regarding the time frame of the development of the central CONTACT POINT, the expert group suggested that it should be established as soon as possible. Where no CONTACT POINTS exist, the regional/national contact points should be developed within 3-5 years, along with the Danube-wide CONTACT POINT.

A fast track to develop Phytopharma CONTACT POINTS could be the support to the currently existing cluster-organisations or business support organisations that deal with bio-related industries to upgrade their services towards Phytopharma.

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