



Interreg



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DanuBioValNet

Country Report

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

Framework Conditions for Cluster Development in bio-based industry
in **Serbia**

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Introduction

I. Description of the region

Serbia is upper middle income country with the population estimated at 7.1 mil in 2015. Agribusiness presents an important part of total economy, contributing a significant part to the total GDP. Agricultural land was last measured in 2011 at 70.9% of the land area, excluding land under trees grown for wood or timber. Arable land and permanent crops account 71% of the total agricultural land. Most of the area of agricultural land is used for cereal crop production. This production (wheat, barley, rye, oats, maize, millet and sorghum) takes up about 60% of the total seeded areas. Maize is predominantly present, with more than 1.2 million seeded hectares. When it comes to maize production, Serbia ranks No 5 in Europe – after France, Ukraine, Romania and Italy. Serbia is among the leading countries in Europe in oilseeds production, particularly soy and sunflower. Field crop production meets the needs of national processing industry and the available surplus is exported. The total quantity of biomass in Serbia is about 3.3 Mt per year, but available quantity of straw stubble cereals for the production of biomass is 1.83 million tons. According to the official statistical energy balance of Serbia in 2012, energy from wood participates in the total balance with 3.2%.

Agricultural land per capita is high in Serbia. The farm structure comprises of large number of small holdings, and a small number of large formerly owned state farms (at varying stages of privatization). Additionally there are a small number of medium size private farms that are emerging and operating on a commercial basis.

Area of Serbia has significant natural resources of wild medicinal plants. The latest data on plant diversity indicate the presence of nearly 4,000 indigenous plant species of which 18% are medicinal plants of high quality, high content and appropriate composition of active substances. This is due to extremely favorable environmental and climatic conditions, as well as the non-contamination of soil, air and water. At the same time, areas under cultivated or plantation grown medicinal herbs are larger every year. Production of traditional herbal medicines and dietary supplements, has recorded considerable growth since 2005. In the last 10 years the participation of Serbia in the total imports of medicinal plants and products based on medicinal plants in the European Union increased from 0.43% to 3%, indicating a solid potential of herbal products industry in Serbia.

Areas under orchards occupies about 6% of cultivable land areas, production structure is dominated by stone fruits (drupes) with 56% share, followed by pomes (28%), berry fruits (14%) and nuts (2%). In terms of value of exports, raspberries top the list. The share of raspberries in the total value of fruit exports is 47% (ranks No.3 in the world). Most of the produced fruits are processed. Cold processing (frozen fruit) is much more present than thermal processing (canned fruit).

Forest area in Serbia was last measured at 29.1% of land area, out of it 51% is state-owned and the remaining 49% (1.3 million ha) is privately owned. The forests are managed by two Public Enterprises and also by 5 National Parks. Serbian forests are dominated by broad-leaved trees accounting for 88% of forest areas, and as for tree species, the most widely present ones are oak and beech. Forests with conifer trees are widespread in the south-west of the country and dominated mostly by spruce and pine trees. The average size of lots in privately owned forests is about 3 hectares, which does not allow the sustainable management.

II. Bio-based industry key assets in Serbia

Key assets of bio-based industry in Serbia are:

- Favorable natural conditions for bio-mass production
- Relatively developed agro-processing and wood-processing industry
- Emerging innovative SMEs in phyto-pharma, bio-energy and construction sectors
- Biotechnology, agriculture and food, energy efficiency are the most represented in innovation oriented R&D activities of the Serbian research community.

III. Stage of development

The stage of development of the clusters is primary biomass production could be evaluated as a Drive to maturity stage (DMS), and also agro- processing, apparel, automotive and construction, the other industry clusters are in Initial stage and take off (IS).

Current situation in the region

I. Key driver, Innovation landscape

Agro-processing industry, primary production and processing industry related to agriculture, presents a vital part of the Serbian economy, with big influence of foreign trade balance of the country (12,81% of total foreign trade of Serbia is agricultural and, at the same time, it is the only part of the economy with surplus in foreign trade). This sector is underrepresented by Cluster organizations. There are 18 of them without critical mass and influence to be regarded as a driving force.

Wood processing and furniture industry includes 2.182 companies employing 22,965 workers, mainly engaged in wood processing (1,504), while others are engaged in the manufacture of furniture (678), with a steady positive growth trend over the past few years. The companies are traditional, stacked in low margin market. Nationwide Cluster organization is well connected and respected among the members with services that are following the present needs of the companies.

Companies engaged in production of traditional herbal medicines, dietary supplements and cosmetics are small to medium size, innovation oriented, gathered in the network „Herbal pharmanet” - herbal raw materials and herbal products cluster. The cluster organization provides limited range of services.

