



Interreg



Danube Transnational Programme

DanuBioValNet

Country Report

WP3 A-3.1.

***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 **Bulgaria**

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Introduction

I. Description of the region

Bulgaria has a long tradition in agriculture and many reserved areas rich in biodiversity, important prerequisites for the development of bioeconomy in the country.

There is a lot of biomass potential in Bulgaria. The woodland is about 38% of the total country area of Bulgaria and the agricultural land is about 47%.

Available biomass:

- Forest residues activities (branches and shrubs), wood from forestry, industrial wood waste (wood, sawdust, bark, scraps, black lye, etc.), building wood waste, solid agricultural waste (straw, corn and sunflower stems, vine leaves, fruit tree pruning branches, tobacco stems), fertilizer from livestock farms
- Compost: a product derived from the natural decomposition of plant and others biodegradable waste under the influence of bacteria and others microorganisms in the presence of sufficient oxygen, moisture at constant temperature.
- Energy crops include: annual energy crops (grain crop harvested together with straw, cereal, potatoes, sugar, beet, sunflower and rapeseed, etc.); perennial energy crops (fast growing tree species - poplar and acacia, fast-moving plantations of willow or poplar, elephant grass, etc.).
- Oil crops for the production of liquid biofuels (sunflower, rape, etc.);
- Industrial waste: - solid (paper, shavings, sawdust - woodworking, furniture industry, production of window frames, etc.); liquid (from the food industry, etc.).
- Urban waste: - solid (organic solid fractions from households and the commercial sector - over 70% of untreated waste is subject to biological decomposition); - liquid (waste water).
- Sludge from sewage treatment plants
- Phyto-pharmaceutical: organic herbs, some cultivated, like mint and lavender and some wild like lime, nettle and chamomile; organic plants - roses, lavender and mint; organic essential oils and derivatives - lavender oil, rose oil, peppermint oil; rosewater and lavender water, etc.
- Blue biomass - Seaweeds.
- Animal and vegetal waste, animal waste of food preparation and products, Animal faeces, urine and manure

II. Bio-based industry key assets in Bulgaria

Still not fully developed, but include:

Companies - including large-scale industries and small and medium enterprises have the leading role in successful development of the Bio-based industry in a region.

R&D and educational institutes and organizations provide pivotal innovation, knowledge and know-how which makes the development of bio-based products possible.

Policy makers help to create "fertile soil" for Bio-based industry by providing governance, institutional structures and adequate financial support

Biomass resources and supply (listed above),

Competitive bio-based products for the market:

- Herbal Phyto-pharmaceutical products
- Pellets
- Rose, lavender and other oil products: cosmetics, pharmaceuticals
- Timber houses
- Furniture
- Renewable energy
- Textiles
- Bio oils

III. Stage of development

The stage of development of bio-based industry is in its initial stage. Bulgaria belongs to the group of Modest Innovators in the Innovation ScoreBoard, meaning that is well below that of the EU average. Bioeconomy is assumed to be a relatively new paradigm to the major share of the Bulgarian business. At the same time leading innovative Bulgarian companies, though limited in number, might be excellent showcases at EU level or globally, demonstrating how adopting bioeconomy principles impact their performance.

There is a lot of potential to drive to maturity the bio-based economy in Bulgaria, because of its rich available biomass. Also the clean technologies and the biotechnologies are part of the Innovation strategy for smart specialization 2014-2020 of Bulgaria.

Current situation in the region

I. Key driver, Innovation landscape

There is still no the bio-based industry cluster established in Bulgaria.

The key drivers of bio-based industry are Research and Development Institutes, Universities and technology centers.

The companies are still lagging in the bio-based R&D, the connection between them and the Institutes and Universities is not well established. They are part of different industries and sectors (energy, pulp and paper, agriculture, plastics, textile, pharma etc.), focused on the traditional manufacturing and processing. There is little or no focus on bioeconomy or the opportunities for creating new value chains.

