

FAO as a tool of ecosystem entrepreneurship and its implementation in Ukraine

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Abstract. In the process of research, it was determined that the cooperation between Ukraine and FAO has a productive activity, in particular, in the formation of national legislation. It is developed together with the government, in particular with the Ministry of Agrarian Policy and Food of Ukraine, and other partners. We developed a special toolkit - a standardized interview questionnaire - for an empirical study of perspectives and strategic priorities in the formation of the FAO activity model and its implementation in Ukraine. In the process of researching enterprises, respondents in the form of managers responsible for ecosystem management were asked to determine the effectiveness of FAO's activities in the field of responsible ecosystem entrepreneurship in order to formalize the model of FAO's activities and its implementation in Ukraine. The answers of the respondents were processed using the developed method of mathematical filtering of the research results, which consists of three filtering blocks, which makes it possible to detect at the first stage the level of variability of the studied data using the mode and median of the studied series. At the second stage we determine the symmetry and sharpness of the distribution, using the calculation of asymmetry, standard deviation and kurtosis. At the third stage of data processing, based on the analysis of the Pearson correlation coefficient, the Fisher F-criterion, the Friedman test and the Kruskal-Wallis H-criterion, correlation-dispersion deviations are determined, which make it possible to exclude such respondent data with significant deviations from the recommendation part from the norm.

1 Introduction

The Food and Agricultural Organization of the United Nations (FAO) is the largest and most authoritative international organization for the development of international cooperation in the field of agriculture, forestry, and fisheries. Its activity has a great practical importance for the economy of the member countries. FAO has unique international experience in the field of application of the latest agro-industrial methods and know-how, breeding of high-yielding, drought-resistant grain crops and methods of combating diseases and pests in agriculture and

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forestry, breeding of highly productive breeds of livestock and fish. FAO has a powerful research and information base that allows member countries to transfer quickly the latest achievements and developments in agriculture, forestry, and fisheries for practical use in the economy. The organization develops recommendations for governments on policies in these sectors according to specific of regions and countries [1].

2 The main areas of FAO activity

The development of international norms and standards for agricultural, forest and fish products within the framework of FAO has a particular practical importance, the implementation of which is of key importance for exporters in the conditions of fierce competition in international trade and the intensifying struggle for potential sales markets. Since the cooperation between Ukraine and FAO (2003), interested ministries and departments have done a lot to introduce its recommendations into the practice of public administration, ensure participation in the work of the main intergovernmental bodies of FAO, as well as international conferences held in its line.

The mechanism of coordination in FAO is the conference of representatives of all member states of the Organization, which is convened once every two years. The Statute provides for the possibility of convening extraordinary (special) sessions of the Conference. The conference determines the general policy of the Organization, approves its program and budget for the next two-year period, adopts rules, procedures and financial regulations. Also, the conference provides recommendations on food and agriculture issues for their practical use, and can provide recommendations to any international organization on any issue within the competence of the FAO. In addition to member states, associate members (without the right to vote) may participate in the work of the Conference session, and observers from member states of the Organization, intergovernmental and non-governmental organizations may be present [2, 3].

Issues of the substantive nature and policy of the Organization in the field of food and agriculture, as well as the program and budget of FAO, are considered by the two commissions created during the session of the Conference. All other issues (including procedural, legal and administrative) are considered at plenary sessions of the Conference, where during general debates, delegations present their countries' positions on food and agricultural issues. In addition, three auxiliary bodies are created for the duration of the Conference session - the General Committee, the Credentials Committee and the Resolutions Committee. Between sessions of the Conference, the governing body is the Council consisting of 49 member states which elected by the Conference for a term of three years. At the same time, the composition of the Council is updated by one third every year. Council sessions are held as often as are deemed necessary.

