

IMPLEMENTATION ACTION PLAN (2020-2025) FOR THE ITALIAN BIOECONOMY STRATEGY BIT II



Presidenza del Consiglio dei Ministri

CNBBSV
CENTRO NAZIONALE
BIOECONOMIA STRATEGIA
BIODIVERSITÀ E SOSTENIBILITÀ

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EXECUTIVE SUMMARY

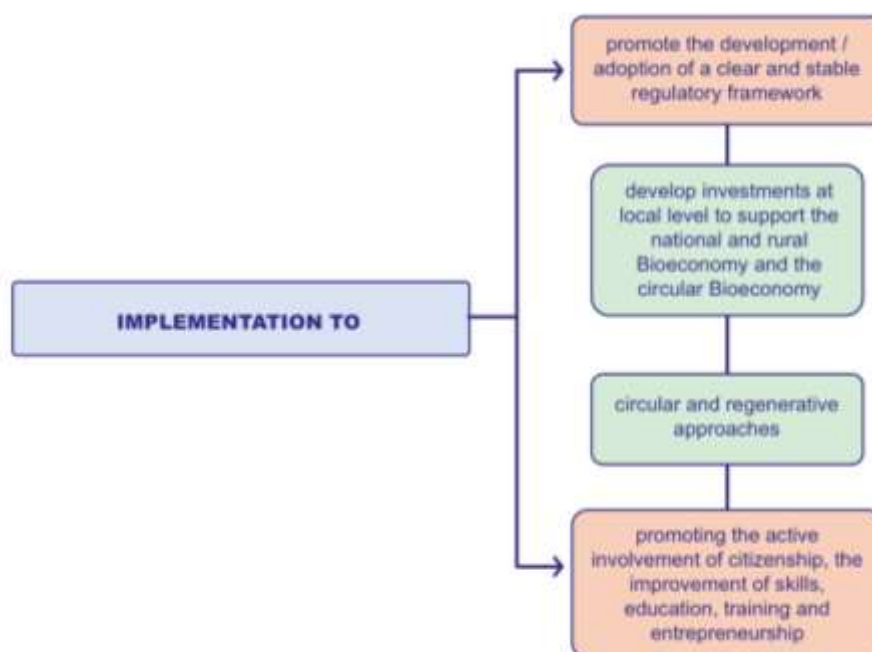
THE GLOBAL PANDEMY HAS REVEALED THE WORLDWIDE FRAGILITIES OF THE CURRENT MODEL OF PRODUCTION AND CONSUMPTION, based on dissipation of natural resources, relocation of production, disconnection with territories and communities for the realization of short-range objectives, highlighting a development approach that is based on the idea of unlimited growth to the detriment of the quality of life and of the natural and social capital of communities in the context of growing environmental impact.

BIOECONOMY IS ONE OF THE PILLARS OF THE ITALIAN ECONOMY and our country owns a long experience in the field of circular economy and Bioeconomy intended as regeneration of territories starting from quality and low impact agriculture, which enhances the relational capital of the communities through virtuous collaborations and partnerships among stakeholders of the public, private and civil society world for the realization of projects capable of regenerating the territories and the soil. With an annual turnover of 330 billion euros and 2 million employees, the Italian Bioeconomy is the third in Europe (after Germany and France) and to better exploit its potential, the Prime Minister's Office (Renzi and Gentiloni' governments) has promoted in 2017 the establishment of a national Bioeconomy strategy (BIT) and, more recently (2019, Conte's Governments), its update (BIT II) in order to integrate the sectors of the national Bioeconomy more effectively and to facilitate cooperation between the country's ministries, regions and autonomous provinces, for policies and regulations, R&I funding programs, infrastructure, etc. This strategy, drafted and currently being implemented by a coordination group for the Bioeconomy active in the Council Presidency, aims to achieve a 15% increase in the current turnover and employment of the Italian Bioeconomy by 2030. **THOUGH IMPACTED BY HEALTH EMERGENCY FOR COVID19, THE BIOECONOMY MODEL HAS SHOWED TO BE RESILIENT** knowing how to enhance its intrinsic adaptive and community spirit, rethinking production logics in a timely manner, ensuring production stability while giving absolute priority to the health and safety of people and leveraging on a spirit of solidarity along the entire supply chain, as an essential force to overcome the emergency.

In a context in which the current linear business models have demonstrated their limits and fragility and in which it is not possible to face future challenges with a simple return to "normal" business as usual, **CIRCULAR BIOECONOMY CAN THEREFORE REPRESENT THE TOOL FOR THE COUNTRY TO ACCELERATE THE POST COVID 19 DEPARTURE** and, at the same time, decarbonise the economy, remedying the problems of degradation of ecosystems and creating new jobs also for small and medium-sized enterprises and innovative start-ups in an Open Innovation logic. In particular, different assets of the circular Bioeconomy model can be valued in this particular critical period from the health and socio-economic point of view: from sustainable circular value chain for the production of food, feed and biobased products to the possibility to reach and involve several manufacturing sectors of Made in Italy, from the promotion of excellence and quality to the regeneration of territory, biodiversity and local ecosystem services.

To make this possible, thanks to a rapid strengthening of the public-private partnership, **IT IS NECESSARY TO IMPLEMENT A SERIES OF ACTIONS** aimed at:

- to **promote the development / adoption of a clear and stable regulatory framework**, policies, high quality standards and demand support measures that allow innovative and sustainable products to compete with existing ones;
- **develop investments at local level to support the national and rural Bioeconomy and the circular Bioeconomy** in the sectors of the agri-food, biological, forestry, maritime and urban sectors;
- implement **circular and regenerative approaches** aimed at protecting ecosystems, reducing risks for biodiversity, and bringing clean organic matter back to the soil, closing the carbon cycle;
- **promoting the active involvement of citizenship, the improvement of skills, education, training and entrepreneurship** throughout the Bioeconomy sector.



READY, CONCRETE AND REPLICABLE PROJECTS HAVE EMERGED as part of the consultation with national stakeholders which, if properly catalyzed and supported by public-private investments, will contribute significantly to the new economic recovery of the country after the health emergency. These **projects identified so far** are aimed at:

- **the adaptation and development of infrastructures for the recovery and treatment of organic matter** and other fundamental nutrients in the liquid and solid flows of **organic waste, wastewater and industrial sludge**;
- **the creation of territorial value chains interconnected with national multi-input and multi-product biorefineries** capable of transforming waste and co-products destined to become waste, as well as biomass from marginal soils into sustainable products designed to not pollute the liquid and solid carbon flows;
- **the reconversion of industrial sites in crisis in synergy with the agricultural sector**.

Finally, it is important to underline the necessity of overcoming the **EXISTING BARRIERS FOR A FULL DEVELOPMENT OF THE CIRCULAR BIOECONOMY SECTOR**. Despite all the actions put in place and investments in new plants and among the most important projects in Europe, there is still no clear regulatory framework capable of leveraging on strengths, high quality standards. Both at European and national level, one of the main obstacles to the development of the Circular Economy is linked to the existence of a clear and stable legislative framework, an essential element to encourage investment. Barriers include the still insufficient diffusion of high quality standards for circular and bio-based products, demand support measures that allow innovative and sustainable products to compete with existing ones, measures to emergence and limit environmental costs and externalities, promoting the circularity of the economy and the reduction of environmental impacts (e.g. incentives for activities that contribute to increasing the sequestration of carbon in the soil, such as the production and use of quality compost) . Other obstacles concern the incomplete application of laws already in force and related sanctions and the lack of homogeneity of the authorization approach regarding End of Waste due to the discretion of the various.

The development of new flagship investments in synergy with the overcoming of regulatory bottlenecks can allow the best forces of the country to be deployed to bring out a generative, competitive and sustainable creativity from the crisis as a distinctive element that makes Italy, an exemplary model at EU and worldwide level of resilient development that integrates the economic, social and environmental dimension to "regenerate" territories, infrastructures, skills and new jobs.