Among the barriers for the development of the bio-based industry clusters are:

- Very limited awareness about the Bio-based industry;
- No enough information about the opportunities to participate or create new value chains and the benefits for the participants;
- Absence of specific Bio-based industry strategy with responsible Ministry or Agency and adequate financing programs/incentives.

II. Cluster development/cluster landscape

The process of creating business clusters in Bulgaria began in 2003 when the PHARE program funded project to implement the cluster approach and establishment of a pilot cluster model. The project budget was € 800 000 and the project resulted in creating two pilot clusters (Non existing today)

Two pilot clusters were created as a result of the project:

- Cluster for furniture production – Troyan
- Rodopi cluster of tourist services – Smolyan

There is no information to date about the existence of these two clusters created under the project.

- Stage 2 PHARE project Second phase BG2005 / 017-586.04.02

The program started in 2005 by creating a methodology for cluster development. Funding in the amount of € 3 million was provided in 2008. From 14 applicants 10 have been approved;

The projects were with duration one year.

As a result of the initiative to date there are three active clusters, one closed, four registered but inactive and for the other two no official data.

- Stage 1 BG161PO003-2.4.01 "Support for cluster development in Bulgaria"
Under Operational Programme Competitiveness. Started 16.07.2010. Financing (about €4 589 000 total) Agreements were signed with 35 beneficiaries.

- Stage 2 BG161PO003-2.4.02 "Support for cluster development in Bulgaria"
Under Operational Programme Competitiveness. Started in the beginning of 2013.

- Financing (about €15 000 000 total) Agreements were signed with 69 beneficiaries.

- Up to 01.01.2017 the information about 260 companies and NGOs with "Cluster" name exists in the legal register, trade register and company department of Sofia City Court. 17 of them are inactive /closed/.

Clusters with functioning administrative body are 99 – almost all of them are funded under the OPIC.

Employees who are socially insured are about 550 people.

- The new Operational program BG16RFOP002-2.009 „Development of clusters in Bulgaria" released in December 2016. The main objective of the procedure is providing support for the cooperation and establishment of clusters in Bulgaria, capacity development and internationalization of already existing ones as a factor for increasing the competitiveness and business development. Directorate General "European Funds for Competitiveness" - Managing Authority of Operational Programme "Innovation and Competitiveness" 2014-2020 invites those wishing to submit project proposals under Priority Axis 2 „Entrepreneurship and capacity for growth of SMEs", Investment Priority 2.2 „Capacity for growth of SMEs", Specific Objective 2.2.: Increasing the productivity and the export potential of Bulgarian SMEs by ANNOUNCING a procedure for selection of projects: BG16RFOP002-2.009 „Development of clusters in Bulgaria".

The applicable state/ minimal aid regimes are „de minimis" under Regulation (EC) No 1407/2013 under Component 1 „Establishment and support for organizational and administrative strengthening of the cluster" and Component 2 „Cooperation, creating partnerships and internationalization" and regional investment aid according to Art. 13 and 14 of Regulation (EU) No 651/2014 under Component 3 „Development of shared infrastructure and know-how".

Cluster initiatives somehow related to bio-based industry

- Bulgarian Furniture Cluster
- Black Sea Energy Cluster
- Cluster Bio
- Cleantech BULGARIA
- Cluster Renewable Energy and Sources
- Cluster Green Sinergy
- Cluster Mechatronics and Automation
- Textile Cluster and institute Dunav
- Electric Vehicles Industrial Cluster
- Green Energy Cluster
- Automotive Cluster Bulgaria
- TKK Bulclust - Textile Cluster
- Bulgarian Association Polymers

Key asset	Primary biomass sector	Food & Feed	Pulp & Paper	Bio Chemicals	Bio Polymers	Phyto-pharma	Textile & Clothing	Renewable Energy (biomass, biogas, biofuels)	Eco-Construction
Cluster organisation							x	x	
Enterprises	x	x	x	x	x	x	x	x	x
Policy makers		x	x				x	x	x
Knowledge institutes		x	x	x		x	x	x	
Biomass supply	x	x	x	x	x	x	x	x	x
Competitive bio-based industry product on the market					x	x		x	
Funding									
Policies, programs and regulations									

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

Wood biomass

Twigs and branches are waste products from wood processing. Currently, only a small portion of these is used as it is considered that the collection of small-size wood is economically ineffective. The technology for the harvesting of small-size wood involves cutting down the branches and twigs to small pieces at a point as close as possible to the lumbering area to which a forest access road can reach. 9.6 % of the planned quantities of branches and twigs are currently being utilised.