An important tool of FAO in the implementation and intensification of its activities is political dialogue. The participation of representatives of the private sector of the economy in the political dialogue on issues related to sustainable and efficient entrepreneurship and food standards at the national and international levels can contribute to this discussion [4]. The dialogue ensures that the interests, technical expertise and capabilities of the private sector are taken into account. This increases the sense of responsibility for the development and implementation of the policy, as well as for its sustainable nature among partners from the private sector of the economy. FAO can play an important role in encouraging and guiding such dialogue at the national and international levels. Examples of political dialogue forums are such FAO programs as the "Private Sector Mechanism" under the Committee on World Food Security, "Partnership for Environmental and Comparative Analysis of Production and Marketing Chains of Livestock Products" [5].

The next tool of FAO in the introduction and intensification of the process of food and

nutrition security is the development of norms and standards. FAO, as an intermediary, plays a key role in the organization and negotiation and implementation of international codes of conduct, standards of safety and quality of food and other raw materials, as well as global conventions and regulatory legal acts in the areas under FAO's mandate. Such important international acts include: Code of Responsible Fishing, International Agreement on Plant Genetic Resources for Food Production and Agriculture, Voluntary Guidelines for Responsible Regulation of Ownership and Use of Land, Fish and Forest Resources.

The next FAO tool in providing food to the world's population is knowledge management and its dissemination. A wide range of FAO activities is aimed at providing the international community with objective information and knowledge, including statistical data on issues of food and nutrition security, sustainable agriculture. FAO technical consultations are often held at the request of international public and private organizations [8]. The private sector contributes to FAO's knowledge and research capacity by providing data and information on market trends and new technologies. Knowledge and technologies of the private sector of the economy can provide an important contribution to the realization of the public good. FAO encourages and supports the sharing and dissemination of private sector information through global networks.

It can be determined that FAO tools include political dialogue, information and propaganda work, development of norms and standards, knowledge management and its dissemination (Table 1).

3 The FAO activity model and its implementation in Ukraine

To implement the effectiveness of FAO's activity in the field of responsible ecosystem entrepreneurship, a study was conducted, the purpose of which was to identify the main factors that contribute to the implementation of the principles of effective development, and will provide a more productive approach to the formation and development of ecosystem entrepreneurship based on a questionnaire of selected enterprises. The main task of the research was to identify the most effective organizational forms of improving the model of FAO activity in Ukraine in the field of responsible ecosystem entrepreneurship and to clarify problems regarding the influence of factors on the development of the above-mentioned field. Based on the formation of a questionnaire survey of the respondents of the analyzed enterprises, which was based on a ten-point scale according to which one is not a relevant answer, and ten is the most relevant in relation to the developed and proposed question about whether or another aspect of ecosystem corporate entrepreneurship, we received a set of answers. They were differentiated by the serial number of the answer. According to the results of processing the questionnaire data, two types of graphs were graphically presented. In the first case, with the help of the "range box" tool, we determined the range of answers according to their scoring characteristics, and the median of the specified answers. On this basis, the most relevant items of the questionnaire, which had the highest points on a ten-point scale, were selected. In particular, we presented the more relevant answer items graphically, where the vertical scale is the relevance of certain aspects that were rated by respondents from one to ten, where one is not relevant, and ten is the highest degree of relevance. The vertical scale is the number of respondents who responded to the point indicated on the graph.

We analyzed the respondents' answers to the question of the importance of the influence of factors on the development of ecosystem entrepreneurship. As we can see from the diagram, according to the median indicator, the most important factors that scored higher according to the respondents are the questionnaire items such as: "1.5. Regulation of international trade within the WTO", "1.7. Development of international logistics" and "1.1. Actions of the Government of Ukraine to

promote the development of ecosystem entrepreneurship".

