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Chapter 1: Abstract

The main objective of this report is to provide an overview of the current processes and the state of the circular bioeconomy, define key determinants of the governance system in relation to the circular bioeconomy, identify and analyse network of stakeholders to assess the potential capacities for participatory governance in the Republic of Croatia (hereinafter: RoC).

Chapter 2: Definitions

Currently there is no national bioeconomy strategy in Croatia, and thus no common, widespread, national definition of bioeconomy. Definitions stated in this chapter are drawn from relevant EU and national documents analysed in DT 1.1.1. and DT 1.1.2. within the GoDanuBio project.

Agricultural development vision 2030 – To produce more high-quality food at competitive prices, sustainably manage natural resources in changing climatic conditions and contribute to improving the quality of life and increasing employment in rural areas

Bioeconomy (EU definition) - 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

Rural area - the whole territory of Croatia with the exclusion of the administrative centres of four cities (Zagreb, Split, Rijeka and Osijek). 75,08 % of total population and 56.164 km² of the rural area (99,24 % of total territory)

Clusters – Legal entities, geographic concentrations of interconnected businesses, specialized suppliers, service providers and firms in related industries and associated institutions in areas in which they both compete, but also cooperate.

Competitiveness clusters – Non-profit organizations operating within sectors of strategic importance for the development of the Republic of Croatia, linking private, scientificresearch and public institutions (triple helix).

Centres of competence – industry-led individual (networked) entities designed to provide support in raising capacities of business sector (mainly SME that lack in-house capacities for R&D) to enforce R&D projects (especially those focused on development and applied research and commercialization of results) in line with the thematic areas identified in Croatian S3 Strategy.

Value chain – Activities required for the product to come from its initial development and design, origin of raw materials and other inputs, its marketing and distribution to the final consumer. When activities are required to be coordinated globally, the used term is **global value chain**.

Innovation – Implementation of a new or significantly improved product, service, process, marketing or organizational method within an existing business process, work organization or other type of contractual relationship. Used to describe a variety of phenomena, from scientific discovery to simply "thinking outside of the box", which are reached by applying creative solutions

Smart specialization – Defining unique characteristics and potentials of each country and region, highlighting the competitive advantages as well as gathering of regional stakeholders and resources around the vision of a future based on excellence.

Chapter 2.1.: Circular Bioeconomy

Although there is no national bioeconomy strategy in Croatia, the reliance on biological resources makes the agriculture, aquaculture, fishery, food processing and forestry sectors central to the Croatian bioeconomy, as key industries with important bioeconomy growth and development potential.

By introducing circular systems, bioeconomy can help add value and improve efficiencies within existing value chains, create income diversification opportunities, minimize waste and GHG emissions, reduce dependencies on external inputs (in particular fossil fuels), and facilitate cross-sectoral synergies and innovations in rural and coastal/blue economies. By clustering different bio-based production systems and industries into functional territorial units, sustainable and circular bioeconomies help regenerate rural areas, while reconciling demands for sustainable use of renewable biological resources for industrial purposes. Croatia's current bioeconomic activities are largely focused on biomass production from crops, followed by production of primary woody biomass and grassland systems. Biomass uses, on the other hand, are concentrated mostly in the food and feed sub-sectors, followed by bio-materials (forestry products) and bio-energy.

In general, bioeconomy activities remain largely uncoordinated and disconnected in Croatia, which limits the potential benefits that a holistic, integrated approach may offer. For example, the bio-energy sector is an important user of both agricultural and forestry residues. However, biomass energy production has largely been driven by "energy producers" as opposed to integrated agricultural-forestry-energy systems that actively involve farmers and private forest owners who would benefit from this alternative economic activity.

Chapter 2.2: Contemporary processes

a) Demographic change

Negative demographic trends over the past few decades are one of the biggest problems of Croatia, with major economic and social consequences, especially in less developed regions. After joining the EU, reduction in the total population is further emphasized by migration of the working age population to richer European countries. Emigration can only be stopped by reaching a significantly higher level of economic development in conjunction with improved quality of life, strong institutions and trust in them. Motives for emigration in other European countries lose much in force as the country approaches the European Union average measured by real GDP per capita.

