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INSTITUTIONAL ENSURING OF MARICULTURE: INTERNATIONAL AND UKRAINIAN CONTEXT

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Introduction. Sustainable development of mariculture as a highly productive industry is a potential and source of income and contributions to the national economy, a guarantee of food and environmental security, socioeconomic benefits for coastal areas. The effective development of mariculture requires a stable basis as an institutional support, which, unfortunately, is not characterized by a high enough level in Ukraine.

Aim and tasks. The aim of the study is to analyze and evaluate the institutional support for the development of mariculture in Ukraine and the implementation of international experience in national practice. The main tasks of the study are: to study the features of theoretical and applied ukrainian context of mariculture development to determine the possibilities of implementing international experience; to analyze ukrainian and international institutional basis for the development of mariculture and the cultivation of marine organisms; to develop conclusions and recommendations on the current state and development of institutional support for mariculture in Ukraine on the basis of compliance with international requirements and the possibility of their implementation.

Results. The concept of mariculture is theoretically substantiated by its definition in texts of the legal framework. The analysis of the ukrainian and international institutional context of mariculture development is based on the procedure of measures on the development of institutional support for mariculture in Ukraine in the context of the implementation of international experience of world leaders in mariculture development, European Union countries, and countries with short traditions of marine cultivation.

Conclusions. A detailed interpretation of the concept of mariculture for its definition in the texts of the legal framework of Ukraine based on the characteristics of the industry presented in the legal documents of Ukraine, the European Union, world leaders in mariculture, dictionaries and works of prominent Ukrainian and foreign scholars. A procedure for measures to develop institutional support for mariculture in Ukraine in the form of an algorithm for implementing the international experience of world leaders in mariculture, the European Union and countries with short traditions of marine organisms.

Keywords: aquaculture, institutional ensuring, implementation, regulatory framework, mariculture.

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1. Introduction.

Global Goals and 2030 Agenda for Sustainable Development identify need to-address poverty and hunger, human rights, and long-term protection of planet and its natural-resources. The development of economy should be aimed both at a single goal and to represent a multifunctional system that covers their achievement in an interdependent set. Building a Blue economy in the context of sustainability is crucial not only for the global goal of 14 Prosperity of Underwater Life (The Global Goals, 2021), but also for the goals of resources, poverty, health, justice and prosperity. This is especially true of island and coastal states, where the seas and oceans provide daily livelihoods and economic opportunities in conditions of poverty and lack of food and nutrition. Sustainable development of mariculture can provide significant potential for increasing revenues and contributions of the industry to the national economy. With the right approach to location, development, management and regulation, the mariculture industry can bring economic, environmental and social benefits. Mariculture as a highly productive industry based on sustainable development practices is the key to food and environmental security, a sustainable seafood supply chain and significant socioeconomic benefits for coastal areas (Radiarta, 2013, 2014; Mugwanya et al., 2022).

For the effective development of mariculture, as for any economic sector, a stable basis is needed as an institutional support, which in Ukraine, unfortunately, is not characterized by a high enough level. The current state of affairs, trends and identified problems actualize the purpose of research.

2. Literature review.

First, there is a requirement to reveal the concept of mariculture in the regulatory, legislative and research fields to understand the essence of the object of study.

The vision of Ukrainian scientists such as Archybisova and Ryzhkova (2016) define marine aquaculture (mariculture) as "the commercial cultivation of marine organisms for sale on natural or artificial feed in fenced bays or special gardens".

Archybisova and Tarasenko (2018) define "mariculture is breeding and commercial

cultivation of seaweed, invertebrates and fish under controlled conditions, including resettlement and acclimatization, biological reclamation, changing environmental parameters to create favorable conditions for cultivated organisms, etc.

Shekk, Shevchenko and Orlenko (2018) present mariculture also as "breeding and commercial cultivation of aquatic organisms in controlled or semi-controlled conditions in marine and brackish waters".

In legislative and normative documents of Ukraine, Law of Ukraine "On Aquaculture" (Verkhovna Rada of Ukraine, 2013) defined mariculture (marine aquaculture) as activities for breeding, maintenance and cultivation of aquaculture in inland waters, territorial sea and exclusive (marine) economic zone of Ukraine with the use of floating gardens and other technological devices using sea water. Law of Ukraine "On the National Program of Fisheries Development of Ukraine for the period up to 2010" (Verkhovna Rada of Ukraine, 2004) defined mariculture as breeding and rearing of marine fish and other aquatic living resources in specially created artificial conditions or designated areas of the coastal strip of the sea. State Fisheries Agency for Land Reclamation and Fisheries of Ukraine (2022) defined mariculture as industrial breeding and cultivation of marine aquatic living resources (fish, invertebrates, aquatic plants) or other products in special farms in the open ocean, its coastal areas, reservoirs, ponds, water mains filled with sea water. Mariculture is a type of aquaculture carried out in the internal sea waters of Ukraine in the Black and Azov Seas".

Dictionaries define mariculture as:

- Academic Dictionaries and Encyclopedias (2022) "Mariculture - breeding and rearing of fish, mollusks, crustaceans, algae and other aquatic organisms in the seas, estuaries, river estuaries";

- Academic Dictionaries and Encyclopedias (2022) "Mariculture - breeding and cultivation in human-controlled aquatic plants and animals of economic or aesthetic value";

- Large Explanatory Dictionary (PTS) (n.d.) "Mariculture - breeding of marine animals and plants in natural conditions as a branch of the economy. Mariculture - marine animals and plants as food".

Consideration of interpretations of the concept of mariculture in the texts of the existing

legal framework of Ukraine, dictionaries and works of prominent Ukrainian scientists working on the development of maritime culture or maritime agriculture, helps to identify the characteristics of the object of study.

Mariculture can be defined as a variety or specialized branch of aquaculture aimed at growing and breeding marine organisms (marine animals and plants, including algae, invertebrates, fish and other aquatic living resources) in controlled, semi-controlled and natural conditions, which include creating a favorable environment through a series of measures (resettlement, acclimatization, biological reclamation, changes in environmental parameters) for the production of food and other products of animal origin that have economic and aesthetic value. According to the definitions above, mariculture can be divided into:

- marine mariculture, in which the process of cultivation and breeding occur takes in the

maritime economic zone, territorial sea;

- coastal mariculture, which the process of cultivation and breeding occur takes in coastal waters (strip) or in artificial reservoirs (ponds, canals, mains, estuaries, river estuaries) filled with sea, brackish. Examples are aqua farms - breeding marine fish and shellfish, shrimp, oysters and algae in ponds with sea.

Mariculture products also include fishmeal, nutrient agar, jewelry (cultured pearls) and cosmetics (Rimmer, 2010; Supii, Lestari, Sudewi, 2012).

To achieve main goal of scientific research, it is necessary to identify opportunities for implementing of international experience in national practices. First of all, it is important to analyze the features and common features of the theoretical and practical basis for the development of the mariculture systems in the domestic and international contexts (Table 1).

Table 1. The concept of mariculture in international legal documents and literature sources.