INTRODUCTION AND SCOPE OF THE DOCUMENT

The global pandemy has revealed the worldwide fragilities of the current model of production and consumption, based on dissipation of natural resources, relocation of production, disconnection with territories and communities for the realization of short-range objectives, highlighting a development approach that is based on the idea of unlimited growth to the detriment of the quality of life and of the natural and social capital of communities in the context of growing environmental impact. The Bioeconomy is one of the core pillars of the Italian economy (about 13% of the country turnover and employment) and, though impacted by health emergency associated with Covid19, the Bioeconomy model has showed to be resilient and therefore represents one of country sector to be exploited for accelerating the post covid 19 departure.

The National Bioeconomy Coordination Body (NBCB) of the Presidency of Council of Ministers (active in the frame of the National Committee Biosecurity, Biotechnology and Life Sciences of the same Presidency¹, involving representatives of 4 Ministries and of all Regions and Provinces, the National Agency for Cohesion and the main relevant National Technology Clusters (public private partnerships), who developed BIT II², prepared the present Implementation Action Plan (IAP). **The IAP is addressed to translate some emerging BIT II priorities into distinct actions and related monitoring, to ensure an operational roll-out of the Italian Bioeconomy potential across Italy in the next 5 years.** It is consistent with the other national strategies relating to the production of bioresources, their mobilization and use within the ecological limits. **The NBCB will facilitate the actions and yearly monitor the IAP adoption.** NBCB will also closely interact with the coordinators of the Bioeconomy strategies active in the other EU Member States to promote common positions in the review of the IAP of the EU strategy on the Bioeconomy launched on 2018. This will facilitate the exchange of best implementation actions and practices, enhance inter-country cooperation and joint activities, promote the overall implementation of the Bioeconomy strategies in all EU Countries and the shaping of a concrete agenda of joint actions and recommendations, aiming at strengthening the development of the Bioeconomy in the EU as a whole. This will also facilitate the alignment of Italian priorities with those of the Water framework directive, the “biodiversity” and “farm to fork” strategies, part of the EU Green Deal, and the ones of the cluster 6 of Horizon Europe “Food, Bioeconomy, Natural Resources, Agriculture and Environment”, and its related Missions and Partnerships.

The proposed document after presenting the national context with particular reference to the role of Bioeconomy in Italy in coherence with the recently revised national Bioeconomy Strategy (BITII), describes:

- how circular Bioeconomy model can be valued in this particular critical period from the health and socio-economic point of view and its key role in the Post-COVID 19 phase;
- a detailed action plan 2020-2025 including a series of relevant targeted actions which have been clustered into 4 main macro areas (policy/standards, pilot actions, regeneration of ecosystem services and stakeholders engagement);

¹ <http://cnbbsv.palazzochigi.it/en/areas-of-work/bioeconomy/>

² http://cnbbsv.palazzochigi.it/media/1774/bit_en_2019_02.pdf

- flagship projects ready for deployment at national levels are presented in order to provide concrete examples of Bioeconomy investments which can act as catalyst of socio-economic growth;
- legislative and proposals for their overcoming is described. A plan for dissemination and monitoring of IAP results is included in the document as well.



THE NATIONAL CONTEXT: THE ROLE OF BIOECONOMY IN ITALY IN COHERENCE WITH THE BITII STRATEGY

The Bioeconomy encompasses the whole range of activities ranging from the terrestrial and marine bioresource production to their processing and the use of products obtained. The objectives consist of providing an environmental, social and economic sustainable response to the need for food and bio-based materials and energy, while at the same time preserving and restoring natural resources via a sustainable management of water, soil, biodiversity, and guaranteeing the provision of high-quality environmental services. **Bioeconomy also has a fundamental role in the decarbonization of systems and the regeneration of territories, starting from the centrality of soil health. It can be an effective accelerator for sustainable innovation, regenerating resources and marginal/desertified/abandoned lands and transforming peripheral areas into strategic centers, a driving force of competitiveness for Italy and for the EU.**

Bioeconomy is one of the cores and enabling pillars of Italian economy. With EUR 330 billions of annual turnover and 2 millions of employees, it is the third Bioeconomy in Europe; the country is often second in terms of presence in the R&I projects funded by Horizon 2020 Societal Challenges 2 and BBI JU and the first one in terms of quality products in the food and bio-based product domains. Bioeconomy is also contributing to the reduction of the Country dependence from fossil fuels and finite materials, biodiversity losses and land use changes; further, it is **contributing to the environmental regeneration and the creation of new economic growth and jobs in the rural, coastal and former industrial areas**, leveraging on regional specificities and traditions.

To further exploit the whole Bioeconomy potential of the Country, **the Italian Government promoted the setup of a national Bioeconomy Strategy in 2017 (BIT) and, more recently, its update (“A new Bioeconomy strategy for a sustainable Italy”, BIT II, 2019³).** The objectives of BIT II are to interconnect more efficiently the main pillars composing the Italian Bioeconomy, namely the production of renewable biological resources and their conversion into valuable food, feed, bio-based products, wooden products, and bioenergy, along with the transformation and valorization of bio-waste streams. **Furthermore, BIT II aims at improving the coordination of Ministries and the 21 national Regions for the alignment of policies, regulations, R&I funding programs and investments in infrastructures. The overall goal is a 15% increase of the current turnover and jobs of the Italian Bioeconomy by 2030 by implementing priority actions and an R&I agenda, which are accompanied by measures creating and guaranteeing the framework conditions.** Due to the strategic geo-political role of Italy in the Mediterranean basin, BIT II also includes actions to improve sustainable productivity, social cohesion and greater political stability through the implementation of **Bioeconomy in the Mediterranean area**, in line with the PRIMA partnership, and the BLUEMED and WESTMED initiatives. BIT II vision is well aligned with the European Union regulatory effort which has focused its intervention on climate change, energy, agriculture, forestry and marine sectors along with a **strong focus on circularity and waste management.** This reflects well in

³ http://cnbbsv.palazzochigi.it/media/1774/bit_en_2019_02.pdf

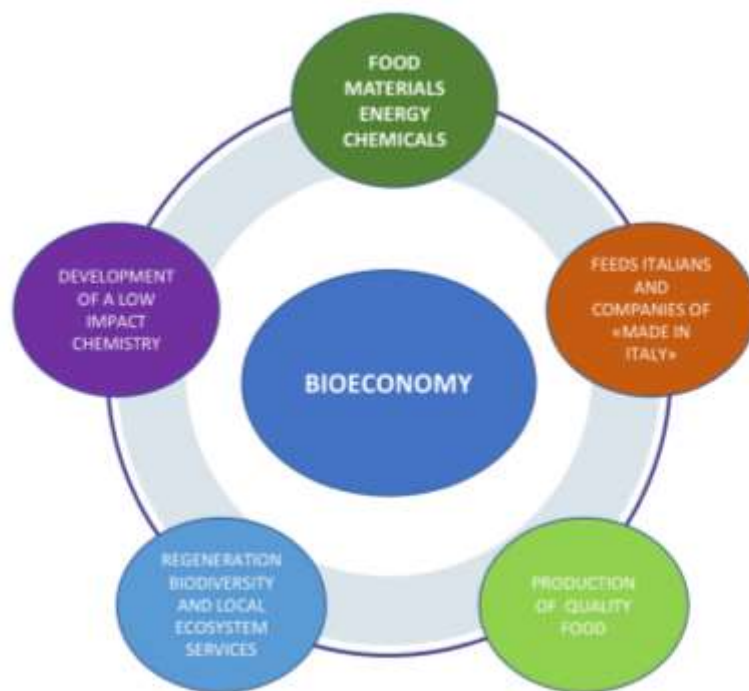
national legislative initiatives, as well as in the ongoing effort to support sustainability standards for prompting the market uptake of bio-based products.

THE CIRCULAR BIOECONOMY TO SUPPORT THE POST COVID-19 PHASE

Bioeconomy is one of the pillars of the Italian Economy and, though impacted by health emergency for covid19, the Bioeconomy model has showed to be resilient knowing how to enhance its intrinsic adaptive and community spirit, rethinking production logics in a timely manner, ensuring production stability while giving absolute priority to the health and safety of people and leveraging on a spirit of solidarity along the entire supply chain, as an essential force to overcome the emergency.