The analysis of ethnic structure and relevant ethnodemographic changes is based primarily on the population census and applied methodology. Since the last one was conducted in 2011, conducting the census (every 10 years) has been postponed this year due to Covid-19 pandemic. Thus, it is not possible

to provide exact up-to-date data. Economic difficulties which in some Croatian areas are reflected in demographic trends include: low growth rate, insufficient number of new jobs, stagnation of employment, high unemployment rate, especially of the younger generations, lack of sufficient economic conditions for the possibility of buying an apartment for young families, low wages, insecurity of job posts and more. Besides, inadequate public policies and support to encourage employment and entrepreneurship are also insufficient, evidently sharpened regional disparities, raising poverty rates and a number of other accompanying socio-economic problems and processes. These are the underlying reasons for the deterioration of recent demographics trends in Croatia. Every emigrated person of younger age on average means a reduction in the population by approximately 1.5 people within 20 years. The share of highly educated people is also related to the degree of their economic development. Data from the 2011 population census show that 41.4% of the total population of Croatia was employed. In 2018 around employment rate was 46,9%.

Index of average registered unemployed persons in 2015 was 82,8 and in 2019 37,3[1]. At-risk-of poverty rate in 2019 was 18,3%, and for persons of above 65 years of age it increases to 28%.[2] At-risk-of poverty rate in 2018 was 19,3%.[3] Problems that can be reported in depopulation areas relate to job availability, no new construction of housing, decay and abandonment of real estate, business premises are closing, a share of retired population and of low consumer capacity. The retired population, which is a large consumer of social services is becoming a growing burden on the economically active population that should finance it on a larger scale despite the fact that it is gradually becoming less numerous.

Over the years, the depopulation process has affected many regional and local units. Joint factors of low fertility, distorted age structure and emigration of young people of reproductive age led to the beginning of the extinction process in many areas of Croatia.

In particular, rural areas have been experiencing negative demographic pressures. In no less than 45% of administrative units (cities and municipalities) the population in rural settlements has been affected by significant ageing rates. Clearly, demographic changes constitute a limiting factor in the development of rural areas and contribute to deepening of inequality between rural and urban areas.

b) Rural development

The Croatian rural area is characterized by negative demographic, economic and development trends associated with lower transport accessibility, lack of adequate public services and infrastructure and insufficient capacity to create sustainable jobs. The development of rural areas is predominantly determined by the implementation of measures included in the Rural Development Program (RDP) of the RoC for the period of 2014—2020 and development strategies of local action groups (LAG). A coordinated approach to development requires a review of the activities to be undertaken in a specific area, as well as the establishment of a system for the coordination of drafting and implementing of

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[1] Source: Croatia in figures, 2020, Central Bureau of Statistics
[2] https://www.dzs.hr/Hrv_Eng/publication/2020/14-01-01_01_2020.htm
[3] https://www.dzs.hr/Hrv_Eng/publication/2019/09-02-07_01_2019.htm

activities carried out by various stakeholders in the same area, for the purpose of achieving maximum benefits for final beneficiaries and target groups.

Croatia's agri-food sector, which is important for the rural areas, must overcome major labor productivity gaps whichdeclined by 1.9% per year on average between 2008 and 2017 when measured by gross agriculture output per annual work unit (AWU) and by 2.6% per year on average when measured by gross value added per annual work unit (AWU). Similarly, land productivity in Croatia significantly lags behind the rest of the EU. Average yields of the major crops and livestock products in Croatia do not match EU-15 levels and this yield gap has not changed significantly over the past decade.[4]

Movements from rural to urban areas, particularly of the younger population, resulted in a general decline in the rural population and an increase in the ageing population. This poses a serious threat to further development and even survival of rural areas. Consequently, generational renewal needs to be fostered in agricultural holdings, which development will contribute to the retention and employment of young people in agriculture thereby reducing the negative trend of uncontrolled migration to the cities.

Vocational training of farmers has a high added value. Implementation of measures to support activities among young farmers aroused a great interest, as the future of rural and agricultural development lies in young generations. In the agricultural sector, a higher level of implementation of types of operations related to better water management i.e. management of fertilizers and pesticides is visible, in relation to the forestry sector.

In order to achieve a competitive position of rural areas, it is necessary to increase investment in processing modernization of agri-food products to improve production efficiency. Improving technological processes and introducing new technologies for better process control, effective use of raw materials, introduction of technological and management strategies to mitigate GHG emissions from the food chain, reduction of energy consumption and improvement of energy efficiency, reduction of negative impacts on the environment while ensuring the protection of human, animal and plant health, are factors that contribute to improving the quality of life and economic well-being of people from rural areas.

The recommendation is to increase actions to inform farmers about the benefits of renewable energy sources and the utilization of waste, by-products and residues for the purpose of the bioeconomy.