Country	Author	Essence	Significant signs
International laws and regulations			
Canada	MAPAQ (2016)	Mariculture is the activity of growing mollusks (mainly blue mussels, American oysters, scallops) and macroalgae.	Activities for growing <i>mollusks</i> and <i>macroalgae</i>
USA	Alaska Fisheries Development Foundation (2018)	Mariculture is the production of mollusks and aquatic plants for long-term economic development, the environment and the public.	Activities for the production of <i>mollusks</i> and <i>aquatic plants</i>
Philippines	Department of Aquaculture. Center for Fisheries Development of Southeast Asia. Mariculture Sustainability Report (Ayson, 2016)	Mariculture - growing marine fish, such as milk fish in marine cages, growing algae, oysters and mussels; scuba diving and other activities that can be carried out through research programs and developments.	Growing <i>sea fish</i> , <i>algae</i> , oysters and mussels
United Kingdom	Dorset Coast Forum (2020)	Mariculture is a special branch of aquaculture, which focuses on the cultivation of marine organisms on land in appropriate systems or, at the location, in the marine environment.	Subsector of aquaculture for the cultivation of <i>marine organisms</i>
Spain	Report of the European Maritime and Fisheries Fund. Ministry of Agriculture, Fisheries of Spain (Ministerio de Agricultura Pesca, 2018)	Mariculture is "responsible farming and gathering from the oceans", the production of lower species in the food chain, such as mollusks and algae.	Responsible farming and gathering food from the oceans, production of lower species in food chain
Italy	Report of the Laore Sardinia Regional Agency and the Sardinian Experimental Zooprophyllactic Institute (Viale, Olla, Salati, 2016)	Mariculture - maritime, has practices that apply mainly to mollusks and fish farming, for which typical designs are floating and submerged gardens.	Marine <i>mollusc farming</i> and <i>fish farming</i>
Africa	Ministry of Fisheries and Marine Resources (2012)	Mariculture - the activity of growing marine organisms.	Activities for the cultivation of marine organisms
India	Ministry of fisheries, animal husbandry & dairying government of India (2019)	Mariculture is a specialized branch of aquaculture, which includes the cultivation of economically important marine plants and animals in the sea or any other natural body of water affected by tides, and includes terrestrial structures such as breeding shores, hatcheries, nurseries and marine farming systems water.	Specialized branch of aquaculture, which includes the cultivation of economically important <i>marine plants</i> and <i>animals</i>

Continuation of the table 1

Country	Author	Essence	Significant signs
EU	European Environment Agency (EEA Glossary, 2022)	Marine fish farming (aquaculture). Breeding of marine animals and plants in the ocean.	Breeding of <i>marine animals and plants</i>
El Salvador	Ministry of Economy of El Salvador (2021)	Mariculture - the production of aquaculture, including mariculture, in the sea or any other natural body of water, if they were born or raised fish, crustaceans, mollusks and other aquatic invertebrates.	Production of <i>fish, crustaceans, mollusks</i>
FAO	Food and Agriculture Organization of the United Nations (Przedzimirska et al., 2019; FAO, 1988)	The general definition of "mariculture" or "marine aquaculture" is the breeding of marine aquatic organisms, including fish, molluscs (molluscs and crustaceans), as well as aquatic plants for food and other products such as pharmaceuticals, food additives, jewelry, nutraceuticals and cosmetics. Mariculture is carried out both in the natural marine environment and in land or sea fences, such as cages, ponds or racetracks.	Breeding of <i>marine aquatic organisms</i>
Vision of foreign scientists			
Japan	Ferrera (2016)	Mariculture is a fishery in coastal areas.	<i>Fisheries</i>
Brazil	Tuna, Tagliolatto (2015)	Mariculture is a lucrative activity of growing organisms in the marine and estuary environment for nutrition and reducing the pressure on organisms exploited by fisheries.	Profitable activities for the cultivation of <i>marine organisms</i>

3. Results.

3.1. National Mariculture Legislation Overview

Legislative basis in which mariculture is presented has a small number of legal documents.

3.1.1. "On aquaculture" (2012):

- Definition of terms. Mariculture (marine aquaculture) - activities for breeding, maintenance and cultivation of aquaculture facilities in inland waters, territorial sea and exclusive (marine) economic zone of Ukraine with the use of floating gardens, other technological devices using sea water (Article 1).

- The main areas of commercial aquaculture. For the implementation of industrial aquaculture, including mariculture, fishponds are used, fishponds, aquariums, as well as parts of water bodies with the use of special technological devices - floating gardens, shellfish collectors, closed water supply systems, etc. (Article 13).

- Features of the conditions of aquaculture and the provision of fishery water body (space) of Ukraine for use on lease for aquaculture. The Cabinet of Ministers of Ukraine provides for the lease of water areas (space), territorial sea, exclusive (marine) economic zone of Ukraine, determination of their boundaries (coordinates) for the purposes of aquaculture (mariculture) (Article 14).

- Scientific support in the field of aquaculture: development of freshwater aquaculture and mariculture resource-saving technologies for breeding and cultivation of aquaculture facilities with improved productive and consumer characteristics (Article 21).

3.1.2. "On the Concept of Fisheries Development of Ukraine" (Verkhovna Rada of Ukraine, 2000):

- Development of aquaculture and fisheries in the Azov-Black Sea basin and inland waters. Prospects for the industrial use of living resources of the Azov-Black Sea basin should be determined primarily taking into account the state of its ecosystem. Stable development of fisheries in the Azov and Black Seas is possible only with the rational use and reproduction of living water resources and the widespread development of mariculture (Chapter 4).

3.1.3. "On approval of the Marine Environmental Strategy of Ukraine" (Cabinet of Ministers of Ukraine, 2021):

- Analysis of the current state of affairs, trends and justifications for the need to solve identified problems. Potential opportunities for seafood production are insufficient due to the weak development of mariculture. Therefore, its potential development together with the provision of the population with seafood will contribute to the reproduction of resource potential and sustainable development of the country.

- Balanced use and reproduction of aquatic bioresources and development of mariculture, revival of the population of especially valuable industrial fish species. Identification of ecologically safe and economically feasible spatial zones for breeding mariculture objects, as well as places for mariculture development, creation of fish farms (Strategic Goal 3.).

- The main mechanisms for achieving the strategic goals and priorities of the Strategy are: improving the regulatory framework for the implementation of state policy in the field of protection and reproduction of the Azov and Black Seas, fisheries and mariculture development of the Azov-Black Sea basin, its harmonization with the Association Agreement, as well as other international agreements to which Ukraine is a Party, including the establishment of programmatic principles for the gradual recovery and achievement and maintenance of "good" environmental status of the marine environment.

3.1.4. *"On approval of the Methodology for determining the amount of payment for the lease of water (water space) of internal sea waters, territorial sea, exclusive (marine) economic zone of Ukraine for aquaculture (mariculture)" (Cabinet of Ministers of Ukraine, 2015a):*

- The mechanism of calculation of the amount of payment for the use on the terms of lease of water area (water space) of internal sea waters, territorial sea, exclusive (marine) economic zone of Ukraine (hereinafter - rent) for aquaculture (mariculture).

3.1.5. *"On approval of the State Strategy for Regional Development for 2021-2027" (Cabinet of Ministers of Ukraine, 2020):*

- Tasks in the field of "Realization of maritime potential for the development of coastal regions and the reproduction of the environment of the Azov and Black Seas."

- Promoting the development of mariculture (industrial breeding and cultivation of marine aquatic living resources) in coastal areas that do not harm the environment.