In particular, different assets of the circular Bioeconomy model can be valued in this particular critical period from the health and socio-economic point of view:

- **The Bioeconomy supply chains produce food, materials, energy, chemicals, in a sustainable way**, taking up the challenges deriving from social, environmental and economic challenges and transforming them into development opportunities, developing cases of real economy as a response to social and health changes, environmental and economic
- **The products of the Bioeconomy not only feed the Italians and make their daily activities possible but also feed the companies of all the manufacturing sectors of Made in Italy**, contributing to the consolidation of the high quality of Italian products, recognized globally
- **The excellence of the Italian Bioeconomy is a driving force for innovation and sustainable growth** of the entire Mediterranean Basin
- **The circular Bioeconomy contributes to the production of quality food, with high nutritional power and safe from a health point of view**: to guarantee the above mentioned productions, the Bioeconomy **regenerates marginal, forest, rural, coastal and industrial disused areas, regenerating biodiversity and local ecosystem services**; this, in addition to creating new jobs and quality in these areas now suffering, creates precious ecosystem conditions for the prevention and containment of future zoonoses and epidemics.



- Italy has a strong know-how capital linked to the chemical industry which represents an ideal asset on which to engage the development of a low impact chemistry based on the valorization of biomass in order to respond to the growing demand of global product markets, such as sustainable chemicals and plastics.

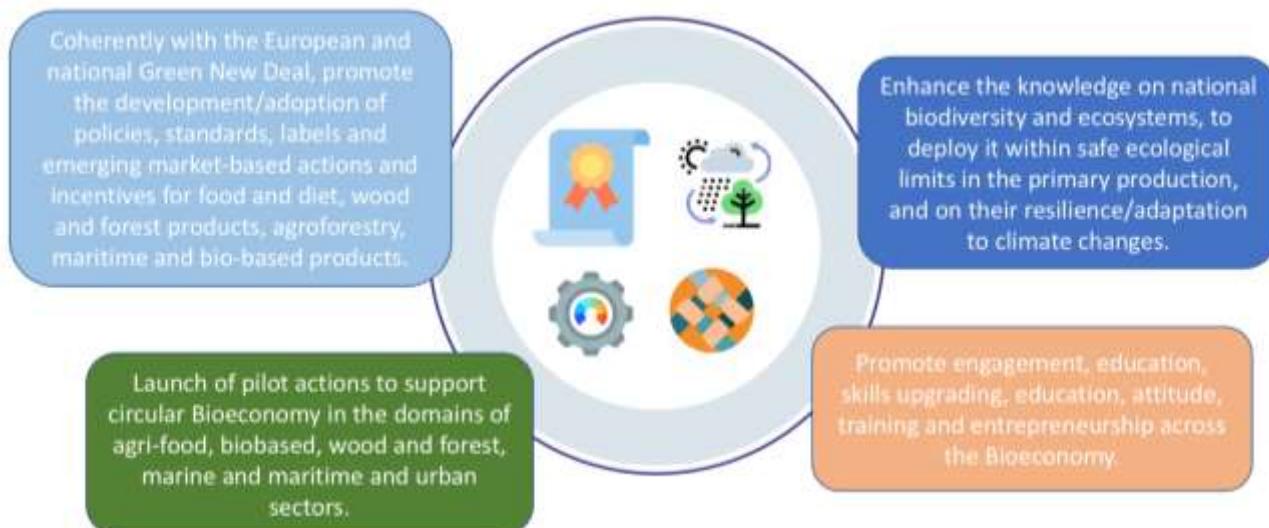
Furthermore, the Green Deal of the new European Commission, which aims to make the climate challenge and the ecological transition an opportunity for a new development model, and the update of the Circular Economy Action Plan, if properly addressed, can make Italy one of the leading countries in the field of circular Bioeconomy and clean technologies.

THE BIT II IMPLEMENTATION ACTION PLAN 2020-2025

To facilitate the implementation of priorities identified in BIT II, through the assets of the circular Bioeconomy mentioned above, operational actions under four broad headings have been identified. They are:

- 1) **Promote the development/adoption of policies, standards, labels and emerging market-based actions and incentives;**
- 2) **Launch of pilot actions at the local level to support national and rural Bioeconomy and circular Bioeconomy in the domains of agrifood, bio-based, forestry and marine and maritime sectors and in the cities;**
- 3) Enhance the **knowledge, protection and restoration of national biodiversity** and ecosystems, and **ecosystem services** on their resilience/adaptation to climate changes;

- 4) Promote **awareness, skill upgrading, education, attitude, training, and entrepreneurship across the Bioeconomy.**



ACTION 1

Coherently with the European and national Green New Deal, promote the development/adoption of policies, standards, labels and emerging market-based actions and incentives for food and diet, wood and forest products, agroforestry, maritime and bio-based products, on the basis of reliable scientific-based data on environmental and climate performance and socio-economic and environmental impacts



The recommended actions are:

- **Embed Bioeconomy strategy in law to guarantee recognition of the Bioeconomy strategy** and its application and define a biannual implementation plan;
- **Strengthen standard and label for low impact bio based products** to improve public perception and market acceptance of biobased products, **developing country-based on Life Cycle Inventories and other tools**, including carbon accounting, based on which promoting **those biobased products which provide evidence on the contribution to lower GHG emissions** in a wide range of sectors (agriculture, services, SMEs, domestic sector);
- **Issue a decree, which fosters systematic use of bio-based products** by official departments and agencies and in **public-sector organizations, hospitals and schools through Green Public Procurements**;

- Re-examine fossil fuel subsidies and **strengthen environmental subsidies for low impact biobased products**, thus creating a level playing field for bio-based industries;
- **Promote the use of products able to biodegrade in different environments in applications** where there is a risk of an accumulation of non-biodegradable residues in liquid and solid carbon streams and in soils, with effects also on water quality;
- **Promote the use of compost, digestate and high-quality organic materials in agriculture**, to tackle the desertification issue and reducing organic material ending up in landfills;
- **Encourage investors towards provision of finances in the Bioeconomy sectors** (e.g. banks, “business angels”, insurers, pension funds, investment funds, crowdfunding schemes), by increasing the awareness on the contribution of Bioeconomy to economic development, mitigation of climate change and environment preservation;
- **Promote Bioeconomy priorities and actions in the frame of national and regional S3**, not only by mobilizing structural funds at regional level, **but also promoting an inter-regional implementation of Bioeconomy** through cooperation and coordination as well as **stimulating synergy among different public and private funding sources for lowering the risk for investments in Bioeconomy initiatives** (such as Circular Bioeconomy Thematic Investment Platform, established by the European Commission, the Common Agricultural Policy (post-reform), the InvestEU Programme, the future European Innovation Council and the ETS Innovation Fund);
- **Promote Bioeconomy priorities and actions in the frame of national and regional ERDF Operational Programmes, in the context** of support for research and innovation initiatives related to the specific objectives of **Policy Objective 1 (A smarter Europe)** and of initiatives aimed at promoting clean and fair energy transition, green and blue investment, the circular economy, climate adaptation and risk prevention and management as envisaged by the specific objectives of **Policy Objective 2 (A greener, low-carbon Europe)**;
- **Deploy the post-2020 CAP National Strategic Plan** to enhance increased sustainable production and use of biomass and the development of innovative Bioeconomy sectors embedded in locally routed supply chains;
- **Promote a capillary digital innovation and transformation of sectors, with new business models reproducible and adaptable to different social and geographical contexts**, by leveraging on local actors and territorial resources, also paying attention to solutions requesting low technological and financial input.