The balanced development of rural areas is a strategic goal for Croatia, and should be realized by creating an attractive environment for young people and families to live and work in. The project "Slavonia, Baranja and Srijem" was launched by the Government of the RoC funded from ESI funds exclusively for projects in the area of five Slavonian counties, which aims to ensure balanced regional development and will continue also in the next multiannual financial framework.   Realized projects show that EU funds are changing less developed Croatian areas, encouraging economic growth and development, investments in infrastructure, agricultural development, employment and entrepreneurship, reducing poverty, defining value chains or establishing development HUBs.

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[4] Source: Eurostat (2018)

The support for entrepreneurship and the creation of new jobs in rural areas are measures which can influence the retention of young and active rural population, and achieve the return of those who left in the longterm.

c) Rural-urban cooperation

Croatian territory is characterised by increasing migration from rural to urban areas and reducing the share of the rural population. Recovery of rural areas cannot be achieved by sector, but only with territorial approach that surpasses the administrative division to achieve a synergistic effect and encouraging results. Green infrastructure, flood risk management and other responses to climate change must be considered in collaboration of cities and rural areas. Preservation of landscape values, restoration and affirmation of identity elements, along with sustainable resource management, is the basis for attractiveness of rural space for visitors, recreationists and tourists, for development and investments, but also for the preservation of the existing population and demographic revitalisation of these spaces.

The relationship between urban and rural areas in Croatia is conditioned, among other things, by institutional framework for development. Challenges in coordinating and achieving integral, participatory and a partnership approach in planning and implementation are inevitable to achieve greater degree of harmonization for balanced and sustainable spatial development, incentives, stimulation of multisectoral economic development and insuring appropriate demographic structures of urban and rural areas. In urban-rural linkages importance is given to organic farming, protection of natural and cultural resources, which does not allow the formation of oversized economic zones. It is important to take care of the residents - their needs, way of life, tradition, as well as novelties which the technological age brings us, based on the principles of green and ecologically-designed activities.[5]

According to the LEADER / CLLD principles, local partnerships have been established through 56 Local Action Groups (LAGs) and 14 Fisheries Local Action Groups (FLAGs). Local community - led (CLLD) mechanism strives to involve partners at the local level, which means representatives of civil society and local economic stakeholders, in the design and implementation of integrated and multisectoral local development strategies that help their area in transition to a sustainable future, are designed to respect local needs and potentials, include innovative development opportunities in a local context and networking and collaboration.

'Business zones' represent a separate area for various economic activities. The implementation of zones ensures economic development in the near and far environment of zones, which directly affects the

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[5] Conference Proceedings 'Rural-urban linkages', 19-20 September 2017, Sveti Martin na Muri

increase in employment rates and economic growth of rural areas, establishes the economic and demographic balance of growth and development and thus reduces the differences between urban and rural areas.

However, urban-rural partnerships are still not strongly developed in Croatia. There are several prerequisites necessary, such as strengthening capacities at the local level, by involving stakeholders from the local area in decision-making processes. This attempts to change the conventional approach ("top down") and provides local actors with the opportunity to be drivers of change in their communities by involving the population in the development of individual rural units, or all stakeholders (public, business and non-governmental sector) with the sustainable development of a particular local area.

Chapter 3: Key determinants of the regional/country governance system

a) Political conditions (strategic level)

Name of policy or strategy: ***Proposal of the National development strategy of the Republic of Croatia until 2030***	
Relation to demographic change	The European Commission predicts that Croatia will have 3.9 million inhabitants in 2030, or 3.7 million in 2050, with an increase in the share of the population over 65 from 19.4% in 2016 to 24.8% in 2030 and 29.1% in 2050. This is an increase in the number of older people for a city larger than Split in a little over two decades. Between 2001 and 2019, Croatia lost 5.5% of its own total population. Consequently, one of the strategic goals of this Strategy is" Demographic revitalization and better family position". Existing and new measures and policies will be decisively aimed at improving the situation of families, children and young people, making it easier to balance between family and work life and the consistent implementation of women's and mothers' right to safety jobs and employment.
Relation to rural development	The Strategy emphasizes that conditions will be created for the Croatian food production sector, including agriculture, fisheries and aquaculture, to produce more quality food at competitive prices, with sustainable management of natural resources and better management of climate change risks. Labour productivity in agriculture is now around 20% of the EU-15 average, while agricultural land productivity is around 50% compared to the EU-27.