Table 1. FAO tools in the promotion of ecosystem corporate entrepreneurship

Tools	Application		
	Agriculture	Forestry	Fish farming
Political dialogue	Discussing the problems of increasing the productivity of food production to overcome the problems of hunger and poverty	Discussing the problems of forests and forestry, where forest policy is state-oriented with a dominant top-down approach to management	Preservation and increase of fish stocks of the World Ocean, seas, rivers and other water bodies
	Conducting business activities focused on the ecosystem approach		
Information and propaganda work	Clear inter-sectoral connections in the field of regulation by thesectors of agriculture, forestry and fisheries, environment and tourism		
	Product quality and consumer availability	ensification certification	ofight againstpoaching
Development of norms and standards	National inter-sectoral and sectoral programs aimed at increasing food security, improving the nutrition of the global population, overcoming hunger and poverty, meeting economic, environmental and social needs		
	Regarding the cultivation of plants and animals, the quality of products is adapted to specific regional characteristics	On growing, felling, cleaning and quality of wood products	Regarding catches of fish resources and features of aquaculture management, product quality
Knowledge management and its dissemination	International seminars, workshops, forums, training courses		
	Monitoring and observation of GIS for the prevention and control of swine diseases and other diseases	Monitoring and observation of GIS for the state of forest resources, forest cover and the quality of forest plantations	Monitoring and observation of GIS for the availability and condition of aquatic living resources, fish migration processes, potential threats to populations
	FAOSTAT provides access to key indicators – from land use and food production to the distribution of the state budget for agriculture and fisheries by countries, regions and the world as a whole		

Source: systematized by the authors based on [12,13]

With the lowest scores according to the median indicator, the respondents highlighted the following factors: "1.2. R&D, which contributed to the renewal of fixed capital, the creation of new branches of the economy", "1.3. A significant increase in the share of services", "1.4.

Active activity of TNCs on the world market", "1.5. Regulation of international trade within the WTO", "1.6. Development of economic and, above all, trade integration: elimination of regional barriers, formation of common markets, free trade zones", "1.7. Development of international logistics", "1.8. Activities of FAO", "1.9. Deepening of the international division of labor and internationalization of production", "1.10. Stimulation of ecosystem development oriented manufacturers to Ukraine". The specified gradations of the answers did not differ significantly by the interviewed respondents, as evidenced by the two-dimensional histogram of the normal distribution. With this distribution, most of the values are grouped around some average value, on both sides of which the frequency of observations gradually decreases. The general data of the respondents' assessments of the development factors of ecosystem entrepreneurship are

shown in fig. 1.

Comparing such a characteristic of the respondents' answers as "Range" can be determined by such a questionnaire item as: "1.6. Development of economic and, above all, trade integration: elimination of regional barriers, formation of common markets, free trade zones" has the best indicator.

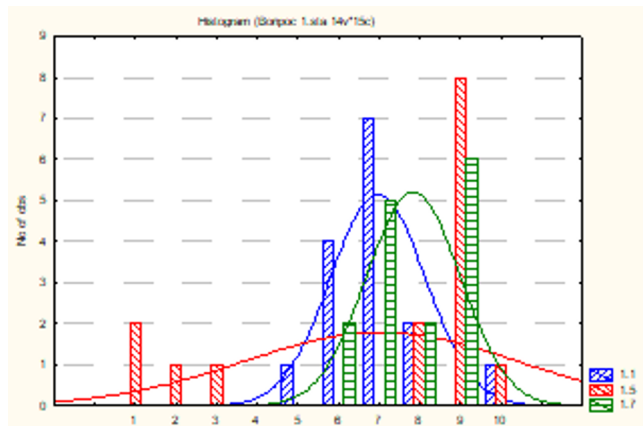


Fig. 1. The results of respondents' answers to the item: "Please rate the impact of the following factors on the development of ecosystem entrepreneurship."