ACTION 2

Launch of pilot actions to support circular Bioeconomy in the domains of agri-food, biobased, wood and forest, marine and maritime and urban sectors



1.1.0 Rural Bioeconomy

In Italy, the priority is to deploy the Bioeconomy in the territories, valorizing the local traditions and biodiversity, trying to make their economies more dynamic. Regarding to rural area, small-to-medium bio-based solutions are recommended, along with the identification of technologies that are suitable to operate at small scale and easy to replicate and/or to adapt to local conditions and promote demonstration activities. Quite relevant to that objective are "living labs" where place-based, multidisciplinary, multi-stakeholders and ecological-based innovations are developed and tested. They promote concrete and efficient ways of cooperation and sharing of experiences between different players such as farmers, forest owners, advisors, researchers, businesses, policymakers, citizens. The following sub-actions are proposed:

- **Develop and test "living labs" as place-based, local infrastructures where multiple disciplines and stakeholders can exchange ideas, co-create, test and replicate** agri-food, forestry, bio based and sea-based **Bioeconomy solutions** on different scales (e.g. from pilot to landscape);
- **Promote the transition of agriculture to climate neutrality, reducing the negative environmental impact of the agri-food activity, to exploit low input crops in marginal lands and to improve the soil organic matter content and fertility;**
- **Support and encourage sustainable forest management** and the cascade use of wood products;
- **Set up a trainer training Programme** designed to foster the creation of **support structures for managing innovation projects and technology transfer in the Bioeconomy field.**

1.1.1 Agrifood

The Italian food and beverage industry represent a prominent sector of the Italian economy. It relies on a large variety of high-quality typical products, which are prominent components of the Mediterranean diet, which in turn is recognized worldwide as a model of healthy and correctly balanced nutrition, permitting a good state of health and preventing onset of significant pathologies associated with the diet. The sustainability and circularity of Italian agrifood value chains can be further increased through processing and utilization of by-products and wastes. By-products often contain phytochemicals, bioactive peptides, prebiotics, dietary fiber, minerals, polyunsaturated fatty acids, carotenoids, etc. that can be exploited as valuable bioactive ingredients. They can be recovered and used both in the formulation of new food products, which combine health and acceptability performances, and in the increase in food safety and shelf life.

The following sub-actions are proposed in this sector:

- Better **identify/document scientifically the health and nutritional properties of the Italian regional products of the Mediterranean diet**, to further promote globally the image of this food style and its cultural, anthropological, nutritional, healthy relevance through solid scientific evidence;
- **Develop tailored biorefinery schemes to fully valorize agrifood byproducts to obtaining high value healthy ingredients for the formulation of ready to eat and other modern new food/feed products as well as additional biobased products (chemicals, materials and fuels) following a cascading use of resources approach;**
- **Standardize methods of assessing bioavailability and functionality** (antioxidant, anti-inflammatory, immune-modulatory, neuroprotective, and anticancer properties, etc....) **of ingredients obtained from byproducts;**
- Develop new food processing methodologies **(including biobased food packaging) based on minimizing the technological damage to decrease food loss and food waste** and increase productivity while **valorizing the unavoidable food losses into the production of high quality biomethane and compost for soil regeneration.**

1.1.2 Biobased industry

The production of bio-based materials from dedicated non-food agroforestry biomass in marginal lands and from biowaste of agrifood, forestry and maritime activities, is a very special opportunity for many rural and coastal areas of the Country, under economic and environmental terms. On the one hand they can constitute a source of income diversification and an additional element of profitability for all the involved stakeholders along the value chain (including primary sector). On the other hand, they can contribute to dispose smartly impacting residues and regenerate territories, thus contrasting the phenomena of desertification and soil contamination. Moreover, in Italy more than 6 thousand contaminated sites are present, often former industrial sites (oil refineries and chemical plants). They have to be decontaminated to lower the associated environmental and health problems. The opportunity is to combine this decontamination phase with their re-industrialization, with the installation of new and advanced biorefineries established in synergy with primary sector, providing environmental and economic regeneration of the territories through the establishment of a win-win agro-industrial value chains between agriculture and biobased industry based on the valorization and enhancement of the existing infrastructures, services, skills and professionalism.

- **Create circular Bioeconomy value chains based on the valorization of dedicated non-food crops grown on marginal lands and/or local agrifood, forestry or marine biowaste to obtain different types of bioproducts and biomaterials to enhance and revitalize the economy and the environmental and social relevance of the areas.**
- **Regenerate some of the former oil refineries or chemical industrial areas, especially those located near populous and relevant urban centers, into biorefineries, able to guarantee locally new environmental, economic and social sustainability. To spur opportunities in such direction, a public database of existing former oil refineries or chemical industrial areas in the Italian territory needs to be created.**

1.1.3 Urban Biowaste

Urban biowaste, normally perceived as a challenge due to its potential pressure on the environment and human health, other than being a fundamental soil improver (in the form of compost), contain bio-based products such as chemicals, nutrients, precursors for plastics, etc. of prominent industrial interest. This represents a relevant opportunity, as demonstrated by the city of Amsterdam, which estimates that the better recycling of high value organic residue streams could generate EUR 150 million in added value per year, create 1.200 new jobs in the long run and save 600.000 tons of carbon dioxide per year. Similar opportunities are associated with municipal wastewaters management and disposal. The availability of such matrices is growing due to the fact that the new EU regulation on waste would lead to an increase of the amount of bio-waste collected and made available in cities and at the same time the current approach to their exploitation are not fully exploiting their potential.

The following sub-actions are proposed in this sector:

- **Exploit the full potential of urban biowaste and wastewaters via a multi-products biorefinery approach, with the production of bio-based chemicals, materials and energy along with valuable and critical materials such as Nitrogen, Phosphorus, and Potassium.**



1.1.4 Blue Bioeconomy

The EU's blue growth strategy identifies aquaculture as a sector that could stimulate economic growth across Europe and the Mediterranean region and the reform of the common fisheries policy also promotes the aquaculture sector, also through the national strategy adopted by Italy. Projections indicate that aquaculture in the Mediterranean Sea could grow by more than 100% by 2030. This level of development inevitably leads to conflicts for space and resources, triggering

competitions with other coastal activities (e.g. tourism) and is associated with environmental concerns related to the discharge of pollutants such as plastics and microplastics, antibiotics and nutrients (from feed) in coastal areas, with consequent deterioration of coastal marine ecosystems. Italy is the second Mediterranean country for the production of fish products. However, the national fishing sector is in crisis due to the excessive exploitation of resources (caused by ineffective management with a consequent reduction in catches, which has led to a significant contraction of the fishing fleet). The sector is also affected by the lack of technological innovation, management and marketing, in the improvement of boats and the welfare of operators. Other adverse elements are associated with the geo-politically complex Mediterranean basin, where are playing prominent non-EU fishing countries with less restrictive regulations, but also with the phenomenon of illegal fishing. Last but not least, aquaculture as well as fish reproduction in the sea are highly susceptible to climate change affecting sea level and salinity.

Despite the aforementioned challenges, marine the marine environment can be considered an inexhaustible mine of products, if properly exploited, with high added value that can generate new production chains with high commercial value, and this is a special opportunity for Italy almost fully surrounded by seas. Despite of this, Italy shows a significant delay in development and technological innovation in the blue biotechnology sector.

The following sub-actions are thus proposed in this sector:

- Implement defined national strategies for the sector and **promote the development of sustainable fisheries, also through new fishing ICT based technologies**, aimed at achieving environmental sustainability, protection and restoration of marine habitats, spatial management of fishing activities, food quality & safety, promotion of market neglected fish species, enhancement of underutilized and discarded fishery and aquaculture products through industrial symbiosis approaches (e.g. bivalve shells, undersized specimens of commercial fisheries species), diversification of fisheries products, promotion of products traceability and labeling, development of integrated traceability systems.
- **Promote aquaculture in offshore sites**, through the reuse of decommissioned offshore platforms existing in Italy
- Create a scientific network for blue applied biotechnology, involved in designing and testing new technologies for the remediation of marine contaminated sites and **tailored exploitation of national marine based feedstock** (including by-products and wastes from sea products transformation), **identifying new biobased products** (i.e., functional cosmetics, foods/feeds nutraceuticals, functional foods) and **biomaterials** (i.e., natural polymers for packaging or biomedical market),
- **Create a national vulnerability evaluation framework** to assess of the sector vulnerability and the integrated coastal management, **improving disaster preparedness and farm and fisheries resilience to climate change**.

ACTION 3

Enhance the knowledge on national biodiversity and ecosystems, to deploy it within safe ecological limits in the primary production, and on their resilience/adaptation to climate changes.