	Croatia has a foreign trade deficit in almost all agricultural products except cereals and oilseeds, while in the fish trade it registers a surplus. The data clearly shows that there are growth opportunities that can be achieved by increasing quantity and raising product quality, more efficiently linking primary production with the food processing industry and strengthening market access, especially in the fresh food market segments and high-quality products.
Relation to circular bioeconomy	It is emphasized that "in line with horizontal policies to strengthen education and training, special attention will be dedicated to the improvement of vocational education for occupations in agriculture and aquaculture to strengthen skills related to modern, environmentally sustainable production and aquaculture including the bioeconomy and the use of digital technology. Training will be encouraged for agricultural and aquaculture producers, especially young people and women, in order to increase knowledge and skills related to increasing the quality, intensity and sustainability of production, financial literacy, accounting and digital skills. Implementation of public policies that will contribute to the development of globally competitive, green and digital industries will be the bases for the development of the circular economy.
Implementation	The strategy will be based on the implementation of objectives through medium-term strategic planning strategic documents related to EU funds programmes. National development plans as well as implementing programmes of local and regional self-government will be developed and will include specific objectives, measures, activities and projects and allocation of resources, responsibilities implementation and deadlines.
Territorial level	This Strategy addresses issues on the national policy level at the whole Croatia. However, the Action Plans that will follow will tackle the local community.
Interactions between levels	Involvement of stakeholders through multisectoral working groups (representatives of local and regional self-government units, regional coordinators and other stakeholders from the regional and local level).
Relation to S3	Strategy S3 is mentioned in the Indicative list of strategic planning acts but also at the part dedicated to the economy. Smart specialization in export-oriented sectors is based on knowledge and

	innovation and it offers an opportunity to transform the Croatian economy and increase its productivity and competitiveness with the application of environmentally sustainable technologies.

Name of policy or strategy: *Draft Strategy of Agriculture (2020-2030)*	
Relation to demographic change	Demographic change is defined _in the_Strategic objective 3 which is „Rebuilding the rural economy and improving living conditions in rural areas", Specific objective 3.1: Poverty reduction in rural areas and Specific objective 3.2: Creating more and better jobs in rural areas
Relation to rural development	The vision of agricultural development is "to produce more high quality food at competitive prices, to sustainably manage natural resources in changing climate conditions and to contribute to improving quality of life and employment in rural areas." The strategic vision for agriculture is shaped by four strategic goals: 1) increasing the productivity and resilience of agricultural production to climate change; 2) strengthening the competitiveness of the agri-food sector; 3) reconstruction of the rural economy and improvement of living conditions in rural areas and horizontal goal 4) encouragement of innovations in the agri-food sector. It is shaped in an evidence-based planning process, which includes economic analysis and stakeholder consultation.
Relation to circular bioeconomy	Key analytical contributions to the strategic planning process of the national bioeconomy plan will be (i) identifying existing stakeholders and initiatives in value chains in the bioeconomy; (ii) a review of the legislative and regulatory framework; and (iii) assessment of biomass potential using tools developed within the National Agroecological Zoning and Land Management System (reference to Intervention B.3). The plan will contain specific activities, investments and sources of funding (EU and national) for the development of selected value chains in the bioeconomy, with continuous support, from research and development to the pilot project and implementation phase. In this sense, increased investments in agricultural research will be focused on the development of solutions for sustainable food and biomass production in the service of circular bioeconomy.

Implementation	The success of implementation of this Strategy will be monitored at the level of achieving defined strategic goals in a ten-year period until 2030, such as: - I (increasing productivity and resilience of agricultural production to climate change) - 120% increase in labor productivity, increase in livestock production, increase in areas under permanent crops and under greenhouses, decrease in pesticide use and increase in the share of energy production from renewable sources in agriculture; etc.
Territorial level	National
Interactions between levels	The Strategy is written at the national level, local plans not included
Relation to S3	There is no reference to S3 Strategy