"On approval of the Procedure for special use of aquatic bioresources in inland fisheries (their parts), inland waters, territorial sea, exclusive (marine) economic zone and on the continental shelf of Ukraine" (Cabinet of Ministers of Ukraine, 2015b):

- The procedure determines the mechanism of special use of aquatic bioresources

that are in the conditions of natural freedom (except for species listed in the Red Book of Ukraine), in inland fisheries (their parts), inland waters, territorial sea, exclusive (marine) economic zone and on the continental shelf of Ukraine - hereinafter referred to as fishery water bodies (parts thereof).

Mariculture in Ukraine is positioned as marine aquaculture and, accordingly, all provisions on aquaculture are coordinated with mariculture. However, Article 1 of the Law of Ukraine "On Aquaculture" (Verkhovna Rada of Ukraine, 2013) stipulates that aquaculture (fish farming) is an agricultural activity of artificial breeding, maintenance and cultivation of aquaculture facilities in fully or partially controlled conditions for the production of agricultural products (aquaculture products) and its sale, feed production, reproduction bioresources, breeding, introduction, resettlement, acclimatization and reacclimatization of marine organisms, replenishment of aquatic bioresources, conservation of their biodiversity, as well as the provision of recreational services.

Instead, mariculture aims to grow and breed marine organisms (marine animals and plants, including algae, invertebrates, fish and other aquatic living resources) to increase biodiversity (environmental impact), food production (social impact), and other animal products. (obtaining economic and aesthetic effect).

Accordingly, based on the basic legal act, it is possible to determine the need for research and evaluation of mariculture as a specialized (separate) branch of aquaculture, with further development of regulatory norms and rules for its development and management.

The third section of the Law of Ukraine "On Aquaculture" Organization of activities in the field of aquaculture (Article 13) defines the directions and types of aquaculture. According to these areas, aquaculture can be carried out in order to:

- receipt of marketable aquaculture products and its further sale (marketable aquaculture);

- artificial breeding (reproduction), cultivation of aquatic bioresources;

- provision of recreational services.

Among the areas of aquaculture, commodity, reproductive and recreational aquaculture are singled out. However, mariculture is classified according to such areas as:

- Non-commercial mariculture (restorative - restoration and increase in the number of endangered, including as a result of industrial activities of marine organisms; sanitary - cultivation of marine organisms for coastal water treatment);

- Commercial (growing marine animals and plants for commercial purposes);

- Sanitary and commodity (cultivation of marine organisms for purification of coastal waters, with their subsequent commercial use).

It is known that there are scientific studies to address the issue of the fastest and most effective cleaning of contaminated waters with the help of marine organisms. And the simplest method of such assistance is the use of sanitary mariculture, construction of hydraulic structures, artificial reefs. At the same time, one of the results of the implementation of the Marine Environmental Strategy of Ukraine (Cabinet of Ministers of Ukraine, 2021) is to achieve an acceptable level of microbiological pollution of coastal waters and ensure sanitary and hygienic conditions safe for life and health. This issue can be solved by sanitary mariculture - a system of biotechnical organizational and engineering-hydraulic measures aimed at normalizing the sanitary condition of marine waters that are polluted due to human activities. Measures and engineering structures of sanitary mariculture are based on the use of natural properties of groups of marine organisms to produce and consume organic compounds that occur in the ecosystem (Nasukha, et al., 2019; Sembiring et al., 2014).

Accordingly, there is a proposal to add in the legal act an abbreviated description of all areas of mariculture in accordance with their existing scientific classification and to reveal in more detail the essence of the commercial area (outlining economic, aesthetic, cosmetic effects, etc.).

Article 16 of the Law of Ukraine "On Aquaculture" on quarantine requirements and veterinary and sanitary control in the field of aquaculture provides conditions for import into Ukraine for: live fish and other aquatic organisms intended for breeding, keeping and growing in aquaculture. There is a proposal to add in the normative legal act delineation of conditions for marine animals, breeding of which is one of the activities in the field of mariculture and to include in related documents the Draft Law of Ukraine

"On Protection of Animals from Cruelty" to create natural conditions for medical rehabilitation mammals, including dolphins (Verkhovna Rada of Ukraine, 2018).

In addition to improving the existing regulatory framework, it is valuable to develop and implement programs to achieve the strategic goals of the Marine Environmental Strategy of Ukraine (Cabinet of Ministers of Ukraine, 2021). One of such goals is the balanced use and reproduction of aquatic bioresources and the development of mariculture, the revival of the population of particularly valuable industrial fish species (Cabinet of Ministers of Ukraine, 2021). Such a document may be the Program for the creation of a complex of specialized breeds of fish and marine animals with characteristic features of different ecological (adaptation to different breeding conditions, including certain temperature and climatic conditions of different areas), economic (taste, consumer demand, optimal market cost) and aesthetic value.

This task is preceded by the need to develop a program for monitoring and environmental certification of marine farms, which will result in the definition of mariculture production zones and additions to assess the environmental component in the Methodology for determining the amount of fees for leased waters (waters) waters, territorial sea, exclusive (marine) economic zone of Ukraine for the purposes of aquaculture (mariculture) (Cabinet of Ministers of Ukraine, 2019).

Development and implementation of such programs, in the first, needs to finalize the Resolution of the Cabinet of Ministers of Ukraine on approval of procedures for leasing part of the fishery water body for aquaculture, water area (water space) of inland sea waters, territorial sea, exclusive (marine) economic zone of Ukraine and determination of its boundaries (coordinates) for the purposes of marine aquaculture (Cabinet of Ministers of Ukraine, 2019; Albasri et al., 2010). It is necessary to define in more detail the conditions and procedure for renting a maritime territory, conducting maritime management (agriculture), choosing the form of ownership. There is a requirement to carry out legislative delimitation of economic activities in aquaculture and mariculture, the relevant powers of different levels of executive power in the management of industries.

3.2. European Union Mariculture Legislation Overview

Aquaculture (including mariculture) has been the fastest growing food industry in the world for the last twenty years, according to the Food and Agriculture Organization of the United Nations (FAO), but the situation in the European Union is not in line with global trends. The Member States of the European Union have acknowledged their volatile position on seafood supplies, as aquaculture production in Europe has stagnated and net output growth over the past decade has shown little. Accordingly, the main directions of development of the EU economy at present are the resumption of growth in aquaculture production as a top priority.

Sustainable development of aquaculture in the European Union is one of the objectives of the Common Fisheries Policy (CFP) Regulation. However, the basic provisions on fisheries and agriculture in the treaties of the European Union do not have a direct reference to aquaculture. Unlike fisheries, aquaculture is largely the responsibility of the Member States of the European Union.

Various pieces of European Union legislation, such as environmental and animal health legislation, apply to this activity, and Member States must ensure that it is implemented. Aquaculture animals and products are covered by Annex I to the Treaty on the Functioning of the European Union (TFEU), which extends the substantive scope of European Union primary law, as referred to in Articles 39 to 44 of the TFEU, to fish, molluscs and crustaceans. However, the Regulation of the Common Fisheries Policy established an "open method of coordination" to support the growth of the aquaculture sector of the European Union, ensuring its economic, environmental and social sustainability (Long, 2016; European Commission, 2021).