The environment, natural resources, natural capital, biodiversity, ecosystems and ecosystem services are under severe pressure at global and local scale. The “farm to fork” and “biodiversity strategies” have been recently launched for facing these treats. It is therefore imperative that the Italian Bioeconomy implementation actions help reducing environmental pressures, value biodiversity, halting and reversing its loss, enrich natural capital and contribute to enhance the provision of main ecosystem services and improving the productivity and resilience of natural resources. There are several sources of soil pollutants/contaminants interfering with our ecosystem and entering in food-feed chains such as plastics and microplastics, chemical fertilizers and herbicides, lubricants, metals, fuels, antibiotics. Sustaining nature’s contribution to humanity requires the maintenance of a healthy planet, resilient ecosystems, an efficient use of natural resources, and conservation and sustainable management of biodiversity. It is therefore necessary to improve the knowledge base (data, information and tacit knowledge) on ecosystems status and their interaction and a forward-looking capacity. At the same time, the application of eco-designed products which don’t accumulate into the environment can provide a substantial contribution to preserve ecosystem services if they are implemented in virtuous systems based on high quality inputs/output flows.

These are essential elements to provide the evidence needed to support policy makers and for underpinning policy coherence. This asks for more knowledge and perception about risks and opportunities of working with biological resources, sustainability thresholds and the values of biodiversity (including economic, cultural and intrinsic values) but also for innovative solutions, new business models, new accounting systems and alternative value chains that are centered on biological resources, ecosystems and biodiversity, developed with local communities and stakeholders.

The recommended actions are:

- Promote mechanisms accelerating the transition towards a resource-efficient, safe, **circular and climate-neutral economy that protects and restore biodiversity and ecosystem services**;
- **Strengthen the knowledge, resilience and status of biodiversity and terrestrial and marine ecosystems, including the services they can provide and the related socio-economic costs and benefits**, with a particular attention to regulatory ecosystem services, in harmony with the Italian Natural Capital Committee. This would allow the implementation of an ecosystem-based approach to natural resources management, valuing the provision of ecosystem services in the frame of the environmental policies on protection of water, soil, biodiversity and habitats as well as promoting the natural capital accounting systems based

on the methodologies defined by the United Nations and the European Union, also within the Mapping and Assessment of Ecosystems and their Services (MAES) and Forest Information System for Europe (FISE);

- **Increase observation, measurement, monitoring and reporting capabilities on the condition of national biodiversity, ecosystems and ecosystem services**, to underpin ecosystem conservation and restoration by contributing/exploiting to Copernicus data and information services, by better integrating monitoring and data systems;
- **Monitoring of degraded land areas or lands at risk of climate change** impacts such as desertification, in cooperation with Copernicus services and Sentinel system, to underpin **actions for soil health improvement based on circular Bioeconomy regenerative practices**;
- **Assess the national role of pollinators, microbiomes and other ecosystem services as factors able to higher up the biomass production, to protect our crops, to restore and better manage soils, to improve human and planetary health, and to spawn new sustainable solutions** and economic opportunities for growing bio economies, while preserving the intrinsic value and biodiversity of our ecosystems. This needs to be carried out in alignment with the national initiative on microbiomes launched by CNBBSV in 2018⁴;
- Support and guide innovation in the area of **protocols and technologies, species identification and improvements for biomass production, harvesting and processing to match the conditions to be met for sustainability of primary production**;
- **Adopt /join climate policy measures at EU level in order to combat biodiversity loss and environmental changes also through the promotion of eco-designed products application which don't accumulate into the environment** preserving ecosystem services.



⁴ <http://cnbbsv.palazzochigi.it/media/1859/microbioma-2019.pdf>

ACTION 4

Promote engagement, education, skills upgrading, education, attitude, training and entrepreneurship across the Bioeconomy.



The recommended actions are:

CITIZENS

- **Promote citizens awareness and engagement through campaigns** to showcase Bioeconomy products , **mobile exhibition** to showcase the Bioeconomy in day to-day life, “**open days**” in companies active in the Bioeconomy, participation to National Bioeconomy Day launched by SPRING Cluster and Assobiotec-Federchimica and all other initiatives which aims at creating awareness in the public opinion

COMPANIES

- **Promote awareness and provide information to enterprises through:** i) the set up a sustainable **Bioeconomy portal** to gather together basic information, highlighting a large number of examples and listing R&I projects on Bioeconomy products and their applications ii) **raising the profile of bio-based products** and their externalities with retail companies to enable them to promote and offer more of them to consumers; iii) **technical information campaigns for each broad family of bio-based products** (e.g. hygiene, construction, clothing) **for downstream actors** in supply chains. iv) **take advantage of the construction of the Olympic Village for the 2026 Games** (Milano Cortina) to make Italian excellence in the Bioeconomy. Construction of the Olympic Village in bio-based materials (wood, hemp, etc.) could an opportunity to showcase these new materials (also bioplastics and biocomposites) and techniques.

EDUCATION

- **Improve the level of training and education of personnel working in the Italian agricultural, forest and marine/maritime sectors** to meet Bioeconomy sector needs, facilitating replacement of the ageing personnel working in the mentioned sectors (e.g. technicians, support engineers, ground-staff) with young and better trained professionals, owning multidisciplinary, managerial and cross-sectoral expertise
- **Include the Bioeconomy both in school education and specialist vocational courses** (schools of agronomy, chemistry and biology courses, agricultural teaching, school education)

- **Disseminate the Bioeconomy concept in initial and continuous training courses and school programs** in partnership with the Ministry of Education and regional governments;
- **Create new Bachelors and Masters' University degree programs in Bioeconomy and better promote the existing ones**, in order to contribute in a more effective way to a smart, innovative multidisciplinary and sustainable Bioeconomy growth in the country. This will require also the support of collaborative networks of academic institutes and private sectors to share best practices and improve the development of Bioeconomy curricula

ENTREPRENEURS

- **Promoting an entrepreneurial mind-set and culture for the Bioeconomy** through the contribution of the EIT KICs (and, in particular, EIT Raw Materials, EIT Food, EIT Climate-KIC and EIT InnoEnergy);
- **Promote Open Innovation initiatives to accelerate a scale-up of innovative solutions** in the Bioeconomy field developed by start-up and SMEs
- **Acting to increase the EU financial support to Bioeconomy projects** in line with the recommendations of the European Investment Bank on 'Access-to-finance conditions for Investments in Bio-Based Industries and the Blue Economy'. This to improve access-to-finance of projects, by helping them to improve their bankability and investment-readiness, structuring their financing and liaising with private investors.


FLAGSHIP PROJECTS TO BE DEPLOYED IN THE SHORT TERM


Some ready, concrete and replicable projects have emerged so far from a consultation launched by the NBCB; if properly catalyzed and supported by public-private investments, these projects can contribute significantly to the new economic recovery of the country after the health emergency. These **projects provide for investments totaling € 570M** and are aimed at:


- **the adaptation and development of infrastructures for the recovery and treatment of organic matter** and other fundamental nutrients in the liquid and solid flows of **organic waste, waste water and industrial sludge**;
- **the creation of territorial value chains interconnected with national multi-input and multi-product biorefineries** capable of transforming waste and co-products destined to become waste, as well as nonfood biomass from marginal soils into sustainable products designed to not pollute the liquid and solid carbon flows;
- **the reconversion of industrial sites in crisis in synergy with the agricultural sector.**


There are several elements of resilience on which the projects proposed on the Italian national territory are based, and described below:


- **Synergy between rural, coastal, industrial and urban areas, overcoming the competition for resources:** interventions aimed at the growth and innovation of the circular Bioeconomy are not designed to promote a single production sector or a single territory but rather to **enhance the competitiveness of entire value chains**. Agricultural, food, forestry, fishing, wastewater and waste management sectors are involved both upstream and downstream of the supply chains both as bio-resource suppliers and as recipients of technologically advanced low impact biobased products necessary, for example, for the preservation of food and agricultural products, packaging, health aspects, etc.
- **Transformation of costs into value:** the virtuous interconnection of different economically relevant national realities which previously presented themselves to the market as isolated and independent realities allows **to transform costs (see waste disposal, by-products, etc.) into value and maintain it on the national territory**
- **Development and growth with the territory and not in the territory:** the creation of the value chains of the circular Bioeconomy catalyzed by incremental innovation allows for a **cohesive and sustainable development, also through trans-regional coordination that enhances the specific characteristics of the individual territories system**
- **Regeneration of the territory, environment and soil:** the activities of the Bioeconomy allow to reduce environmental pollution, fixing CO₂ (seas and forests) and allowing the sustainable disposal of civil and industrial organic waste with the **concomitant production of biodegradable and compostable materials that do not accumulate in soil and water and which, at the end of their life, can be transformed into precious compost for soil regeneration**, contributing to the prevention and containment of future zoonoses and epidemics.