Name of policy or strategy: **Proposal of the Strategy for energy development of the Republic of Croatia until 2030 with a view of 2050**	
Relation to demographic change	Demographic trends in Croatia are briefly mentioned in the Strategy mostly connected to the fact that demographic trends and expectations in the future indicate a gradual decrease in population and an increase in the number of households, which directly affects future energy needs - in quantity and type.
Relation to rural development	Rural development is described in the bioeconomy chapter
Relation to circular bioeconomy	The bioeconomy is defined as the production of renewable biological resources and the conversion of those resources, together with waste streams, into value-added products such as food, feed, biological products and bioenergy. The use of biomass is gaining a new context with the circular economy and the bioeconomy where the demand for biomass as a raw material is expanding from current values to new, innovative supply chains and biologically based products. Agriculture, forestry and fisheries and industries based on these sectors, landscape maintenance (transport, energy and other infrastructure, watercourses, urban green areas) with waste management, represent the raw material basis of renewable biological resources of the bioeconomy or biomass. Preference in the use of biomass should be

	given to products with higher added value or through cascading use, but also in line with the national capacity of the economy and the scientific research community and with strategic development goals. It is stated that the draft national strategy for food and the bioeconomy emphasizes the production and processing of food as the basis for the development of the future bioeconomy of the RoC. In order to achieve the competitiveness of the existing stakeholders of the bioeconomy and the development of supporting branches through innovation, the production of energy from biomass should enable the decarbonisation of the entire production chain - from the field to the table.
Implementation	The transition to low-carbon energy in the Republic of Croatia is a long-term process that will be carried out for the next thirty years, with continuous monitoring and measurement of achieved results and consideration of possible dynamics of change after 2050. Monitoring and evaluation of the implementation of the strategy and energy policies will be based on the analysis of indicators defined by the European Commission that show changes and developments in the field of energy security, internal energy market, energy efficiency, decarbonisation and greenhouse gas emissions.
Territorial level	This Strategy is the umbrella national framework for all strategic energy planning activities.
Interactions between levels	The strategy is written on a national level, no local plans are included.
Relation to S3	There is no relation to S3.

b) Legal conditions

Currently, the Draft Proposal of the Law on Amendments to the Law on Agriculture is in the process of adoption, which will serve as the basis for drafting the national bioeconomy strategy. The framework for regional development policy, has been established following the adoption of the Croatian Regional Development Act and its amendments (2019).

According to Article 81 of the **_Law on Agriculture of the Republic of Croatia_**, the Food prevention and reduction plan for food waste of the RoC has been established, which is prepared for the purpose of prevention and reduction of food waste generation.

The plan contains goals and measures to prevent the generation and reduction of food waste at all stages of the food chain, from primary production, through processing, trade, catering, institutional kitchens to households.

The Law on Sustainable Waste Management of the RoC determines measures to prevent or reduce the harmful effects of waste on human health and environment by reducing the amount of waste generated and / or production and regulates waste management without the use of risky procedures for human health and environment, using valuable waste properties.

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The Law on Energy Efficiency of the RoC regulates the area of efficient use of energy, adoption of plans at local, regional and national level for improving energy efficiency and their implementation, energy efficiency measures, obligations, obligations of the energy regulatory body, transmission system operator, operator distribution system and energy market operators in connection with the transmission, ie transport and distribution of energy, obligations of energy distributors, energy and / or water suppliers, and in particular the energy service activity, determination of energy savings and consumer rights in the application of energy efficiency measures.

The purpose of this Act is to achieve the goals of sustainable energy development: reducing negative environmental impacts from the energy sector, improving security of energy supply, meeting the needs of energy consumers and meeting international obligations in reducing GHG emissions by encouraging energy efficiency measures in all consumption sectors energy.

The Law on Climate Change and Protection of the Ozone Layer determines the competence and responsibility for climate change mitigation, adaptation to climate change and protection of the ozone layer, monitoring and reporting of GHG emissions, GHG emissions activity, climate change adaptation and ozone layer protection, climate change and ozone protection information system, administrative and inspection supervision.

c) Socio-economic conditions

The latest data show that in Croatia GDP in 2019 (million EUR, current prices) was 54.270, GDP per capita (in EUR) was 13.350, general government debt (as % of GDP) was 72,7, external debt (as of % GDP)was

75,3 , unemployment rate (ILO, persons above 15 years of age) was 6,6. In 2020, GDP (million EUR, current prices) was 49.139, GDP per capita (in EUR) was 12.141. external debt (as of % GDP)was 82,7.6