Fashion and apparel industry is well positioned and growing, based on imported fabrics and fibers, with substantial quantity of textile waste which is not exploited so far. Well organized and efficient Cluster organization is representing their interests.

Automotive cluster and Construction cluster organizations have long experience in supporting networking and competitiveness of respective industries, operating, the former on national level, and the later on regional level. Specially, Construction cluster is active in promoting the use of bio-based materials in construction industry.

There is no biopolymer production in Serbia. Some state owned former big companies, e.g. big scale cellulose pulp and fiber producer, are facing bankruptcy. Still, substantial resources are devoted to biopolymer research within few Faculties and Institutes of the University of Belgrade. On average, the results that, besides scientific, have

practical application in biotechnology and agriculture refers to 10% of the overall scientific results, according to the Report on the state of science, 2015. The overall scientific and research potential is important but not used enough for the benefits of the economy.

II. Cluster development/cluster landscape

1. "HERBAL PHARMANET", Producers of herbal raw materials and herbal products association, Obrenovac
2. "AC SERBIA", Automotive cluster, Belgrade
3. "FACT"-FashionApparelClusterSerbia,Belgrade
4. "Dundjer" - Construction cluster, Nis
5. ICT Net, Belgrade
6. BIO-NAUČNI KLASTER-bio-science cluster, Subotica
7. Agency for wood, Wood-processing cluster, Belgrade
8. "KLASTER AGROINDUSTRIJA", Agro- industry cluster, Subotica
9. UDRUŽENJE "AGRO KLASTER HOMOLJE" , Agro- industry cluster East Serbia
10. KLASTER "VOGANJ", RUMA Agro- industry cluster
11. FRUŠKOGORSKI KLASTER VINOGRADARA I VINARA "ALMA MONS", Cluster of wine growers and winemakers of Fruška Gora
12. Pannonia fruit and vegetable producers Cluster, KUCURA
13. Vojvodina Organic agriculture cluster, Novi Sad
14. "ECOPANONIA", Cluster for Ecological Energy and Ecological Culture Novi Sad
15. ENEF KLASTER, NOVI SAD "Cluster for Energy Efficiency" Novi Sad.
16. KLASTER VOJPLAST, Packaging cluster SUBOTICA
17. SRBIJE "POLUKS", Association of food manufacturers, KIKINDA
18. ALKO KLASTER - Cluster of grapes, fruit, wine and brandy producers, South Serbia
19. KLASTER PANONSKA PČELA, Honey and honey-based products clusters, Novi Sad

Key asset	Primary biomass sector	Food & Feed	Pulp & Paper	Chemicals	Polymers	Phyto-pharma	Textile & Clothing	Energy	Construction
Cluster organization	X	X				X	X	X	X
Enterprises	X	X	X	X		X	X	X	X
Policy makers	X	X							X
Knowledge institutes	X	X		X	X	X	X	X	X
Biomass supply	X	X	X	X		X		X	
Competitive bio-based industry product on the market	X	X				X	X	X	X
Funding								X	
Policies, programs and regulations	X	X		X		X		X	X

III. Where has a given region /country relevant strengths and opportunities

Serbia has strengths in Primary biomass, Food & Feed production, Phytopharmaceuticals, Textile & Clothing, Energy, Construction industry.

Transportation

Inland water transportation is underdeveloped; there is the opportunity of the development of integrated transport. Several initiatives and projects are ongoing.

Human resource

Approximately, 16% of the total number of the students with secondary and tertiary education is related to bio-based industry. Approximately the same percentage of the other professionals educated in other engineering and IT departments

at universities in Belgrade, Novi Sad, Kragujevac, Nis, Novi Pazar could potentially be engaged in bio-based industry, in total, the industry can count on around 33% of working population.

Exploit technical managerial and other know-how from your region worldwide?

Registered patents are mainly related to agriculture, food processing, fish production, agricultural machines, bio-energy productions, polymers, polymeric biomaterials, recycling and degradation of the polymer and herbal extracts for the cosmetic and medical use. Besides domestic production, herbal extracts are exploited outside the region.