Almost all other points have the same indicator, which indicates a relatively low level of reliability of the data presented by the respondents. Comparing such a characteristic of respondents' answers as Std.dev. (standard deviation), it can be determined that items (1.1), (1.7), (1.5) are characterized by the best characteristics. Points (1.1), (1.5), (1.9) have the largest characteristics of standard deviations. The above makes it possible to select for further analysis the most relevant point of the answer, namely points (1.1 and 1.7.). In general, the dispersion of respondents' answers to the item: "Please rate the influence of the following factors on the development of ecosystem entrepreneurship" is presented in Fig. 2

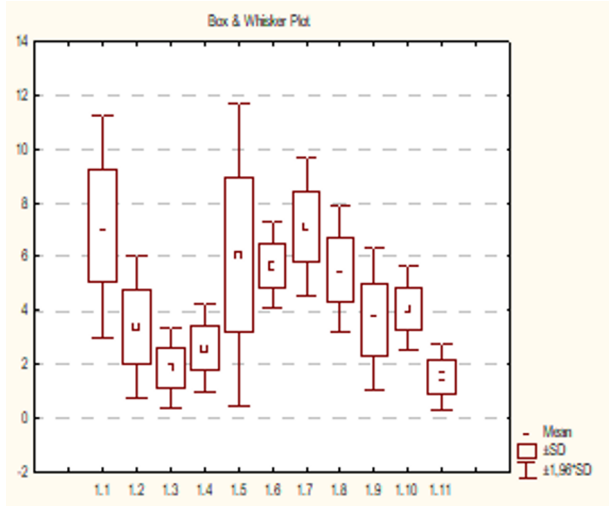


Fig. 2. Dispersion of respondents' answers to the item: "Please rate the influence of the following factors on the development of ecosystem entrepreneurship".

The next point of the questionnaire, in which the respondents were asked to determine "How effective are the following tools, that provide promotion of ecosystem entrepreneurship at the current stage". Among the respondents' answers, as we can see from the diagram in fig. 3, according to the median indicator, the most important factors that scored higher are the questionnaire items such as: "2.3. Optimization of the national legal and regulatory-institutional regime of ecosystem entrepreneurship", "2.4. Improvement of the mechanism of financing and crediting of ecosystem entrepreneurship productions", "2.8. Development and implementation of a system of national priorities in the environmental sphere according to FAO standards and their practical implementation by means of state regulation." The general characteristics of the respondents' answers indicate fairly clear accents in solving issue

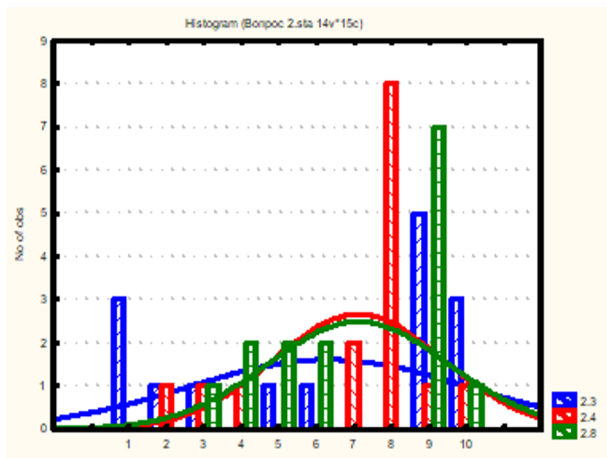


Fig. 3. The results of respondents' answers to the item: "In your opinion, how effective are the following tools that ensure the promotion of ecosystem entrepreneurship at the current stage?"

By comparing such a characteristic of respondents' answers as "Range", it is possible to determine such items of the questionnaire as "2.7. Stimulation of investment activities of both

national and foreign individuals and legal entities, which implement the ecosystem principle in their business activities with the help of financial, tax, economic mechanisms" and "2.1. Stimulating the production of ecological products, in particular high-quality products, as well as products with low use of biotechnology." Almost all other items have the same indicator, which indicates a relatively low level of either reliability or importance of the data presented by the respondents. Comparing such a characteristic of respondents' answers as Std.dev. (standard deviation), it can be determined that the best characteristics are characterized by points "2.6. Ensuring receipt of certificates for domestically produced products in accordance with the metrological and standardization design of FAO requirements", "2.7. Stimulation of investment activities of both national and foreign individuals and legal entities engaged in entrepreneurial activity implement the ecosystem principle with the help of financial, tax, economic mechanisms", "2.1. Stimulating the production of ecological products, in particular high-quality products, as well as products with low use of biotechnology." Points 2.3 and "2.5. Establishing an effective insurance system for corporations that are transitioning to the principles of ecosystem entrepreneurship" have the largest characteristics of standard deviations. The above makes it possible to select the most relevant answer item for further analysis (see Fig. 4).