The total size of the bioeconomy in Croatia is estimated at 204,000 employees in 2018. Viewed by individual industries, the largest share of turnover in the bioeconomy sector was realized in the production of food, beverages and tobacco products, followed by agriculture and processing of wood, wood products and furniture from biomass. New sectors of the bioeconomy (production of chemicals, pharmaceuticals, rubber and plastics and biomass preparations) account for only 4.1 percent of the total estimated turnover or 462 million euros. The Covid 19 pandemic has largely affected the slowdown in the Croatian economy since mid-March 2020. Although the spread of the disease did not significantly affect economic indicators in January and February 2020, the impact of the pandemic has been present since March 2020 and the first quarter of 2020. The first estimate shows that quarterly GDP in the second quarter of 2020 was 15.1% lower in real terms than in the same quarter of 2019. The quarterly decline in GVA was recorded in most industries. The activities of Wholesale and retail trade, Transport and storage, Accommodation and food service activities and Manufacturing were the most affected. Although there were positive developments in May and June 2020 after epidemic measures eased, the level of service production is still well below periods before the impact of the pandemic. Household consumption fell 14.0% in the second quarter of 2020, the biggest quarterly decline so far. The impact of the COVID-19 pandemic on the global economy has led to a large decline in trade flows between the RoC and other countries. Exports of services recorded a significant decline in travel, traffic and other business services. Travel restrictions implemented globally have also significantly reduced tourist traffic. Due to the closure of world economies and falling demand, imports of goods are experiencing a significant reduction, especially from the most important foreign trade partners from the EU. The decline in total investment was mostly due to the decline in investment in the business sector, especially in the area of investment in equipment. The EC, as a result of COVID pandemic, predicts a decline in the Croatian economy of 9.1% and an increase in public debt to 88.6% of GDP. Significant uncertainty arises from the large share of tourism and hospitality in the Croatian economy, and this activity will be extremely affected by the pandemic, although initial estimates indicate that some tourist segments (nautical tourism, camps and some smaller accommodation facilities) will have a smaller decline than hotel accommodation.[7] Furthermore, COVID 19 pandemic is acknowledged in the majority of the strategic documents that were endorsed in 2020/2021. As an example, the process of drafting the National Development Strategy (up to 2030) started in 2018, but due to the fact that COVID 19 happened and that it affects all the economic aspects of the society (including bioeconomy) the draft Strategy was modified and now COVID 19

pandemic represents a significant part of the document, from the global context to the measures that will be taken in order to fulfill the vision of 2030. Circular economy indicators in Croatia:

Production and consumption		
Indicator	Value	Trend
ⓘ EU self-sufficiency for raw materials *(percentage)*	N/A	N/A
ⓘ Green public procurement	N/A	N/A
Waste generation		
ⓘ Generation of municipal waste per capita *(Kg per capita)*	445 [2019]	
ⓘ Generation of waste excluding major mineral wastes per GDP unit *(Kg per thousand euro, chain linked volumes (2010))*	77 [2018]	
ⓘ Generation of waste excluding major mineral wastes per domestic material consumption *(percentage)*	8.8 [2018]	
ⓘ Food waste *(million tonne)*	N/A	N/A

Waste Management		
Indicator	Value	Trend
Recycling rates		
ⓘ Recycling rate of municipal waste *(percentage)*	30.2 [2019]	
ⓘ Recycling rate of all waste excluding major mineral waste *(percentage)*	52 [2016]	
Recycling / recovery for specific waste streams		
ⓘ Recycling rate of overall packaging *(percentage)*	58.4 [2018]	
ⓘ Recycling rate of plastic packaging *(percentage)*	37.3 [2018]	
ⓘ Recycling rate of wooden packaging *(percentage)*	3.8 [2018]	
ⓘ Recycling rate of e-waste *(percentage)*	83.4 [2018]	
ⓘ Recycling of biowaste *(kg per capita)*	15 [2019]	
ⓘ Recovery rate of construction and demolition waste *(percentage)*	78 [2018]	

Secondary raw materials

Indicator	Value	Trend
ⓘ Contribution of recycled materials to raw materials demand		
ⓘ End-of-life recycling input rates (EOL-RIR) *(percentage)*	N/A	N/A
ⓘ Circular material use rate *(percentage)*	4.9 [2019]	
ⓘ Trade in recyclable raw materials *(tonne)*		
ⓘ Imports from non-EU countries	77,714 [2019]	
ⓘ Exports to non-EU countries	259,385 [2019]	
ⓘ Intra EU trade	227,723 [2019]	

Competitiveness and innovation

Indicator	Value	Trend
ⓘ Private investment, jobs and gross value added related to circular economy sectors		
ⓘ Gross investment in tangible goods *(percentage of gross domestic product (GDP) at current prices)*	0.19 [2018]	
ⓘ Persons employed *(percentage of total employment)*	2.5 [2018]	
ⓘ Value added at factor cost *(percentage of gross domestic product (GDP) at current prices)*	1.56 [2018]	
ⓘ Number of patents related to recycling and secondary raw materials	1.66 [2016]	