Solid agricultural waste

In the past there was practice in Bulgaria to use straw as an energy resource – for heating purposes, and in the first half of the 20th century, also as fuel for the engines of harvesting machines. There was also a well-developed practice to utilise a considerable portion of the straw from harvested crops and use it in live-stock breeding and the paper

industry. Cases have been reported of the transportation of baled straw to relatively large distances for the needs of the paper industry. Vine and fruit tree prunings were also used as fuel in the past. This practice could be facilitated by the shredding of the wood close to the areas for pruning, similar to the shredding of branches and twigs from forestry. Solid agricultural residues are generated in the process of growing crops, and their quantity is in direct dependence from the annual yield and harvested areas. Straw is a solid agricultural by-product that is used in the country primarily in horticulture and live-stock breeding. About 20 % of straw can be utilised for energy purposes. The remaining types of solid agricultural by-products have no other application and the share of quantities used for energy purposes is set according to the maximum capacity for collection.

Types of solid agricultural by-products	Total quantities t/yr.	Estimated share of available % unused quantities	Available unused quantities, t/yr
Straw	2 714 500	20	542 900
Maize stems	1 799 680	60	1 079 808
Sunflower stems	1 270 000	60	762 000
Vine prunings	170 000	80	136 000
Fruit tree prunings	58 900	80	47 120
Tobacco stems	50 000	80	40 000

Possible methods for transformation of biomass into energy include: direct combustion and utilization of heat, gasification or pyrolysis (through which fuel gas is extracted) and fast pyrolysis (through which a liquid fuel product is extracted). Solid agricultural by-products can also be used as fuel in Stirling engines. There are also methods for the production of ethanol from the cellulose components of biomass, as well as hydrocarbons from its lignin components. Of all methods listed, direct burning is the most efficient.

Based on the methods for the energy utilisation, the types of biomass can be classified in the following 3 groups:

- Vine prunings and fruit tree prunings;
- Straw;
- Maize, sunflower and tobacco stems.

With regard to vine prunings and fruit tree prunings, a popular technology is direct burning. The reason these products are not used in a greater degree is the lack of suitable facilities for treatment (for example shredding facilities). Baled straw is a product that is more difficult to use as fuel. Solid agricultural by-products have different quality indicators which are particularly important in ensuring a stable combustion process. The key characteristics are shown below:

Types of solid agricultural by-products	Available unused quantities, t/yr	Humidity %	Carbon content % usable mass	Lower calorific value kcal/kg	Energy equivalent toe/yr
Straw	542 900	10-20	42	3 400	184 500
Vine prunings	136 000	30-40	32	2 200	29 900
Fruit tree prunings	47 120	40-50	27	2 000	9 400
Total (straw, vine prunings and fruit tree prunings)					223 800
Maize stems	1 079 808	40-60	24	1 800	194 400
Sunflower stems	762 000	30-40	30	2 200	167 600
Tobacco stems	40 000	40	28	2 000	8 000
Total					593 800

The results shown indicate the great significance of the energy potential of unused quantities of solid agricultural by-products. If only the by-products, for which well-developed technologies of energy transformation exist (straw, vine prunings, fruit tree prunings), their energy equivalent would amount to 2.9 % of the gross domestic consumption in Bulgaria.

Livestock waste

One of the possible methods for the utilization of livestock waste is based on anaerobic decomposition. The products derived in this process are:

- Biogas – a mix of methane (40 – 60 %) and carbon dioxide containing also small quantities of hydrogen and hydrogen sulphide;
- Acidic residues from decomposition – an organic substance containing lignin, chitin, and a number of mineral components. It can be used as compost or as a component for construction materials, for example fibre sheets.
- Leach – rich in nutrients, in some cases can be used for fertilization.