	FLAGSHIP 1 – CREATION OF REGIONAL VALUE CHAINS INTERCONNECTED WITH MULTI-INPUTS AND MULTI-PRODUCTS BIORAFINERIES	
	INVESTMENT	~ 150 M €
TARGET	EXPECTED IMPACTS	
<p>Develop multi-purpose and multi-product biorefineries capable of converting, through biotechnological and chemical processes, renewable raw materials into low-impact biobased products conceived as solutions to specific environmental problems, enhancing cascade all the streams leaving the biorefinery (including waste), increasing energy efficiency, all in a highly efficient "biorefinery" zero waste logic.</p> <p>In this perspective, the establishment of supply chains in agreement with a circular Bioeconomy logic based on dedicated industrial crops in marginal areas not in competition with the food supply chain is an effective solution for enhancing and revitalizing the soil resources, especially in fragile territories of South Italy (also through the integrated growth of industrial and food crops), and to generate new business models based on the synergy between the agricultural and industrial sectors. In addition to this, the opportunity to valorise other agricultural and/or forestry by products and waste, and marine biomass, particularly interesting for the extraction of high biological value and high value-added molecules.</p>	<ul style="list-style-type: none"> ▪ Significant opportunity for the creation of new jobs, many of which specialize, both in the primary sector for the production and management of biomass, and within the biorefinery itself ▪ Generation of new sources of income for primary and secondary sector players and enhancement of districts/territories. ▪ Activation of highly specialized production chains, which can also be replicated in different production contexts. ▪ Recovery and revitalization of lands uncultivated or long abandoned by agriculture and prevention of hydrogeological instability through the cultivation of marginal and/or desertified soils. ▪ Development of technological solutions on an industrial scale for the implementation of second generation biorefineries ▪ Obtaining bioproducts and/or high added value molecules with wide market potential ▪ Reduction of the dependence on fossil sources for the sectors of application of the products defined in the process ▪ Reduction of management and disposal costs of organic waste and residues from different agro-industrial sectors ▪ Creation of supply chain certification systems aimed at guaranteeing the real use and marketing of the bioproducts developed. 	

		FLAGSHIP 2 – URBAN BIOWASTE AND WASTEWATER/SLUDGES VALORISATION INTO COMPOST, BIOCHAR, BIOGAS, CHEMICAL SUBSTANCES AND MATERIALS FOR THE BENEFIT OF THE LOCAL AREAS	
		INVESTMENT	~ 250 M € (for the revamping of existing plants) + 880-1.760 M € (for new plants for anaerobic digestion and composting mostly in the southern Country)
TARGET		EXPECTED IMPACTS	
<p>To develop industrial bioeconomic threads in the area for the enhancement of biodegradable urban waste (organic fraction of urban solid waste, sewage sludge, waste cellulose and other waste streams) in the production of low impact and secure bio-based products market shares (e.g., natural organic soil improvers, renewable mineral and organo-mineral fertilizers, biostimulants, renewable biochemicals, biomethane , CO₂, etc.).</p>		<ul style="list-style-type: none"> ▪ New investment opportunities and employment effects for all stakeholders involved in the supply chain (<i>waste managers, multi-utilities, developers of technologies and processes, large, small and medium-sized enterprises for the development of bioproducts, innovative start-ups, trade associations, research and technology transfer centres</i>) ▪ Significant reduction of the problems of disposal of different types of biomass and organic waste of urban origin, such as OFMSW, anaerobic digestates, sewage sludge, waste cellulose, etc. ▪ Significant reduction in the amount of process waste generated during the treatment of organic waste. ▪ Potential integration of the technological chain with existing and currently underutilized plants (e.g. anaerobic sludge digesters in wastewater treatment plants). ▪ Reduction of climate-changing emissions associated with current treatment processes ▪ Maintenance and improvement of the ecosystemic services of agricultural, urban and industrial soils. 	

	FLAGSHIP 3 – RECONVERSION OF INDUSTRIAL SITES IN CRISIS THROUGH THE BIOECONOMY	
	INVESTMENT	~ 170 M €
TARGET	EXPECTED IMPACTS	
<p>Redevelop the old Italian non-productive industrial plants converting them to the specific needs of the innovative value chain of biobased products, in connection with the agriculture: focus the efforts on marginal lands that are not in competition with food chain, in full respect of local biodiversity and slowing down the erosion of soil and agricultural surfaces.</p>	<ul style="list-style-type: none"> ▪ Significant opportunity for the creation of new jobs, many of which specialize, both in the primary sector for the production and management of biomass, and within the biorefinery itself. ▪ Revitalize the local economy ▪ Insert the remediation into the general framework of the protection of environmental resources. Ensure the recovery of areas reclaimed for productive use ▪ Guarantee the economic and temporal sustainability of the interventions by ensuring full compatibility with the activities in place in the areas ▪ Evaluate and minimize secondary impacts. 	

	FLAGSHIP 4 – RESTORATION OF THE MARINE ECOSYSTEM OF THE ADRIATIC-IONIAN MACRO REGION	
	INVESTMENT	~ 20 M €
TARGET	EXPECTED IMPACTS	
<p>This flagship will involve the entrepreneurial and industrial systems of blue economy interested in the recovery of plastics wastes, solid (urban) waste including war residues and dangerous wastes, abandoned or / and lost fishing nets and fishing waste from the sea. New business opportunities will be developed from the valorization of the collected plastics (with the production of chemical compounds and material of interest for the textiles and fashion, and biofuels) and wastes. Another priority addressed would be the (bio)remediation of the contaminated marine sediments, with particular those coming from the port dredging operations.</p> <p>The initiative will be implemented in close cooperation with the EU and non-EU cross-border regions, in order to create a macro-regional (Adriatic-Ionian) consensus on prevention and management of anthropogenic and plastic waste in the sea and on the actions and R&I needs to put on place. A transnational response in the Balkan region, coordinated by Italy, could increase the effectiveness of interventions through the sharing of experiences, professionalism and skills.</p>	<ul style="list-style-type: none"> ▪ to implement and promote ecological restoration of degraded marine areas; ▪ to improve the health conditions of the sea living fauna, threatened by the plastic wastes as well as the human consumption of fish products; ▪ the promotion and active involvement of coastal and fishing communities, through the redevelopment of fishing ports currently in crisis; ▪ the adaptation and implementation of infrastructures in the ports for the recovery and valorisation of anthropogenic waste, plastic and other waste (i.e., fishing waste); ▪ the implementation of territorial supply chains capable of transforming plastics collected from the sea into eco-products and materials of interest for textile, fashion, chemical and energy industries, multi-input and multi-output biorefineries; ▪ the promotion and development and adoption of clear and stable regulatory frameworks, policies, high quality standards and demand support measures for the innovative and sustainable products coming from the valorisation of the plastics and waste recovered from the sea; ▪ to drive the fishing and aquaculture sectors towards technological innovation on the recovery and valorisation of waste from fishing, aquaculture and the fish processing industry with the production of compounds and molecules of high nutritional and commercial value to be used in the health, cosmetic and food sectors. 	