Regional Bio-based industry Strategy

Criteria	Indicator	Region	
		2010	2015
Land use	Forestry land (% of total land area)	28%	29,1%
	Agricultural & horticultural land (% of total land area)	70%	70,9%
Biomass availability	Agricultural biomass production (kg/capita]	230kg	235 kg
	Blue biomass production (kg/capita)	10Kg	10,57Kg
	Forestry biomass production (kg/capita)	210kg	215kg
	Waste production (kg/capita)	28%	29,1%
Innovation	SME birth rage (% of total firms in region)	9%	15,12%
	R&D expenditure (index (EU = 1))	0,34	0,44
	R&D employment (% of total employment in region)	4,7%	4,8%
Industry size	Firms in total bio-based industry sectors (% of total firms in region)	8,1%	8,17%
	Employment in total bio-based industry sectors (% of total employment in region)	21%	20%
	Firms in primary biomass sector (% of total firms in region)	2%	2%
	Employment in primary biomass sector (% of total employment in region)	*4,2%	4%
	Firms in food & feed sector (% of total firms in region)	3,80%	3,88%
	Employment in food & feed sector (% of total employment in region)	6,8%	6,7%
	Firms in paper & pulp sector (% of total firms in region)	0,70%	0,71%
	Employment in paper & pulp sector (% of total employment in region)	0,39%	0,38%
	Firms in chemicals sector (% of total firms in region)	0,71%	0,70%
	Employment in chemical sector (% of total employment in region)	0,84%	0,83%
	Firms in polymers sector (% of total firms in region)		
	Employment in polymers sector (% of total employment in region)		
	Firms in phytopharma sector (% of total firms in region)		
	Employment in phytopharma sector (% of total employment in region)	0,36%	0,36%
	Firms in textile sector (% of total firms in region)	0,52%	0,51%
	Employment in textile sector (% of total employment in region)	2,75%	2,70%
	Firms in energy sector (% of total firms in region)	0,37%	0,38%
	Employment in energy sector (% of total employment in region)	2,5%	2,4%
Quality of workforce	Secondary & Tertiary education in bio-based industry (% of total population in region)	15%	16,02%

I. Is there a specific regional Bio-based industry strategy? On which pillars is the strategy focused? Is there a smart specialization strategy? Is the strategy focused on Value Chains?

There are no specifically defined strategies relating to Bio-based industry in Serbia. Bio-based industry is mentioned in several documents:

- "National strategy for sustainable development" 2008-2017, setting up the basis for various measures that affects bioeconomy: tax incentives for the expansion of the territory covered by forests; incentives for the production and use of energy from renewable sources; subsidies for the production of "energy" crops etc.
- National Strategy on Economic Development

of the Republic of Serbia 2006-2012, defined strategic sectors, mostly related to bioeconomy: bio part of the chemical industry, pharmaceuticals, food industry - but was not followed by the operational Action plan. Industrial strategy and policy of development 2011 - 2020, didn't emphasized specific sectors. The public debate about priority sectors is ongoing.

- "Strategy of Scientific and Technological Development 2010-2015" defined 7 priorities, 4 of them related to bio-based science: bio-medicine, energy and energy efficiency, agriculture and food. The budgetary resources were channeled according to these priorities and the fundamental, applied and developmental research results are mainly related to bioeconomy. "Strategy for Research for Innovation, Scientific and technological development 2016

- 2020" is mainly focused on the framework and infrastructure development, including clusters, not emphasizing specific sectors.
- Smart specialization strategy is at the very beginning of the development. Inter-ministerial group is established led by the Ministry of education, science and technological development. Due to the position in the innovation system of Serbia, the Innovation Center will be able to present the results of the Project and participate in defining the priorities.
- "Strategy for SME development and Action plan 2014 – 2020" in Pillar 4: Enhancing the sustainability and competitiveness of SMEs, M1 – Support to joint participation on the market, envisages a continuation of the program of financial support for cluster development, with special emphasis on the development of joint products and joint participation on the foreign markets. Serbian Development Agency implements this measure - limited in scope and with very limited resources.

II. How is Bio-based industry supported?

Bio-based industry is not systematically supported, but some individual measures are in place like budgetary allocation for R&D in strategic research fields aimed at increasing of applied and developmental results applicable in bio-based fields; support to export activities of the clusters without sectoral focus; incentives for the production of electricity from renewable energy sources and high-efficiency combined production of electricity and thermal energy (Ministry of Energy decree - "Official Gazette of RS", No. 56/2016)

III. Who are the authors of the strategy? Which clusters are involved?

The author of the strategy is the state administration, public debates were organized with interested parties, but clusters were not particularly involved.

Strategy implementation

Promoting innovation

Center for the promotion of Science - CPN has the goal to increase the general scientific literacy and thus assure the future technological progress in Serbia. Main activities are organizing promotions, lectures and workshops all over Serbia and editing numerous publications on science popularization. Every year the National Competition for the best technological innovation is organized including promotion and assistance to potential and existing high-tech entrepreneurs/researchers ready to translate their invention into innovation.