Of these 3 products, biogas is the most important from the point of view of energy production. It can be used as fuel for boilers or piston engines for the combined generation of heat and electric energy.

Type of livestock farm	Number of animals in large farms	Average daily quantities of manure per animal, kg of dry matter/day	Average daily quantities of manure from larger farms, t of dry matter/yr	Energy equivalent of biogas, toe/yr
Bovines	127 205	4.0	92 860***	20 000
Pigs	462 070	0.6	101 193	21 800
Birds	12 000 000	0.03	131 400	28 200
Total			325 453	70 000

The quantity of biogas generated depends on a number of factors. During the proper operation of the installation, it is possible to produce biogas with an energy equivalent of 2 150 kcal/kg dry manure. This corresponds to producing 1 tonne of manure dry matter per 500 m³ of biogas with 50% methane content (lower calorific value of methane 35.818 MJ/m³). The energy potential of biogas shown above can be used to generate around 325 GWh/yr. of electricity.

Solid household waste

The best perspective for the utilisation of solid household waste as fuel in an incineration facility is in place for the city of Sofia. This is so because for most of the remaining larger cities, for example Burgas, Varna, Vratsa, Dobrich, Montana, Pleven, Pernik, Ruse, Razgrad, Silistra, Shumen, Yambol, new regional landfills are planned or already under construction, while Plovdiv is planning to open a composting plant and a new landfill.

Landfill gas

The landfills producing relatively large landfill gas quantities (corresponding to at least 200 – 300

kW of installed capacity) are suitable for electricity generation. These are landfills with:

- substantial quantities of landfilled organic waste over the past 10 – 15 years;
- good insulation layers (ensuring anaerobic conditions), as well as systems for the collection on infiltrated water.

Gas from waste water treatment plants

According to information from the National Statistical Institute, 69.2 % of the country's population is using sewerage systems (about 5 200 000 residents), of which as few as 39.9 % use waste water treatment plants (about 2 075 000 residents). The specific quantity of sludge in treatment installations is 82 tonnes/day of dry matter per 1 million people, which is equal to about 62.1 tonnes of dry matter/yr. In the anaerobic digestion of sludge, the gas derived (50% methane content) is 345 m³ /tonne dry matter. If the entire quantity of sludge is anaerobically treated, the generated quantity of gas will be 21 424 500 m³/yr with energy potential of about 9 100 toe/yr and possible electric power generation of about 42 GWh/yr.

Summarized information on the energy potential of waste and unused biomass

	Unused quantities	Energy equivalent, toe/yr.
Branches and twigs	315 000 m ³ /yr.	65 100
Industrial wood waste	50 000 t dry matter/yr.	23 000
Solid agricultural waste including:		
Straw	542 900 t/yr.	184 500
Maize stems	1 079 808 t/yr.	194 400
Sunflower stems	762 000 t/yr.	167 600
Vine prunings	136 000 t/yr.	29 900
Fruit tree prunings	47 120 t/yr.	9 400
Tobacco stems	40 000 t/yr.	8 000
Waste from live-stock breeding (only from large farms) and energy potential of biogas	325 453 t/yr.	70 000
Solid household waste and fuel equivalent when using in combustion installation	361 700 t/yr.	36 300
Landfill gas (from 10 selected landfills)	37 729 971 m ³ /yr.	12 600
Gas from waste water treatments plants	21 424 500 m ³ /yr.	9 100
Total		809 900

The summarised information shows the importance of the energy potential of unused quantities of biomass which equals 809 900 toe/yr. If this potential is utilised, it could cover about 9 % of the final energy consumption in Bulgaria.

Biofuels

According to research, Bulgaria has sufficient areas to provide raw materials needed for the production of biofuels without causing negative

impact on the food and beverage industry. Table below shows estimates for the production of biofuels for growing energy crops. The areas were defined based on the crops currently grown in the country for the production of biodiesel that have low concentrations of fatty acids, leading to a high iodine index (I40) of the biodiesel produced. The areas necessary to reach the binding target of 10 % of biofuels by 2020 is 509 001 ha.