The strategic coordination of aquaculture policy in the European Union includes such key strategic documents as the Strategic Guidelines of the European Union Commission for the Sustainable Development of Aquaculture and the Multiannual National Strategic Plans for Aquaculture. In the medium term, aquaculture (including mariculture) of the European Union

will be developed within the framework of the following strategic recommendations:

- EU 2020 is the European Union's 10-year strategy for job creation and growth. It was developed in 2010 to create conditions for smart, sustainable and inclusive growth. The five main goals (employment, research / development, climate / energy, education, social inclusion / poverty reduction) agreed by the EU by the end of 2020.

- Integrated Maritime Policy of the EU - ensuring a more coherent approach to maritime issues with enhanced coordination between different policy areas. The focus is on issues that do not fall under one sector and on issues that require coordination between different sectors and actors. Commission Decision (EU), 2018/620 of 20 April 2018 "On the technical characteristics of the Copernicus service component" in accordance with Regulation (EC) № 377/2014 of the European Parliament and of the Council defines the task of integrated maritime monitoring for data collection (European Commission, 2018).

A number of other legal documents cover issues related to: protection of wild fauna and flora and ensuring their conservation (European Commission, 2019), protection of marine areas (European Commission, 1991c) submitted by Italy pursuant to Council Regulation (EEC) No 4028/86), maritime spatial planning (Przedzimirska et al., 2019), development of sea basin development strategies, improving the structure of the maritime sector, improving its competitiveness and sustainability (European Commission, 1986.). The feature is coordination, not policy change for specific maritime sectors.

Qualitative content of institutional support requires more detailed analysis and study, in particular the results within the countries, but the available number of existing regulations indicates the intention to develop mariculture in the respective countries.

Figure 1 shows that Portugal has the highest level of legal capacity among the European Union. Spain is a leader in the European Union in the development of mariculture (FAO, 2020).

Countries such as Portugal, France and Italy have a sufficient legal framework. When substantiating the ways of implementing the institutional support of mariculture in Ukraine, it is appropriate to consider these countries.



Fig. 1. Diagram of institutional support for mariculture in the European Union, 2020.

Source: authorial development based on the analyzed EU regulatory framework.

The average level of institutional security among the considered available regulatory sources of the respective countries is represented by: Croatia, Denmark, Ireland, Romania. Next in accordance with Figure 1 are Belgium, Bulgaria, Greece. The last four: Estonia, Latvia, Lithuania and Poland.

Institutional support for the development of mariculture on the basis of sustainable development is not covered in all these databases of the European Union. Regulations governing the sustainable development of this specialized field are present in countries such as Portugal, Spain, Croatia and Latvia (Fig. 2).

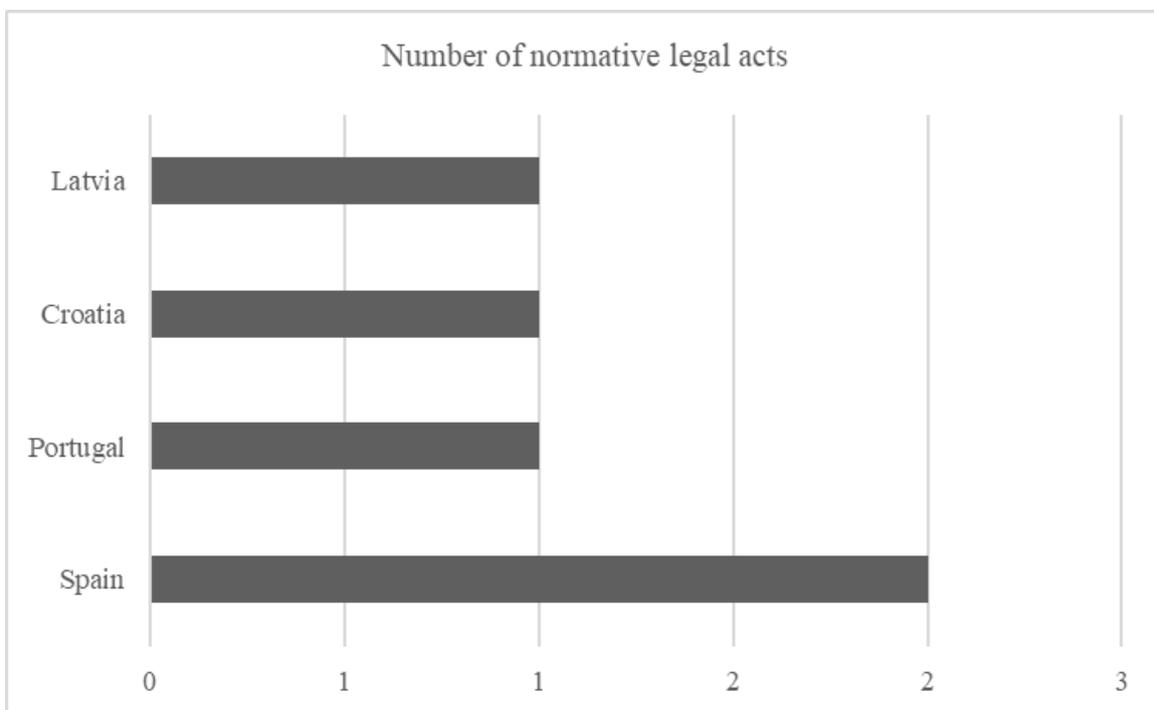


Fig. 2. Diagram of institutional support for mariculture on the basis of sustainable development in the European Union.

Source: authorial development based on the analyzed EU regulatory framework.

Sustainable use of water and marine resources is based on obtaining licenses / permits for the allocation of areas in the relevant areas. Among the best practices of the Member States (Spain, Austria, the Netherlands) are references to specific certification schemes that should ensure sustainability, quality and social responsibility:

- Sustainable Development Certificates: ISO 14001: 2004 (ERM), EMAS, ISO 14040: 2006 and 14044: 2006 (LCA), ISO 14067 (carbon printing), ASC, GlobalGAP, ACC, GAA, FOS;

- Quality certificates: ISO 9001: 2008 (quality management), ISO 22000: 2005 (food safety), BRC, IFS;

- Certificates of performance: designations of origin (specific to Member States), "Friend of the Sea", GAA, ACC, ASC;

- Certificates of social responsibility: ISO 26000 (SR), Fairtrade, SA 8000.

Some legal acts of EU member states are listed below:

- Blue growth is a long-term strategy to support sustainable growth in the maritime sector. This complements the Europe 2020 goals of smart, sustainable and inclusive growth. Identifies aquaculture as an area of focus that has the potential to sustain growth and create jobs in the blue economy. The European Union's Integrated Maritime Policy, the Atlantic Strategy and the related Action Plan recognize the contribution of that the Blue Economy can make to European and global economic growth.

- Common fisheries policy – ensuring the conservation of marine biological resources (including freshwater biological resources, aquaculture), fisheries management and the fleet that exploits them, processing and marketing; ensuring environmental sustainability in the long run of fisheries and aquaculture, in order to achieve economic and social effects, promote food availability.

- The Aquaculture Sustainability Strategy – provides a European policy for the development and growth of aquaculture. The study aims to identify the causes of the European Union's stagnation and to identify policies for competitiveness, sustainability and governance in the sector.

- Strategic guidelines (principles) for sustainable development of aquaculture of the European Union is a new approach to promoting aquaculture through the open method of coordination: a voluntary process of cooperation based on strategic guidelines and multiannual national strategic plans, common goals, indicators of progress in achieving these goals. The principles set out three crucial objectives to be addressed by the competent national authorities: simplifying administrative procedures in the Member States, promoting maritime spatial planning and increasing competitiveness through marketing and labeling initiatives (National Strategic Plan for Sustainable Aquaculture Development (European Commission, 2020a), Strategic Guidelines for the sustainable development of EU aquaculture (European Commission, 2013).