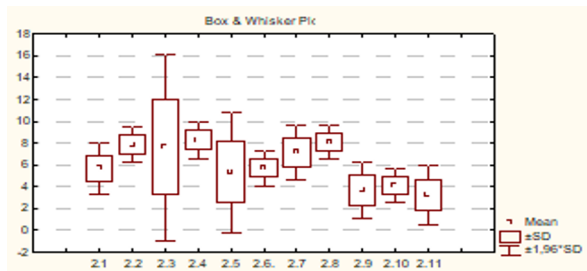


Fig. 4. Dispersion of respondents' answers to the item: "In your opinion, how effective are the following tools that ensure the promotion of ecosystem entrepreneurship at the current stage?"

In addition, as can be seen on the histogram from the answers "practically not effective", "lowly effective", "sufficiently effective", "perceptibly effective", "highly effective", the experts noted the item "Ensuring the receipt of certificates for domestically produced products in accordance with metrological and standardized design FAO requirements" is "highly effective" with the largest number of responses.

The next point of the questionnaire, was one in which respondents were asked to determine "How effective are the current conditions for improving the market environment of ecosystem entrepreneurship?" Among the respondents' answers, as we can see from the diagram in fig. 5, according to the median indicator, the most important factors that scored higher are the questionnaire items such as: "3.4. Establishing strict limits on emissions and discharges of pollutants and microorganisms, limits on the placement of production and consumption waste and other types of negative impact on the environment", "3.7. Deepening cross-border cooperation in the field of ecosystem entrepreneurship at all borders, expanding the rights of local authorities in this process, broad involvement of small and medium-sized businesses in foreign economic activities" (see Figure 5.)

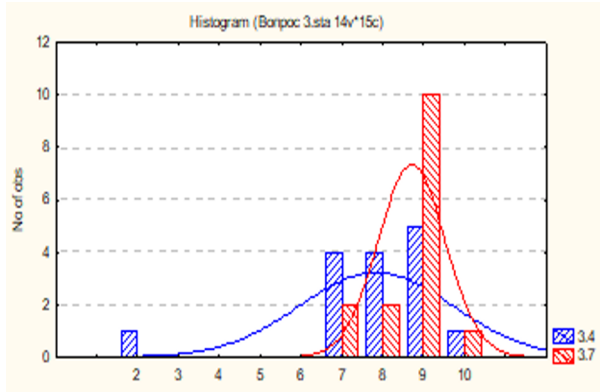


Fig. 5. The results of respondents' answers to the item: "To what extent do you think the current conditions for improving the market environment of ecosystem entrepreneurship are effective?"

By comparing such a characteristic of respondents' answers as "Range", it is possible to determine such points of the questionnaire as "3.1. Conducting the negotiation process and concluding bilateral intergovernmental agreements on ecosystem entrepreneurship with the countries – the main trade partners of Ukraine, adopting intergovernmental documents on the coordination of unified principles", "3.4. Conducting an economic evaluation of natural and natural-anthropogenic objects" and "3.7. Deepening cross-border cooperation in the field of ecosystem entrepreneurship on all borders, expanding the rights of local authorities in this process, broad involvement in the foreign economic activity of small and medium-sized businesses", it should be emphasized: although the above-mentioned points have significant Range, they were identified as the most important. Almost all the last items have the same indicator, which indicates a relatively low level of either reliability or importance of the data presented by the respondents (see Fig. 6).