In line with the strategy, several programs and funding schemes with the competitive procedures are in place: the Ministry of education, science and technology development is funding research (fundamental and applied) and innovation activities of academia as well as innovative companies on the project basis.

The Innovation Fund, operational since 2011, finances innovative projects with potential for commercialization. Its primary goal is offering, on competitive basis, the financial instruments supporting early-stage innovation activities and stimulating research and development with commercial potential in private enterprises.

Improving infrastructure

The Innovation infrastructure is not comprehensive and complete, but some great improvements have been made in recent years. Besides

several Universities (the Faculties have more than 15 Departments that educate students and work on the research related to bio-based science), in all Departments and Institutes, the investments in research and testing laboratory equipment has been made, but still the main impediment is the lack of notification bodies. To support the main goal of the Strategy-strengthening the links between science and economy, Science-technology parks in 4 University centers are established and several technology incubators are functioning. Innovation fund is strengthened with several instruments aiming in supporting start-ups.

Workforce development

Formal education is organized nationwide (secondary level) and in University centers (tertiary level). Informal education is organized by Chamber of Commerce, Employment agency and by several NGOs, where cluster organizations have a clear role.

Framework conditions

Since, Serbia is in process of transition into functional democratic system and emerging market economy, frequent changes in legislation negatively influence business efficiency. It also leads to legal uncertainty and constitutes the basis for unjust court decisions. Despite significant progress, the current political and institutional environment has in many aspects unfavorable influence on business processes.

Future challenges for cluster development in bio-based industry

Organization (cluster organization reinforcement, clear membership, enrich services provided to cluster participants)

All Cluster organization active in bio-based industry (in Serbia) are networks of stakeholders in traditional industries- biomass producers or traditional industries such as pharmaceuticals, wood processing etc. The critical role of cluster organization is to help in defining new value chains and connecting its key actors: from biomass production, process technology, advanced bio-based materials and end-users of various industries e.g. Pharmaceutical, Automotive, and Packaging. The reinforcement of cluster organization is needed to be able to provide services to cluster participants that support in development of new application fields thus enabling to unleash the huge potential of bio-based Industry.

Actors (R&D providers)

The role of cluster organizations is to spread capacity and knowledge among all cluster actors and enable technology transfer. Biotechnology is a priority in the strategy for R&D and innovation in Serbia, and the majority of funds available were channeled to the development of new solutions related to Biotechnology, many of them suitable for industrial use. Cluster organization could unlock this potential.

Biomass supply

Bio-based industry uses renewable biological resources, biomass, for the production of bio-based products. The role of clusters is to provide the continual and secure biomass supply through cross-cluster cooperation.

Competitive bio-based products

All active Cluster organization has to work constantly on utilize the potential of bio-based industry - effective use of renewable bio resources and the production and commercialization of innovative value added products, especially through identifying cooperation opportunities in other Industries and regions and connecting different actors along the bio-based value chains.

Funding

Specific program for bio-based industry is needed with diversified PPP funding schemes.

Policies and measures

Serbia is at the beginning of S3 development and Cluster organizations are in position to do a lot on awareness about the potential of bioeconomy. Thanks to valuable insight knowledge about the sector they are working with, they can provide Inputs for the development of S3 and the Action plans for the implementation of the above mentioned Strategies that are recently adopted and to be credible partners to the Authorities.

Lessons learned

Individual measures, and specially cluster exclusion in its development, cannot unlock the potential of bio-based industry.

Key recommendations

Awareness about the potential of bioeconomy for the production of innovative value added products; Information about the potential, mobilization of the industry in providing inputs for the S3 and for the Action plan development; Identifying opportunities in other industries; Spreading capacity and knowledge being a liaison between industry and research community.

Annex

Definitions/Glossary

Clusters: Clusters are generally described as groups of specialised enterprises, often SMEs, and other supporting actors in a particular location that cooperate closely together.

Cluster initiatives: A cluster initiative is an organised effort aiming at fostering the development of the cluster either by strengthening the potential of cluster actors or shaping relationships between them. They often have a character like a regional network. Cluster initiatives usually managed by a cluster organisations.

Cluster organisations: Cluster organisations are entities that support the strengthening of collaboration, networking and learning in innovation clusters and act as innovation support providers by providing or channelling specialised and customised business support services to stimulate innovation activities, especially in SMEs. They are usually the actors that facilitate strategic partnering across clusters. Cluster organisations are also called cluster managements.

Cluster participants: Cluster participants are representatives industry, academia or other intermediaries, which are commonly engaged in a cluster initiative. Given the case a cluster initiative has a certain legal form, like associations, cluster participants are often called cluster members.

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.

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