The European Union has adopted a wide range of environmental legislation related to aquaculture, including the Water Framework Directive (WFD) (European Commission, 2000), the Marine Strategy Framework Directive (MSFD) (European Commission, 2008). He exercised his competence by taking political, fiscal and legal measures. The main part of the legislation on the licensing of aquaculture in the European Union is the Fisheries Act (FAO, 1997).

The framework for management and policy measures of the European Union is set out in the Basic Fisheries Management Regulations № 1380/2013. This is complemented by a detailed code of bylaws relating to environmental protection, organic production, as well as rules of marketing and trade (Long, 2016; Rubel, 2014).

Other key pieces of legislation include:

- Sections 2, 3 and 4 of the Fisheries and Coastline Act 1998, № 54;

- Section 101 of the Law on Marine Fisheries and Maritime Jurisdiction of 2006, №8;

- Regulations on Aquaculture, 1998 S.I. NO. 236 of 1998 (National Strategic Plan for Sustainable Aquaculture Development, 2020).

The European Union's Common Fisheries Policy, Maritime Policy and International Ocean Management is supported by the European Maritime, Fisheries and Aquaculture Fund from 2021 to 2027. Regulation (EC) 2021/1139 of 7 July 2021 (European

Commission, 2021d). Funding for the sustainable use of water and marine resources is a key factor in sustainable blue growth, including fisheries, conservation of marine biological resources, food security, healthy, safe, clean and environmentally sound seas and oceans, achieving UN Goal 14 on sustainable development.

Licensing of the industry at national level, in particular compliance with aquaculture animal health requirements, is harmonized in the form of Directive 2006/88. Directive 2006/88 provides for the establishment of appropriate permits for aquaculture establishments and enterprises, with a view to establishing a common structure for the prevention, control and eradication of diseases (Council Directive 2006/88/EC on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals). A general framework for the planning of human activities at sea is established by Directive 2014/89 / EC of the European Parliament and of the Council establishing a framework for maritime spatial planning (European Commission, 2014).

Many Member States have set up (or intend to do so) committees to strengthen aquaculture (including marine aquaculture) and to promote best practices (Cyprus, France, Ireland, Estonia, Greece, Lithuania and Latvia). These committees include stakeholders: producers, research institutes, local and national administrations, processors and traders, and various non-governmental organizations. The committees cover the entire aquaculture sector or focus on specific activities. They can play the general role of a platform for the exchange of knowledge and experience, as well as perform specific tasks, such as coordination of disease control (European Commission, 2016).

The aquaculture sector is playing an important role in the European Union's recovery from the European Union's Covid-19 outbreak, which focuses on the green and digital transition of the economy. The European Green Agreement and the Farm to Fork Strategy emphasize the potential of grown seafood as a source of protein for low-carbon food and feed, which is the basis for building a sustainable food system.

The Strategic Guidelines for More Sustainable and Competitive EU Aquaculture for 2021-2030 (Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030, 2021, Rubel, 2018) aim to provide a common vision for the Commission, the Member States of the European Union and stakeholders to further increase aquaculture as a sector that is more competitive and a global benchmark in terms of sustainability. These recommendations are aimed at achieving the objectives of the European Green Agreement in aquaculture, including helping consumers to make informed choices and ensuring a level playing field for aquaculture products. The recommendations are the basis for managing the use of tools and funds to support aquaculture and the implementation of current European Union legislation.

In order to substantiate measures to implement institutional support of mariculture, in addition to the regulatory framework, the development of gross domestic product of EU countries, leaders in the development of specialized mariculture, countries with a legislative framework for mariculture on the basis of sustainable development and Ukraine (Fig. 3).

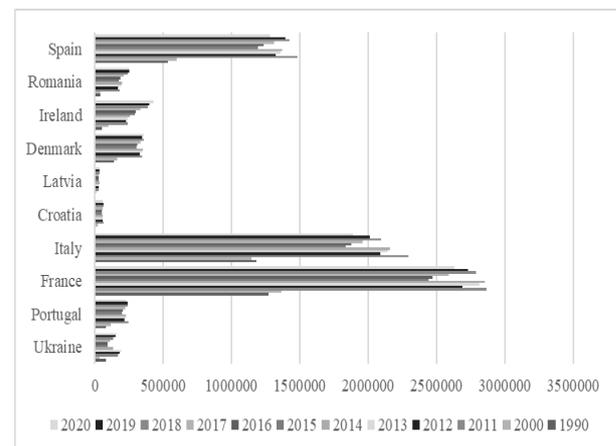


Fig. 3. Diagram of the current state of GDP of the European Union leaders in the development of specialized mariculture, countries with a legislative basis for the development of mariculture on the basis of sustainable development and Ukraine (in US mln. dollars) for 1990-2020.

Source: authorial development using (World Bank, 2022).

According to the analysis, it is possible to consider the possibility of considering the institutional support of Portugal and Spain, which corresponds to a high level of regulatory framework for mariculture, attention to sustainable development of the industry and the relevant key indicators of economic development) in the field of tangible and intangible production.

3.3. World Mariculture Legislation Overview.

World experience includes a wide variety of regulations and other documents, the subject of which is mariculture as a specialized industry. Analysis of the legal acts of the world among the available sources allows us to conclude that the most detailed in content is the institutional support of Peru and Brazil (Fig. 4). The following countries were ranked as follows: Australia, the United States, the United Kingdom, Norway, and New Zealand.

Cape Verde, the Cook Islands, Mauritania, Mauritius, Panama, the Philippines, East Timor, Tonga, Venezuela, and the Republic of Bolivia constitute a number of four legal acts.

There are three mariculture regulations in the country: Albania, Argentina, Grenada, Honduras, Jamaica, the Republic of Korea, Montenegro, Nicaragua, Singapore, and Vietnam.

The regulatory framework for mariculture, which has two pieces of legislation, is present in the following countries: Belize, Cambodia, Congo, El Salvador, Gambia, Guinea, Guinea-Bissau, Iceland, Indonesia, Liberia, Marshall Islands, Saint Kitts and Nevis, Senevo, Senegal islands, Sri Lanka, Turkey, Yemen.

The least developed institutional base for mariculture can be described in the countries: Antigua and Barbuda, Bangladesh, Bosnia and Herzegovina, Dominican Republic, Cameroon, Canada, Chile, China, Costa Rica, Cuba, Djibouti, Dominica, Ecuador, Equatorial, Equatorial, Guatemala, Guyana, Kenya, Kiribati, Kuwait, Madagascar, Malaysia, Maldives, Mexico, Montserrat, Morocco, Mozambique, Namibia, Nauru, Palau, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sierra Leone, South Africa Arab

Republic, Tuvalu, Vanuatu, Zambia.

Among these are a number of countries that are characterized by sufficient development of mariculture and we can only emphasize the lack of available information from the legal framework of these countries or the quality and sufficient content of a small number of legislative acts.

Institutional support for the sustainable development of mariculture in the world, similar to the situation in the European Union is not disclosed and is not developing among all countries specializing in this field.