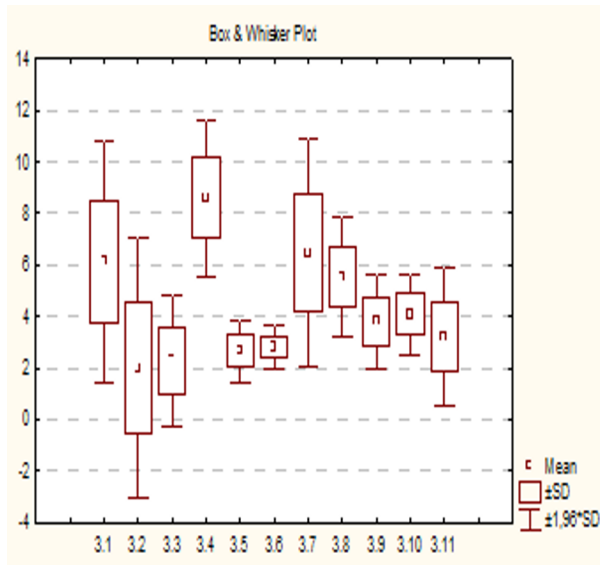


Fig. 6. Dispersion of respondents' answers to the item: "To what extent do you think the current conditions for improving the market environment of ecosystem entrepreneurship are effective?"

Comparing such characteristics of respondents' answers as Std.dev. (standard deviation), it can be determined that the best characteristics are determined by points (3.4), (3.7). Points

(3.1) and "3.2. Economic assessment of natural and natural-anthropogenic objects." have the largest characteristics of standard deviations. The above makes it possible to highlight the most relevant answer item for further analysis.

The next point of the questionnaire, in which the respondents were asked to determine "How effective, in your opinion, are the following international and national institutions in the development of ecosystem entrepreneurship?", is presented in fig. 7.

Among the responses of the respondents, as we can see from diagram 7, according to the median indicator, the most important factors that scored higher indicators are such items of the questionnaire as: "4.2. Food and Agricultural Organization of the United Nations", "4.3. UN Economic and Social Council", and "4.9. Public organizations", which speaks of the need to implement the experience of international organizations in the development of ecosystem corporate entrepreneurship (Fig. 8).

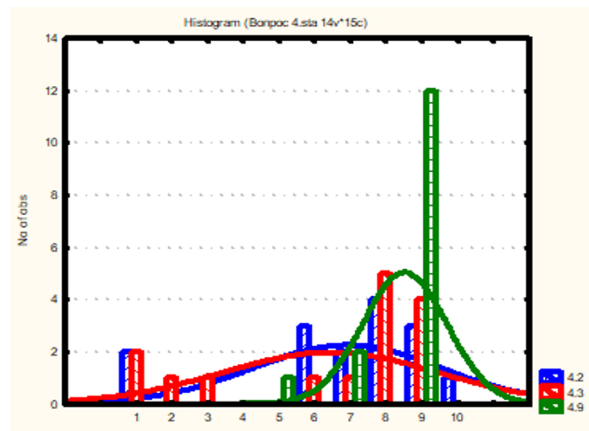


Fig. 7. The results of respondents' answers to the item: "To what extent do you think the following international and national institutions are effective in the development of ecosystem entrepreneurship?"

By comparing the characteristics of respondents' answers as "Range", it is possible to determine such points of the questionnaire as "4.1. World Trade Organization" "4.4. Verkhovna Rada", "4.5. Ministry of Environmental Protection and Natural Resources of Ukraine", "4.6. Ministry of Economy of Ukraine", "4.7. Ministry of Agrarian Policy and Food of Ukraine", "4.8. Ministry of Information Policy of Ukraine", they were marked by the respondents as not important enough and among the answers "Practically not effective", "Ineffective", "Sufficiently effective", "Perceptibly effective", "Highly effective", the most common answer was "Ineffective".