Figure 1- 1, source: https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework

d) Technological conditions

Currently, cooperation between public and private stakeholders in the RDI sector is insufficient, which is a major obstacle to more successful results in the field of innovation. As a moderate innovator, the RoC tries to solve the problem through several newly developed instruments and interventions, but also continues to implement several existing instruments aimed at developing and encouraging innovation,

financing joint public and private sector projects. In order to carry out research activities that are closer to the needs of the economy and the business sector, closer cooperation between Croatian scientific organizations and business sectors needs to be encouraged. The Government of the RoC has launched a number of initiatives to improve cooperation between science and economy, including huge opportunities through structural projects, the formation of competitiveness clusters in fields where Croatia is competitive and has realistic opportunities to gain a greater market role in Croatia and the EU. One example is certainly the Intersectoral Center of Competence for Advanced (KET) Technologies in Zagreb. The aim of the project is to respond to challenges in all sectors by establishing a multidisciplinary research platform, improving industrial competitiveness and innovation by pooling resources and expertise, encouraging cooperation between businesses, government agencies, research institutions and universities. The Croatian Science Foundation (CSF) implements the program which is designed to support cutting-edge research in both public and private sectors, with the aim of disseminating results and patenting.[8]

At the regional level, the BIOEAST Initiative representing a long-term process that was formally launched in September 2017, offers a shared strategic research and innovation framework for organizing joint programming towards sustainable bioeconomies in the Central and Eastern European countries. In June 2018, the Ministry of Agriculture of Croatia signed a joint BIOEAST vision 2030 declaration, which identifies investment needs and opportunities in three strategic areas: (i) sustainably increase biomass production; (ii) develop methods for circular („zero waste") processing of available biomass with a specific focus on (localized) agrofood systems and other bio-based sectors such as forestry; and (iii) further diversify local economies in rural areas.

e) Environmental conditions

As regards conditions in the forestry sector, special attention should be paid to its inclusion and integration with the rest of the economy into one interactive unity, which is especially difficult in Croatia for small rural forest estates (about 25% of forest area). It is an aggravating circumstance that any investment in the forest is long-term and not very profitable for investors, primarily because they do not see forestry as very influential factor in the national economy. The forest is seen only as a source of raw materials for processing, while the generally useful role of forests, which requires wider support of the national economy, is forgotten.[9]

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[8] https://www.irb.hr/Novosti/Do-EU-sredstva-jedino-kroz-suradnju-industrije-i-znanosti
[9] https://www.sumari.hr/sumlist/rijecurednika.asp, Treba li osuvremeniti nacionalnu šumarsku politiku i strategiju?, 11-12/2019

Farmers face a double challenge - to produce food and at the same time protect nature and biodiversity. The consequences of major technical and structural changes in the world market, which resulted in the globalization of agricultural production and strong strengthening of competition in the primary agricultural sector, are visible in small and non-specialized producers who could no longer live from primary agricultural production, manufacturing and service activities, especially in the rural part of Croatia, where they have resulted in very unfavorable situation characterized by numerous problems: small and uncompetitive farms, large number of old farms, fragmented agricultural land, small production plots, extensiveness and low technological level of production, insufficient use of agro-technical measures, poor productivity, poor disposal of manure and agricultural waste, etc. Such agriculture is low - income, uncompetitive and unprofitable, and in its current state cannot be a factor of sustainable development.[10]

Support for agriculture in Croatia is influenced by the CAP and in line with EU rural development policy with an emphasis on improving the competitiveness of agriculture, preserving the environment and rural areas and improving life in rural areas. Although the income target is still in focus, the instrument for achieving it is changing – instead of payments for performing agricultural activities, payments for environmentally friendly activities are preffered, i.e. activities that preserve and improve the landscape or cultural values of rural areas**.[11]**

According to a report by the European Environment Agency (EEA), the RoC belongs to the group of three European countries with the highest cumulative share of damage from extreme weather and climate events in relation to gross national product (GNP). Consequently, the extreme vulnerability of the economy to the effects of climate change can have a negative impact on overall social development. Innovative measures are especially important, which contribute to strengthening the resistance to climate change and at the same time contribute to the reduction of GHGemissions (adaptation-mitigation co-benefits). According to some forecasts, agriculture is the sector that will suffer the most from the effects of climate change. It is expected that due to climate change by 2050, the yield of current agricultural crops in the Roc will decrease by 3 - 8%. Sectors of particular importance for adapting biodiversity to climate change are water management, agriculture, forestry and spatial planning.[12]