The most prominent representatives of the sustainable development of the specialized mariculture industry are: Brazil, Peru, Australia, the United States, the United Kingdom, Cape Verde, Panama, East Timor, Jamaica, Belize, Liberia, El Salvador, Seychelles, Solomon Islands, Solomon Islands. you, Vanuatu, Georgia, Dominican Republic, Ecuador, Equatorial Guinea, Kenya, Costa Rica, Cuba, Mexico (Fig. 5).

The leaders are Brazil, Australia, the United States, Peru, and the United Kingdom.

According to the information on the legal framework of the world, you can take into account and consider the institutional support of countries such as Brazil, Peru, Australia, the United States, the United Kingdom (Fig. 6).

Based on the pricing policy and the current state of gross domestic product, it is recommended to pay the most attention to the institutional security of mariculture in Peru.

Emphasizing that this country is a major country and territory for the development of mariculture, almost on a par with China (Huang, 2018; Zhao, Shen, 2016).

In countries the European Union and Peru it developing on the basis of the idea of its definition of mariculture as specialized. However, most legislation is designed to emphasize aquaculture.

According to global world practices is divided into marine aquaculture, freshwater aquaculture and aquaculture in brackish waters and are isolated industries. Because mariculture is characterized by individual features of its development, in particular, it has a rich variety of species of animal and plant species that require certain approaches to their cultivation.

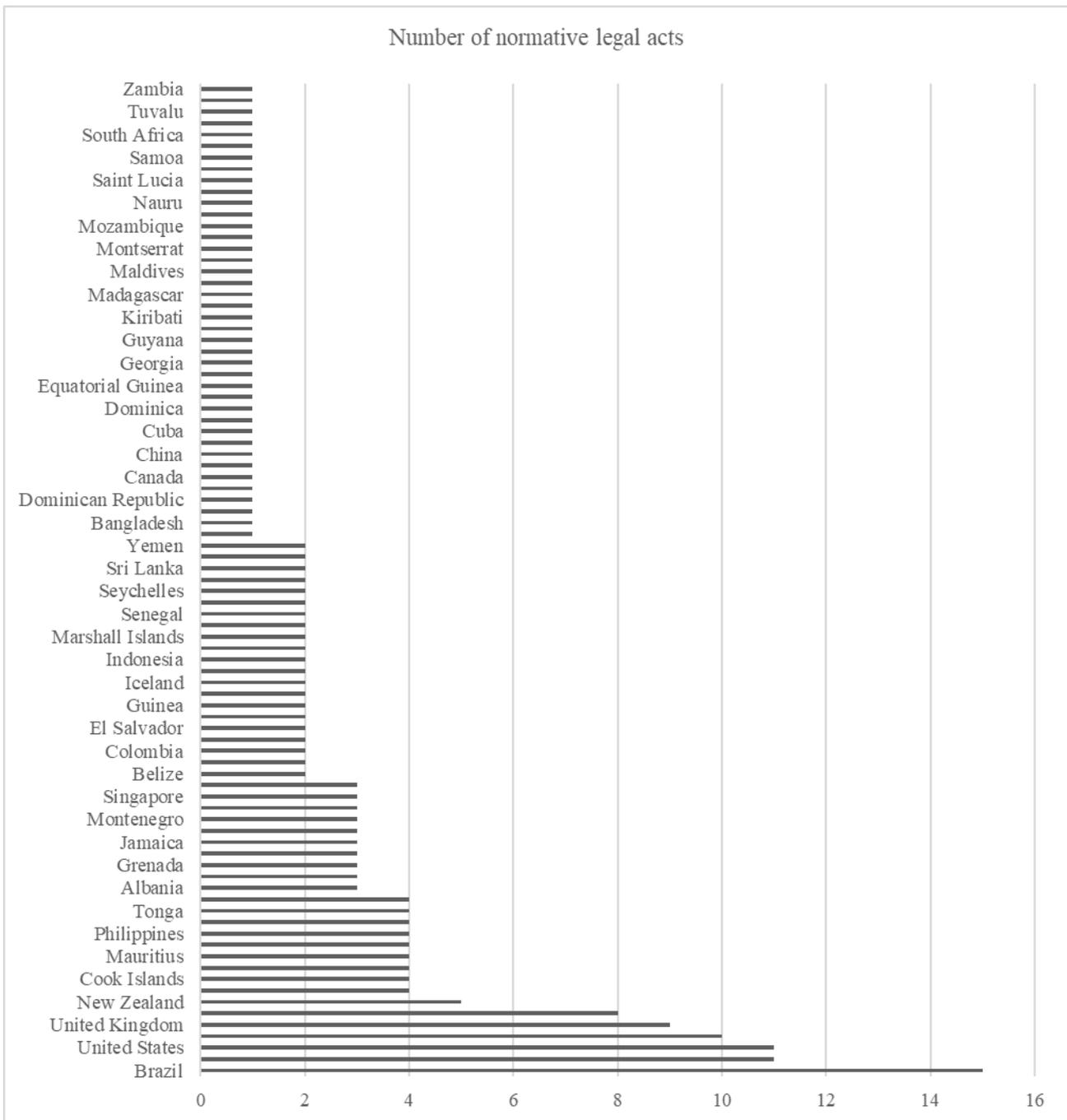


Fig. 4. Diagram of institutional support of mariculture in the world for 1926-2022.

Source: authorial development on the basis of the analyzed normative-legal acts of the countries of the world (the names of the countries with the largest normative-legal base on mariculture are noted)

Many of these issues are covered in the regulatory documents of the European Union, which should be taken into account when building and improving the institutional support of mariculture in Ukraine. However, consideration of the legal frameworks of other countries shows that there are guidelines for national development policies specifically for mariculture, for example in India (National Mariculture Policy, 2019).

India's fisheries sector has a number of subsectors and relevant national policies for each of them, namely: National Maritime Policy, National Inland Fisheries and Aquaculture Policy, National Mariculture Policy.

These decisions are more correct and can be considered into account additional provisions for the mariculture development in Ukraine.