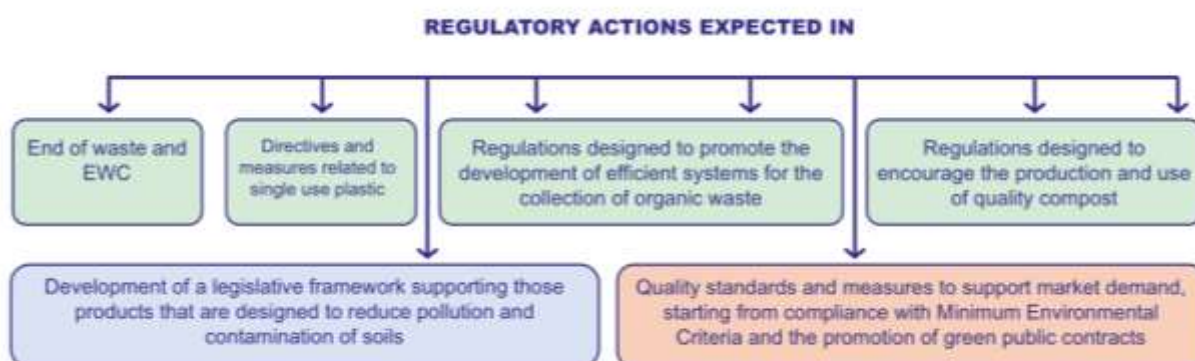
	FLAGSHIP 5 – CIRCULAR AND SUSTAINABLE AGRI-FOOD CHAINS	
	INVESTMENT	~ 25 M €
TARGET	EXPECTED IMPACTS	
<p>The project involves the complete revamping of 2 existing transformation plants - anaerobic digestion and composting, to make them integrated and complementary, to allow the joint recovery of organic waste, waste and by-products of agri-food and urban origin to produce renewable energy (bio-methane) and high quality organic amendments, to be reinserted into the supply value chain by the wine and livestock sectors.</p> <p>The main objectives are: renovate and valorize existing industrial assets no longer used or underused, exploit the chemical complementary richness of carbon and nitrogen nutrients of the by-products of the wine and livestock sectors, increase the competitiveness and sustainability of the Italian wine and meat supply chains by reducing their carbon footprint along with the creation of a national integrated hub for the valorization of waste and scraps at the service of the whole Italian agri-food system and a reproducible model for energy conversion and technological adaptation of the national network of first generation agricultural and agri-food biogas plants.</p>	<ul style="list-style-type: none"> ▪ Generate revenues of approximately € 6.5 million including the biomethane and related incentives provided for by the Ministerial Decree of 2 March 2018, waste and scrap recovery service, as well as the sale of soil improvers. ▪ Obtain the efficient disposal and valorisation of over than 100,000 tons/year of highly impacting biowaste, scraps and by-products of animal origin from the agri-food and civil sector from all over the country; ▪ Produce 12,000 tons / year of organic amendments to be reintroduced into primary production; ▪ Produce 3,500,000 cubic meters of biomethane obtained from renewable sources; ▪ To develop innovative solutions for the recovery of bioactive molecules and ingredients from by- products of the wine making and animal processing pipelines. ▪ The direct employment impact involved in the management of the production sites is about 12 people; indirect resources employed in the design, technical assistance and maintenance of the processes are 15 people. ▪ To assess innovative and sustainable technical solution for cat.1 animal by-product alternative to incineration that is facing increasing difficulties due to a lack of specific plants and air pollution concerns. 	

The national flagship investment projects intend to involve all the Italian regions, acting as a real platform to multiply the investments of the industrial and agricultural sector, maximizing the synergy between national, regional and European funds. The potential to generate new jobs is significant: **120 new jobs per 1000 tons of new biomaterials throughout the supply chain with important the consequences for strategic sectors for Italy: food, textile, automotive, cosmetics, packaging, paper, wastewater treatment.**

PROPOSALS FOR OVERCOMING LEGISLATIVE BARRIERS

Despite all the actions put in place and investments in new plants and among the most important projects in Europe, there is still no clear and stable legislative framework, an essential element to encourage investment. Barriers include the still insufficient diffusion of high quality standards for circular and bio-based products, demand support measures that allow innovative and sustainable products to compete with existing ones, measures to emergence and limit environmental costs and externalities, promoting the circularity of the economy and the reduction of environmental impacts (e.g. incentives for activities that contribute to increasing the sequestration of carbon in the soil, such as the production and use of quality compost) . Other obstacles concern the incomplete application of laws already in force and related sanctions and the lack of homogeneity of the authorization approach regarding End Of Waste due to the discretion of the various. This chapter lists some priorities identified by the Cluster members that hold back the development of a virtuous circular Bioeconomy systems, suggesting some actions that may favour market access for biobased Bioeconomy products. Regulatory actions are expected in the following areas:

1. **End of Waste and EWC** (European Waste Codes):
2. **Directives and measures related to single use plastics;**
3. **Regulations designed to promote the development of efficient systems for the collection of organic waste** and the construction of technologically advanced treatment plants, in order to expand the collection and treatment capacity of this fraction
4. **Regulations designed to encourage the production and use of quality compost** obtained from the treatment of organic waste
5. **Quality standards and measures to support market demand, starting from compliance with Minimum Environmental Criteria and the promotion of green public contracts**, with particular reference to waste treatment, recovery and disposal systems.
6. Development of a legislative framework **supporting those products that are designed to reduce pollution and contamination of soils**



End of Waste and European Waste Codes

The End of waste is a process that allows a given waste to lose this qualification in order to become a non-waste, that is, a new resource, transforming a cost into a new value. In Italian law, this transformation is subject to an extraordinary procedure that can only be used for specific types of waste.

This limitation can represent an obstacle to the development of the Bioeconomy sector, which uses biological resources and waste as inputs for energy, industrial, food and feed production, following a "cascade" approach and the valorisation of secondary raw materials. In the same way, the Bioeconomy by its nature is a sector that in terms of produced wastewater and sludges is comparable to the agro-food sector since it uses and transforms vegetable and animal raw materials whose waste can present characteristics suitable for further use in other chains.

The lack of a correct regulatory procedure slows down the development of an integrated Bioeconomy as well as the application of the principles of the circular economy. It follows that the country that has developed correct and well-defined regulations will be the one that will take advantage of these technological changes and will enjoy the consequent economic benefits. What is generally desirable is a complete change in the economic paradigm, which goes beyond the concept of waste by transforming it into that of resource, a raw material that offers great opportunities for sustainable development.

Therefore, it is proposed to define an EoW decree for waste and recovery activities of interest to the Bioeconomy, or alternatively to insert these issues within an already active GDL c / o the Ministry itself.

Directives and measures relating to single use plastics

The single use plastics directive - (SUP)⁵, more precisely Directive (EU) 2019/904 of June 5th 2019, published in the OJEU on 12 June 2019, regulates a part of disposable plastic products, some of which are subject to reduction goals (art. 4), others are banned (prohibitions of art. 5), and still others are subject to specific collection, recycling, etc. requirements (articles 6 ss.).

It should be stressed that Italy is the country most affected by the measures provided for by art. 5 as the major European producers of disposable tableware are present in the

national territory. It is a solid sector and, according to the available data, "The Italian industry producing disposable plastic tableware is the most important in Europe with an export share of over 30%".

It is important to consider and discuss about the activation of measures that do not put the national system in crisis, but at the same time

⁵ Directive (EU) 2019/904 of the European Parliament and of the Council - [https://eur-lex.europa.eu/legal-](https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:32019L0904&from=EN)

[content/IT/TXT/HTML/?uri=CELEX:32019L0904&from=EN](https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:32019L0904&from=EN)

*push the innovation of the production chains with a view of environmental protection.*⁶

Moreover, with the goal of developing an integrated cycle for the complete collection and valorisation of organic waste⁷ it is necessary to introduce even clearer labelling systems that favour the correct management

of bioplastics in its end of life, in compliance with existing standards and with particular regards to their properties of biodegradability and compostability in a way to favour a correct separate collection.⁸

Regulations designed to promote the development of efficient systems for the collection of organic waste and the construction of technologically advanced treatment plants, in order to expand the collection and treatment capacity of this fraction

In particular, concerning the transposition of the European Directive relating to the Circular Economy Package, in the area of organic waste it is desirable:

- To include in the definition of waste recoverable through composting all those wastes with biodegradability and compostability properties similar to those of organic waste, deriving from manufactured articles (including packaging) conform to the European standards for biodegradable and compostable packaging (EN13432) and products other than packaging (EN14995),

with specific labelling and clear indications regarding the treatment method of the product (i.e. in the organic fraction treatment facilities).