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[10] http://www.og-corping.hr/lokalni-i-ruralni-razvoj/poljoprivreda-i-ruralni-razvoj.html

[11] Utjecaj reformi Zajedničke poljoprivredne politike na hrvatsku poljoprivrednu potporu u razdoblju 2001. - 2013., Tihana LJUBAJ, Mateja JEŽ ROGELJ, Ramona FRANIĆ

[12] Strategija prilagodbe klimatskim promjenama u Republici Hrvatskoj za razdoblje do 2040. godine s pogledom na 2070. godinu, NN 46/2020 https://narodne-novine.nn.hr/clanci/sluzbeni/2020_04_46_921.html

Chapter 4: Stakeholder inventory[13]

Stakeholder group	Public
Stakeholder subgroup	a) National ministries b) Regional and local authorities
Position in the network	Very important stakeholders National ministries will develop legal bases and framework for developing the bioeconomy in RoC by preparing the national policy strategic documents for the bioeconomy These documents will unite different policy areas, set a clear course for bioeconomy policy and set the framework for sustainable economic activity with renewable resources. Regional and local authorities will disseminate this legal national strategic documents and frameworks into local action plans. These subgroups are very involved with all the other stakeholders and have very important regional relevance. They are very strong in their interconnections/embedding in the network because they are the primary initiators of setting the legal bases, on national as well as the regional/local level.
Importance for GoDanuBio	This stakeholders group will contribute highly to the project outcomes and will be relevant for decision making process. They will have a huge influence on the project objectives, outcomes and future implementation and will also be used as a medium to disseminate the

	information.

Stakeholder group	Industry
Stakeholder subgroup	a) private companies b) industrial chambers c) cluster initiatives
Position in the network	There are many theories that tackle the development of biobased industry. But with the time it became clear the transition towards new model is not an easy task. In these theories industry stakeholders are meant as a target groups but in their implementation they are supposed to take the role of subjects. Chambers serve as the support to companies in applying and promoting the principles of sustainable economic development. Their position is therefore two-fold, however, in order to create well-designed policies that will be able to foster the transition, the industry stakeholders should be more actively involved in the development of those policies.
Importance for GoDanuBio	Strenghtening of the linkages between industry and policy stakeholders is one of the biggest challenge of implementing bio-based economy. Being often situated in the rural area, industry stakeholders are crucial in the implementation of regional strategies by facilitating the transition from a fossil resource-based economy towards an economy making use of renewable raw materials. Therefore during the project implementation, industry representatives will be actively involved according to the multi-stakeholder approach.

Stakeholder group	Academy
Stakeholder subgroup	a) research institutions b) educational institutions
Position in the network	Public universities and scientific institutes are

	included in smart specialisation processes and encourage interaction and transfer mechanisms of cooperation. Increased cooperation between scientific and
	educational community in order to share resources and realize solutions that can be competitive in the global market and contribute to addressing societal challenges.
	Cooperation within academy group will contribute to the development of conditions for attracting top scientists from abroad and prevent "brain drain". Systematic data collection of scientific organizations and dissemination through universities will contribute to the medium and long-term creation of evidence-based guidelines, strategies, development plans and the adoption of public policies.
Importance for GoDanuBio	Scientific centers of excellence enable an interdisciplinary network of innovative researchers, together with business and other public entities, to
	conducts research in areas of greatest importance to science. Science and technology parks are established to encourage cooperation between scientific organizations, the local and economic community with the aim of transferring and commercializing scientific results.
	One of strategic aims of research institutions is to enhance cooperation with public and private sector through implementation of projects, signing of cooperation contracts, conducting studies, consultant services, developing life-long education programmes.

Stakeholder group	
	Society
Stakeholder subgroup	

	a) NGOs b) Informal civil organisations
Position in the network	Civil society can be directly or indirectly affected by future developments in the bioeconomy field. NGOs are a link between public sector and citizens. Bio-based products and processes are associated with economic, social and environmental effects, which may have positive or negative impacts on society.
Importance for GoDanuBio	This project aims to discuss the role of civil society organisations in the bioeconomy development processes, specifically reflecting on current approaches and what opportunities and challenges arise. There is opportunity to learn from organic and eco-labelling and the potential implications for increasing the demand for bioeconomy-based product alternatives by encouraging more sustainable consumption.