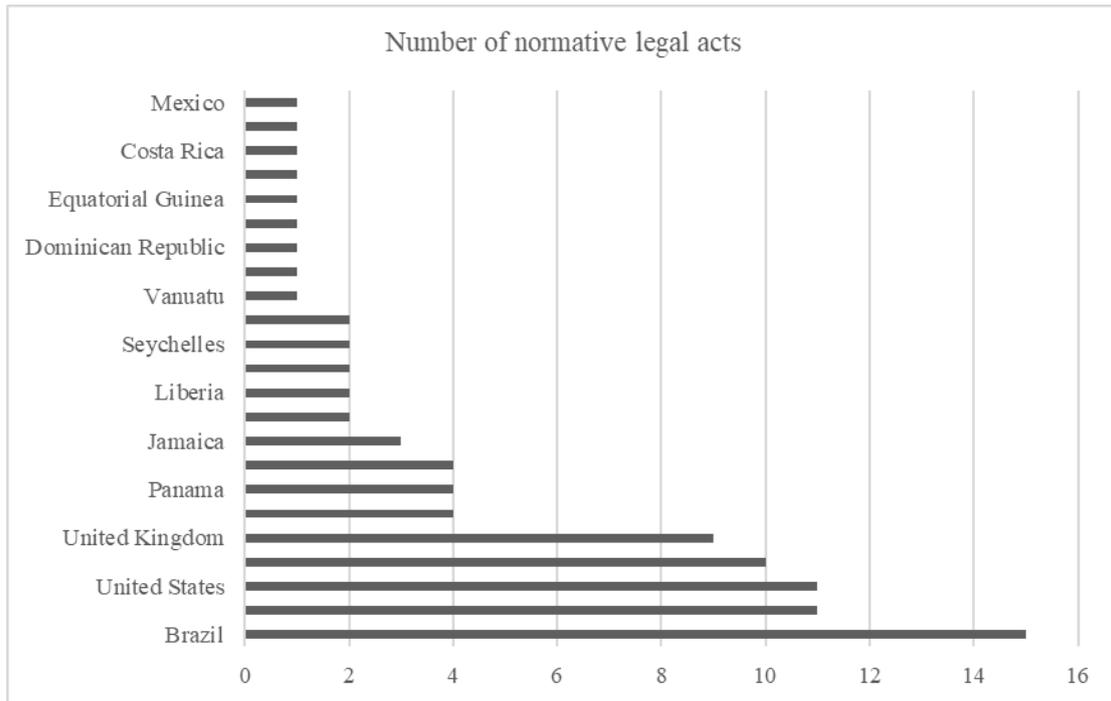


Fig. 5. Diagram of institutional support of mariculture on the basis of sustainable development in the world for 1926-2022.

Source: authorial development on the basis of the analyzed normative-legal acts of the countries of the world (countries with the largest normative-legal base on mariculture are noted).

The main provisions that can be taken into account as the implementation in Ukraine, namely the characteristics of mariculture in Peru as a world leader (after China) and Spain as a leader of the European Union according to previous studies, namely the state of economic

development and mariculture. It can be determined that the leading countries Spain and Peru have provisions in their institutional base of mariculture development, which are highly effective both for these countries and can be implemented in Ukraine.

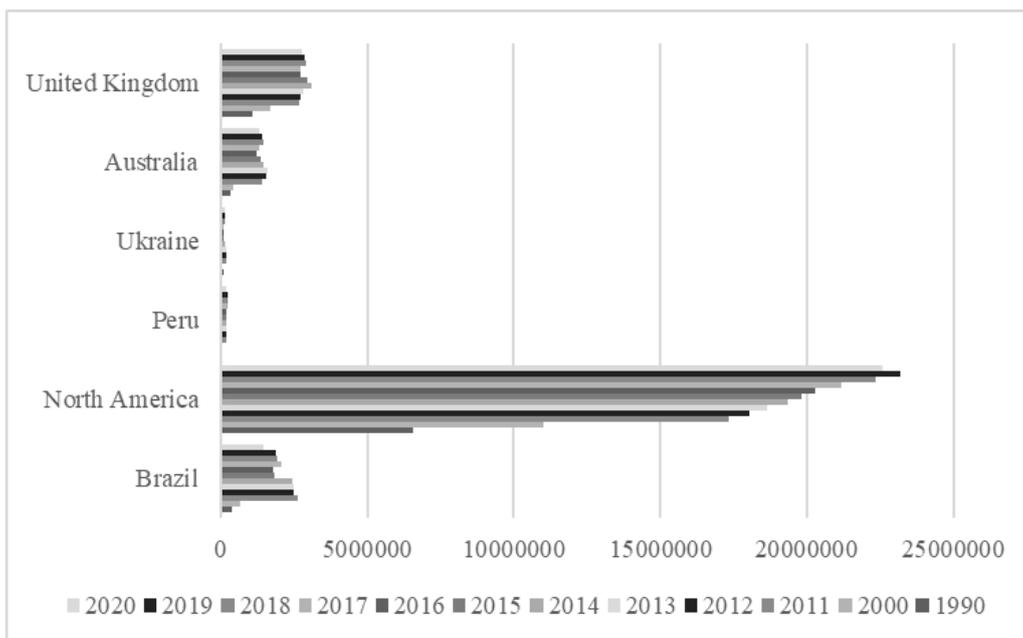


Fig. 6. Diagram of the current state of GDP in Brazil, North America, Peru, Ukraine, Australia, Great Britain (in US mln. dollars), 1990-2020.

Source: World Bank (2022).

Spain's multifunctional system of government is based on the concept of autonomous organizations and institutions, professional associations and cooperatives. This plays quite harmoniously against the background of the decentralization process in Ukraine. Where each institute (organization) is responsible for the development of mariculture.

An important role is played by the Fund for Regulation and Marketing of Fisheries and Aquaculture Products (FROM - Fund for Regulation and Organization of the Market of Pesca y Cultivos Marinos) and the Financial Instrument for Fisheries Orientation (FOP - Instrumento Financiero de Orientación de la Pesca). The main tasks are to promote the consumption of fishery products and provide technical or financial assistance to associations, cooperatives and enterprises in the field and the development of fisheries and marine aquaculture.

The legal framework is based on sustainable development, which is not presented in detail in all countries. Sufficiently developed and popularized scientific and educational component: courses, training activities and activities adapted to the needs of the fisheries and marine aquaculture sector, including training of trainers.

In general, the development of institutional support in Spain is based on the principles of production of species with market potential, protection and improvement of the environment, support of traditional aquaculture and mariculture, human and animal health, quality and specificity of action, socioeconomic efficiency.

Peru's government system is also decentralized. The mariculture industry finds support among the many intertwined governing bodies, institutions, organizations and institutions. Authorities that have protective functions for humans, the environment, animals, etc. are of great importance. Responsible for compliance with the rules of international laws, conventions and agreements. Conduct Control and monitoring to prevent and combat the effects of pollution.

Development of a statistical information base for monitoring, evaluation and decision-making by socioeconomic agents, the public sector and communities is high. The country has conducted zoning and appropriate certification for aquaculture and mariculture activities. Management tools such as the National

Aquaculture and Mariculture Cadastre and the single aquaculture window have been established, a system by which a natural or legal person interested in investing in aquaculture implements the procedures required by the competent authorities governing access to aquaculture. As in Spain, the legal framework is built on the principles of sustainable development and is consistent with the regulations of the Food and Agriculture Organization.

3.4. Implementation of international experience in institutional ensuring of mariculture development

The procedure for the development of institutional support for mariculture in Ukraine is presented in the form of an algorithm and is given below:

- Clarify and provide a more detailed description of the mariculture industry for further formation of the regulatory framework:

- Concept - a specialized branch of aquaculture, aimed at growing and breeding marine organisms (marine animals and plants, including algae, invertebrates, fish and other aquatic living resources) in controlled, semi-controlled and natural conditions, which include creating a favorable environment through a number of measures (resettlement, acclimatization, biological reclamation, changes in environmental parameters) for the production of food and other products of animal origin that have economic and aesthetic value.

- Purpose - mariculture is aimed at growing and breeding marine organisms (marine animals and plants, including algae, invertebrates, fish and other aquatic living resources) to increase biodiversity (environmental impact), food production (social impact), other animal products origin (obtaining economic and aesthetic effect).

- Types of mariculture (marine, coastal);

- Add an abbreviated description of all areas of mariculture in accordance with their existing scientific classification and reveal in more detail the essence of the commercial area:

- Commodity – obtaining marketable aquaculture products and their further sale (commodity aquaculture).

- Reproductive – artificial breeding (reproduction), cultivation of aquatic bioresources.