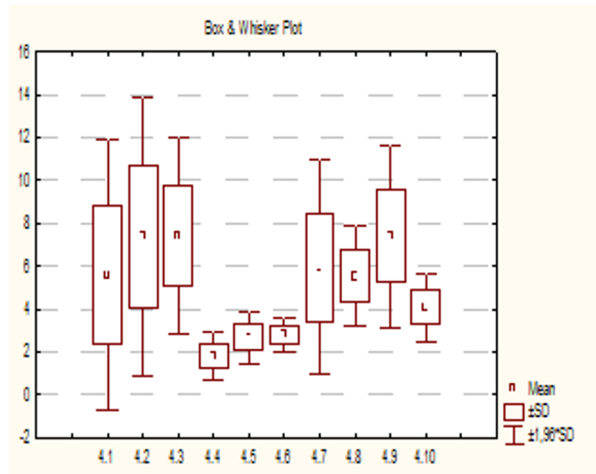


Fig. 8. Dispersion of respondents' answers to the item: "How effective, in your opinion, are the following tools that ensure the promotion of ecosystem entrepreneurship at the current stage?"

The next point of the questionnaire, was "Do you think, how appropriate is the interaction of FAO with organizations of the state public and private sector in the context of ecosystem entrepreneurship in the following forms?" Among the responses of the respondents, as we can see from diagram 9, according to the median indicator, the most important factors that scored higher indicators are such items of the questionnaire as: "5.1. Verkhovna Rada", "5.2. Enterprises", "5.3. Public organizations" (see Fig. 9)

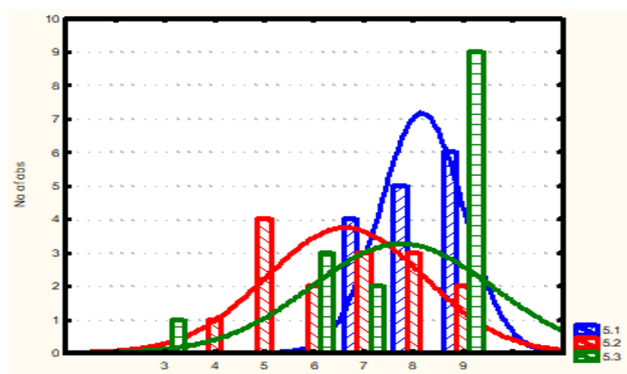


Fig. 9. The results of respondents' answers to the item: "In your opinion, how appropriate is the interaction of FAO with state organizations public and private sector in the context of ecosystem corporate entrepreneurship in the following forms?"

By comparing such a characteristic of respondents' answers as "Range", it is possible to determine such items of the questionnaire as "5.4. Cabinet of Ministers", "5.5. Ministry of Environmental Protection and Natural Resources of Ukraine", "5.6. Ministry of Economy of Ukraine", "5.8. Ministry of Information Policy of Ukraine", "5.9. Cooperatives". It should be noted that these points were noted by the respondents as not important enough and among the answers "Absolutely impractical", "Impractical", "Rather impractical than expedient", "Rather expedient than impractical", "Expedient", Full compliance with this aspect is very important and principled" respondents most often chose "rather impractical than expedient". In general, the dispersion of respondents' answers to the item: "In your opinion, how appropriate is the interaction of FAO with public and private sector organizations in the

context of ecosystem entrepreneurship in the following forms?" presented in fig. 10, confirms the relevance of the interaction between the state, business and society, because only with close cooperation it is possible to quickly and efficiently establish cooperation and get maximum benefits from ecosystem entrepreneurship.

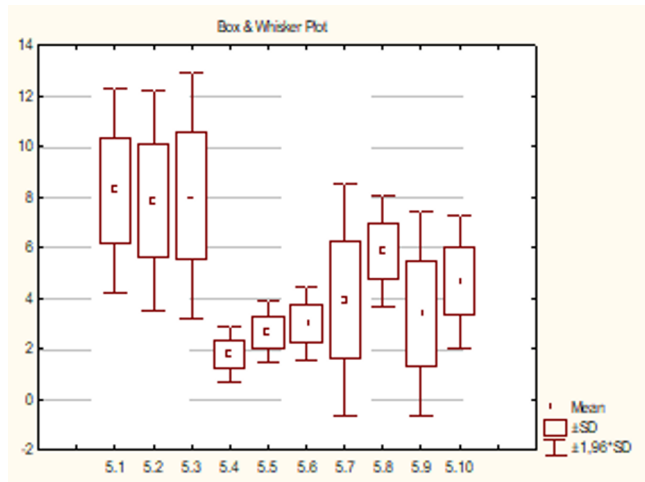


Fig. 10. Dispersion of respondents' answers to the item: "In your opinion, how appropriate is the interaction of FAO with public and private sector organizations in the context of ecosystem corporate entrepreneurship in the following forms?"