	Dimension	2005	2008	2009	2010	2015	2020
Conventional fuels:	thousand t	1 952.0	2 193.1	2 264.7	2 317.3	2 731.9	3 146.0
Petrol	thousand t	572.0	485.3	456.0	426.0	417.1	370.5
Diesel fuels	thousand t	1 380.0	1 707.8	1 808.7	1 891.3	2 314.8	2 775.5
Biofuels	thousand t	0.0	43.9	79.3	133.2	218.6	314.5
Bioethanol	thousand t	0.0	9.7	16.0	24.5	33.4	37.0
Biodiesel	thousand t	0.0	34.2	63.3	108.7	185.2	277.5
All fuels	thousand t	1 952.0	2 237.0	2 344.0	2 450.5	2 950.5	3 460.5
National target	%	0.0	2.0	3.5	5.75	8.0	10.0

Pulp & Paper:

Bulgaria is a major exporter of paper and paper products in Eastern Europe. The production of wood, paper, cardboard and products and the SMEs involved are of great importance for the country's economy, as these products are related to households and their availability, market demand and the guarantee of their specificity of use. The country has a rich resource base for the production of wood, paper, cardboard and products. The paper, cardboard and paper and cardboard manufacturing sector accounts for about 1.4% of industrial production in the country and also accounts for about 1.4% of value added in the industry.

Textile & Clothing:

There is a significant opportunity to create a good value chain connected to the production of textiles and clothing as it is one of the most traditional sectors in Bulgaria. It has become one of the Bulgaria's most competitive industries in recent years with considerable investment, and export and employment opportunities.

Export of textiles and clothing is now going through another boom and is close to the strongest years before the crisis. European countries remain our

traditional markets. A great number of major companies have been returning to Bulgaria because of its geographical location, traditionally good relations and technological capabilities of Bulgarian enterprises. Bulgaria's biggest export market remains Germany, followed by Italy, France, Greece and Spain. Domestic consumption is relatively small.

Phytopharmaceuticals:

There is huge opportunity in this field as Bulgaria is a leader in herb export, but lags in production of Phyto-pharmaceuticals. The Bulgarian flora includes over 4100 species of higher plants (twice the number included in the English flora), 770 of them are medicinal. The 250 of them are used in traditional and conventional medicine.

Around 17 000 tons of dried or frozen herbs are exported from Bulgaria annually. They are sold on the international market for over 25 million euro. We are a leader in herb export volumes in Europe and are among the top 3 exporters in the world.

Medicinal plants provide livelihood to local communities living in close proximity to their habitats. Even today, over 300 000 people rely on the income generated through the collection, cultivation, processing and trade of herbs in Bulgaria.

Regional Bio-based industry Strategy

Criteria	Indicator	Region	
		2010	2015
Land use	Forestry land (% of total land area)	37.28%	38.05%
	Agricultural & horticultural land (% of total land area)	50%	47%
Biomass availability	Agricultural biomass production (kg/capita)		845
	Blue biomass production (kg/capita)		
	Forestry biomass production (m ³ /capita) *data found in cubic meters		0.778*
	Waste production (kg/capita)		436
	*Based on population of 7 178 000		
Innovation	SME birth rage (% of total firms in region)		12%
	R&D expenditure as % of GDP (this index (EU = 1) is unknown to us)		0.39 % of GDP
	R&D employment (% of total employment in region)		0.56

Employment

Economic activity	2016
Total employed	3 463.347
Agriculture, forestry and fishing	624.981
Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities	700.476
Construction	175.184
Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities	887.253
Information and communication	90.195
Financial and insurance activities	65.085
Real estate activities	26.453
Professional, scientific and technical activities; administrative and support service activities	244.025
Public administration and defence; compulsory social security; education; human health and social work activities	544.088
Arts, entertainment and recreation, repair of household goods and other services	105.607

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 is no dedicated Bio-based industry national/regional policy developed in Bulgaria. But there are some programs and strategies related to it.