- Recreational – provision of recreational services. Or another variant:

- Non-commercial mariculture (restorative - restoration and increase in the number of endangered, including as a result of industrial activities of marine organisms; sanitary - cultivation of marine organisms for purification of coastal waters).

- Commercial (growing marine animals and plants for commercial purposes) (outlining the economic, aesthetic, cosmetic effects, etc.).

- Sanitary and commodity (cultivation of marine organisms for purification of coastal waters, with their subsequent commercial use).

- Add in the normative legal act delineation of conditions for marine animals, breeding of which is one of the activities in the field of mariculture and include in related documents the Draft Law of Ukraine "On Protection of Animals from Cruelty" to create natural conditions for medical rehabilitation of marine mammals, including dolphins (Verkhovna Rada of Ukraine, 2018).

- To define in more detail conditions and the order of rent of the sea territory, conducting sea management (agriculture), a choice of a form of ownership:

- Finalize the Resolutions of the Cabinet of Ministers of Ukraine on approval of procedures for leasing part of a fishery water body for aquaculture, water area (water space) of inland sea waters, territorial sea, exclusive (marine) economic zone of Ukraine, as well as defining its boundaries (coordinates) for mariculture purposes.

- Carry out legislative delimitation of economic activities in aquaculture and mariculture, the relevant powers of different levels of executive power in the management of industries.

- Develop a number of programs for the development of mariculture and related industries and sectors:

- Program to create a complex of specialized breeds of fish and marine animals with characteristics of different ecological (adaptation to different breeding conditions, including certain temperature and climatic conditions of different areas), economic (taste, consumer demand, optimal market value) and aesthetic value.

- Programs for monitoring and ecological certification of maritime farms, which will result in the definition of areas of mariculture production and amendments to the assessment of the environmental component in the Methodology for

determining the amount of payment for the lease of waters (waters) of inland waters, territorial sea, exclusive (marine) economic zone of Ukraine for the purposes of aquaculture (mariculture).

- Harmonize the regulatory framework in accordance with the standards and requirements of the European Union:

- Blue growth Strategy, Integrated Maritime Policy of the EU, Common Fisheries Policy Strategy for Sustainable Aquaculture Development, Strategic Guidelines (Principles) for Sustainable Aquaculture Development;

- Commission Regulation (EU) 2019/1587 of 24 September 2019 prohibiting the introduction into the Union of certain species of wild fauna and flora in accordance with Council Regulation (EC) № 338/97 on the protection of species of wild fauna and flora by regulating trade therein;

- Commission Decision of 20 December 1991 on a multiannual management program for aquaculture and the protection of marine protected areas (1992-1996) pursuant to Council Regulation (EEC) No 4028/86. 5. 2. 92. 39-42 (European Commission (1991c);

- Generally accepted methodological approach to the inclusion of mussel farms in maritime spatial plans;

- Council Regulation (EEC) No 4028/86 of 18 December 1986 on Community measures for the improvement and adaptation of structures in the fisheries and aquaculture sector;

- European Parliament resolution of 12 June 2018 on a sustainable and competitive European aquaculture sector (2017/2118 (INI)) (European Commission, 2020b).

- Certificates of sustainable development: ISO 14001: 2004 (ERM), EMAS, ISO 14040: 2006 and 14044: 2006 (LCA), ISO 14067 (carbon printing), ASC, GlobalGAP, ACC, GAA, FOS;

- Quality certificates: ISO 9001: 2008 (quality management), ISO 22000: 2005 (food safety), BRC, IFS;

- Certificates of performance: designations of origin (specific to Member States), "Friend of the Sea", GAA, ACC, ASC;

- Certificates of social responsibility: ISO 26000 (SR), Fairtrade, SA 8000.

- Council Directive 91/492 / EEC of 15 July 1991 laying down the health conditions for the production and the placing on the market of live bivalve molluscs (European Commission, 1991a);

- Council Directive 91/493 / EEC of 22 July 1991 laying down the health conditions for the production and marketing of fishery products (European Commission, 1991b, European Commission, 2021c);

- Directive 2000/60 / EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (European Commission, 2000);

- Directive 2008/56 / EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of maritime environmental policy (Marine Strategy Framework Directive);

- Council Directive 2006/88 / EC on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals;

- Directive 2014/89 / EU of the European Parliament and of the Council establishing a framework for maritime spatial planning;

- Council Directive 95/70 / EC introducing minimum Community measures for the control of certain diseases affecting bivalve molluscs (European Commission, 1995).

- Carry out organizational, legal and institutional measures and implement the adopted international norms and principles within the most important for Ukraine components and features of institutional support of the world (Spain, Peru, other countries).

1) Case of Spain:

- Multifunctional system of government based on autonomous organizations, institutions, institutes;

- Fund for regulation and organization of marketing of fishery and aquaculture products;

- Development of the marine aquaculture sector on the basis of professional associations and cooperatives;

- Development of the legal framework on the basis of sustainable development and autonomy;

- Financial instrument of fisheries orientation;

- Courses, training and activities tailored to the needs of the fisheries and aquaculture sector, including training of trainers.

2) Case of Peru:

- Multifunctional decentralized system of government;

- Development of the legal framework on the basis of sustainable development;

- Zoning of areas for aquaculture (mariculture) activities;

- National Cadastre of Aquaculture (Mariculture);

- Single window of aquaculture;

- Ecological certification of territories.

3) Case of other countries:

- Concretization of activities in marine aquaculture, freshwater aquaculture and brackish aquaculture;

- Identification of subsectors and relevant national policies for each of them, namely: National Maritime Policy, National Policy on Inland Fisheries and Aquaculture, National Mariculture Policy.

It can be determined that the institutional support of the countries selected by the preliminary analysis in the research is characterized by a high level and best practices of mariculture development for the implementation of leading positions in Ukraine. In general, the institutional field of the specialized mariculture industry in Ukraine needs further significant research, rational improvement and effective development.

4. Conclusions.

Mariculture one of the few industries that can ensure the growth of both rural and coastal areas. With the right approach to location, development, management and regulation, the mariculture industry can provide environmental benefits. These include increasing biodiversity, improving water quality and reducing greenhouse gas emissions. Coastal mariculture can also be a way to minimize the demands and pressures of the marine environment through the use of recycling systems and advanced technologies that ensure efficient use of resources while curbing and mitigating discharges and using relatively small areas of land to grow large amounts of food. The economic advantages in the rational management of this industry, are export income and income in related chains (supply, processing, packaging). The development of such systems provides an opportunity to diversify livelihoods on the coast by stimulating new local jobs.

Grown seafood, as a vital source of protein and other useful vitamins and trace elements, can promote domestic production of food and cosmetics, meet health and food safety requirements. Mariculture is a highly productive industry based on sustainable development practices is the key to food and environmental security, a sustainable seafood supply chain and significant socioeconomic benefits for coastal areas. The article offers a detailed interpretation of mariculture based on the characteristics of the industry presented in the texts of the existing legal framework of Ukraine, dictionaries and works of prominent Ukrainian scientists; the information base of normative-legal documents on European and world development of mariculture is analyzed; diagrams of development of institutional support of mariculture for the countries of the European Union and other countries of the world, including on the basis of

sustainable development are created; an algorithm for the development of institutional support for mariculture in Ukraine based on the implementation of international norms and principles (subject, object and spatial sphere) based on the analysis of the experience of the European Union, world leaders in mariculture and countries with short traditions of marine organisms or where the industry did not previously exist.

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