- Compute organic waste within the national recycling targets of urban waste and packaging waste, when it fulfils the criteria of biodegradability and compostability (and therefore subjected to composting and / or anaerobic digestion operations).⁹

- Invite the national government to proceed with the assessment of needs in terms of plants for the treatment of organic waste and

⁶ The separately collected OFMSW is sent to industrial composting plants (3.3 Mt in 2018) or in integrated anaerobic digestion/composting plants (2.8 Mt in 2018).

⁷ According to ISPRA's Urban Waste Report Ed. 2019, in Italy almost 7.1 million tonnes of OFMSW were collected in Italy, with an increase of 6.9% compared to 2017. With reference to the entire period 2010 – 2018 there was an average annual increase in the collection of the organic fraction equal to 6.8%, higher than that recorded for all the other fractions. This is a sustained and constant growth trend. In terms of efficiency increase of the management system of the organic fraction as a whole, in Italy in the years 2010-2017, the average share of the collected OFMSW rose from 36% to 62% compared to the total present in municipal waste.

⁸ Following the publication of Directive (EU) 904/2019 on disposable articles, in Italy numerous other types of compostable products are now being marketed as an alternative to traditional disposable plastics. If Italy would transpose the directive by exempting

compostable bioplastics alternatives to protect a well-represented production sector in our country and favor its transition to the circular bioeconomy, it would be reasonable to envision an impact on the OFMSW treatment for a total volume of disposable compostable products of less than 100 ktons per year, which would add to those of flexible films. It should also be taken into account that compostable alternatives to traditional plastics will also, and probably to an even greater extent, be represented by cellulosic-based products and combinations of the two materials or cellulosic packaging laminated with compostable biopolymers. The strategic role of compostability and certification of this according to the aforementioned standards is therefore clear in certain products and packaging to improve the quality of the OFMSW and increase the recyclability of certain types of food packaging.

⁹ As required by the European Delegation Law 2018 n.117 of 4/10/2019 (art. 16 letter h) it is necessary "to calculate the relative organic recycling in the national recycling targets for urban waste and packaging waste".

the subsequent collaboration with the regional, local authorities and with the public and private subjects involved in the research and in the promotion of new settlements necessary to cover the identified needs.¹⁰

Regulations designed to encourage the production and use of quality compost obtained from the treatment of organic waste

The production and use of quality compost obtained from the treatment of organic waste makes it possible to return organic matter to the soil, representing a concrete way to improve the quality of the soil and protect it. To achieve this goal, the indications summarized below provided by the Italy Towards Zero Organic Waste in Landfill strategy, promoted in 2016 by the Kyoto Club and the Foundation for Sustainable Development, could be adopted:

- Encourage the separate collection by ensuring that the waste is not mixed with other types of waste¹¹ also making the users to be responsible for the sorting through the introduction of tariff systems and periodic communication campaigns.

- Allocate funding for the development of plant for composting and anaerobic digestion alongside other innovative solutions aimed at increasing the use of the organic fraction as a resource for obtaining new products and intermediates with high added value.¹²

- Guarantee the high quality of the organic fraction by organizing monitoring and surveillance systems with respect to the use of compostable bags according to the law.

- Support agronomic practices or use of products in agriculture that allow to bring back organic carbon in the soil to restore its fertility.

¹⁰ According to the estimations of the CIC (Italian Composting Consortium) carried out on the basis of ISPRA data only the Regions of Marche, Lazio and Campania currently present a plant deficiency equal to 1,100,000 t / year compared to the collected materials. If the estimation would have concerned the difference between the treated and the potentially processable OFMSW (with the extension of separate waste collection to the whole population, as required by EU standard), the plant capacity required in the Center-South would increase as follows: Marche 150,000 t / year; Lazio 720,000 t / year; Campania 770,000 t / year; Puglia 130,000 t / year; Basilicata 80,000 t / year; Calabria 120,000 t / year; Sicily 480,000 t / year. Only these regions have a prospect, i.e. by 2025 with the extension to the whole territory of separate waste collection, a plant engineering need which should allow a total of 2,450,000 t / year of organic waste to be treated.

¹¹ As required by article 22 of Directive 851/2018.

¹² The Italian Composting Consortium (CIC) estimates that by 2025 Italy will have to treat about 11.5 Mton/y of OFMSW, sludge and other waste in composting and anaerobic digestion. Overall, the CIC estimates a need for plants to be able to treat 13.2 Mton/y which will require the construction of an additional 50 plants, estimated by considering an average size of 30,000 ton/y for composting only plant and 60,000 ton/y for integrated composting and anaerobic digestion plant (assuming an equal division of the two types). In addition to the investments for new plants, the system must necessarily meet a series of technological innovations of the existing plant park, in order to respond to the new BAT (Best Available Techniques), the new Fertilizer Regulation (Reg 1009/2019), in addition to satisfy the implementation of the Circular Economy Package (including Directive 851/2018).

Quality standards and measures to support demand, starting from compliance with Minimum Environmental Criteria and the promotion of green public contracts, with particular reference to waste treatment, recovery and disposal systems.

The Minimum Environmental Criteria (CAM) are the environmental requirements defined for the different steps of the process of Green Public Procurement, aimed at identifying the best design solution, product or service from an environmental point of view throughout the life cycle, taking into account the market availability.

In Italy, the effectiveness of CAM has been ensured thanks to a legislative act¹³ which made it mandatory for all contracting stations to apply these criteria. This obligation ensures that the national policy on green public

procurement is incisive not only in the objective of reducing environmental impacts, but in the objective of promoting more sustainable, "circular" production and consumption models and in spreading employment "green".

It would be desirable for greater support for the application of these criteria by the municipalities, through the definition of less restrictive and more clear requirements and greater training for those responsible for purchasing, especially in small-sized municipalities.

Development of a legislative framework supporting those products that are designed to reduce pollution and contamination of soils.

Some categories of Bioeconomy products are specifically designed to protect soil from pollution and contamination. As an example, biodegradable mulch films are designed to be incorporated into the soil after use, without releasing residues, and reducing the production of a plastic waste that is difficult to recycle. Biolubricants are the optimal solution for all machinery operating in ecologically sensitive areas such as agricultural, forest, marine or urban areas, since in the event of

accidental dispersion in the environment they biodegrade in a few days without leaving any trace.

In lights of the desertification and pollution issues that affect our soils, the use of products that do not accumulate in soil and protect them in case of accidental release should be promoted and supported through policy actions.

¹³ art. 18 of Law 221/2015 and, subsequently, art. 34 containing "Energy and environmental sustainability

criteria" of Legislative Decree 50/2016 "Procurement Code" (modified by Legislative Decree 56/2017),

MEASURES TO MAXIMIZE ACTIONS IMPACTS

8.1 Communication and Dissemination

This IAP will be presented in a dedicated event hosted by the Presidency of Council of Ministers in the second semester of the 2020 and open to any national and international stakeholders interested in being involved in the implementation process. The NBCB will then hold a public forum every year in order to stimulate the research/industrial/primary producers/education and citizen communities to share their needs and thus contributing to improvement and implementation of proposed actions.

8.2 Action plan monitoring and controlling

Coordination and monitoring of the actions put in place in this IAP will be carried out in accordance to criteria and indicators discussed in Chapter 7 of BIT II, under the responsibility of the NBCB of the Presidency of Council of Ministers. The actions, recommendations and action plan have a focus on addressing the strategic actions and on aligning actors, territories and value chains. To ensure the effective delivery of the strategic objectives of the present IAP, NBCB will review the implementation actions in progress every year and will report regularly on the progress, by also adapting or discontinuing activities that do not contribute to the objectives of the IAP in a satisfactory manner.

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Rome, Italy, July 28, 2020