National long-term program for promotion of the usage of biomass 2008-2020, where the potential of the biomass in Bulgaria is revealed. According to this document the increasing consumption of biomass, especially wood for energy goals is a global trend. Biomass is a resource which wider usage allows reducing the dependence of importing energy resources, contributes for the security of the energy supplies and has relatively less impact on the environment, compared to conventional fuels.

The absorption of the biomass potential in Bulgaria depends on the availability of the following main factors:

- Usage of efficient technologies for direct biomass combustion;
- Implementation of energy production technologies;
- Availability of infrastructure allowing the usage of different types of biomass;
- Development of the biomass market in the country.

Smart specialization strategy

There is Innovation Strategy for Smart Specialisation 2014-2020 (IS3).

On the basis of proposals from businesses, and the established and declared interest of the academia to participate in international projects, including Horizon 2020, and on the basis of the

assessment of international trends and market potential, four thematic areas have been identified and certain product and technology niches, services and productions have been specified. One of the 4 areas is closely connected with Bio-based industry „Industry for healthy life-style and bio-technologies. The following priority Bio-based related directions were identified:

- Methods for clean production, conservation and reaching the final consumer of specific Bulgarian products and elements (yogurt, honey, breads, milk products, etheric oils, herbal products, bio-cosmetics and bio-products)
- Production of specialized food and drink (baby, children, „astronaut“)
- Bio-technologies serving the needs of healthy life and aging
- „blue“ technologies and application of new methods and technologies in sustainable use of sea and river resources
- Production plants for the extraction of clean electricity and industrial water
- Green Economy

ENERGY FROM RENEWABLE SOURCES ACT

This Act regulates the public relations associated with production and consumption of:

- electricity, heating and cooling from renewable sources;
- gas from renewable sources;
- biofuels and energy from renewable sources in transport

NATIONAL RENEWABLE ENERGY ACTION PLAN

drawn up in accordance with the template for national renewable energy action plans as set out in Directive 2009/28/EC of the European Parliament and of the Council

II. How is Bio-based industry supported?

Even though there is no specific regional Bio-based industry, there are several other strategic documents related, supporting it.

- Third National Climate Change Action Plan 2013-2020;
- Energy Strategy of the Republic of Bulgaria until 2020;
- National Environmental Strategy 2009-2018
- National Reform Programme (2014 update);
- National Development Programme: "Bulgaria 2020";
- National Energy Efficiency Programme;
- National Programme for Promotion of the Biofuels Use in the Transport Sector 2008-2020; and
- National Strategy for Development of the Forestry Sector

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

Not applicable in Bulgaria. However the key players and authorities that could affect the creation of such a strategy are:

- Ministry of Economy, Energy and Tourism
 - National Innovation Fund
 - Sustainable Energy Development Agency (SEDA)
 - The Bulgarian Small and Medium Enterprises Promotion Agency (BSMEPA)
- Ministry of Education and science
- Ministry of environment and waters
- Ministry of agriculture and Food

Future challenges for cluster development in bio-based industry

Future challenges:

- Need of establishment of durable and sustainable relations among science-education-business;
- Incentives to retain the available and attracting foreign HR;
- Additional reforms in the areas of high and higher education for strengthening the practical focus and covering needs of the labour market;
- Support for adoption of good EU practices, especially management capacity;
- Creation and development of a data base or a network of scientific elaborations, waiting for market realization, as well as dissemination of results of science projects;
- Internationalization and advertisement with focus on guarantee and durable quality.

Funding needed:

- Grant schemes/vouchers for cooperation science-business
- Support for marketing and export activities;
- Support for governance/management capacity;
- Certification, quality control.

Indicative activities and measures

- Incentives to restructure the product portfolio
- Help clusters internationalization and others forms of cooperation
- Funding of specialized equipment for laboratories
- Support for quality assurance
- Support for learning and training
- Support for information networks, websites, European forms of cooperation

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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