The next item of the questionnaire, in which the respondents were asked to determine "To what extent do you think the following types of cooperation of FAO in the field of ecosystem entrepreneurship are effective?" In general, among the answers of the respondents according to the median indicator, the most important factors that scored higher indicators are the following items of the questionnaire, which are presented in fig. 11.

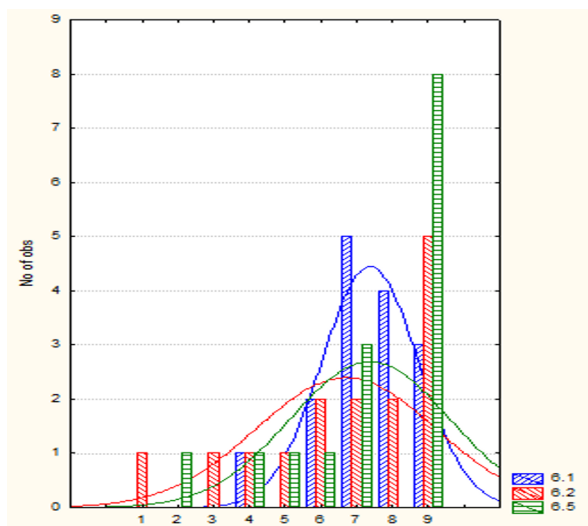


Fig. 11. The results of respondents' answers to the item: "How effective, in your opinion, are the identified following types of FAO cooperation in the field of ecosystem entrepreneurship?"

The dispersion of respondents' answers to this item is presented in Fig. 12.

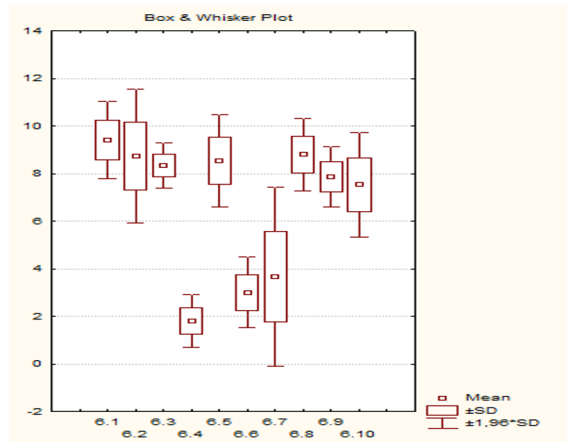


Fig. 12. Dispersion of respondents' answers to the item: "How effective, in your opinion, are the identified following types of FAO cooperation in the field of ecosystem entrepreneurship?"

By comparing a such characteristics of respondents' answers as "Range", it is possible to determine such items of the questionnaire as: "6.1. Cooperation with the private sector", "6.2. Conducting trainings and seminars", "6.5. Cooperation in the form of public organizations" were the most important, the points of the questionnaire were also noted: "6.3.

Cooperation in the form of cooperatives", "6.6. Technical and institutional assistance on the basis of research organizations", "6.7. South-South cooperation", "6.8. Functioning of knowledge bases", "6.9. Partnership agreements" as important, therefore, almost all proposed types of FAO cooperation in the field of ecosystem entrepreneurship are important, except item "6.4. Parliamentary unions".

The last point, which determines priorities in the formation of cooperation with FAO in solving problems of ecosystem entrepreneurship, there is an item "Which segments of regulation of ecosystem entrepreneurship in Ukraine, in your opinion, need improvement in order to adapt to international FAO standards?" The respondents' answers to this item are presented in fig. 13

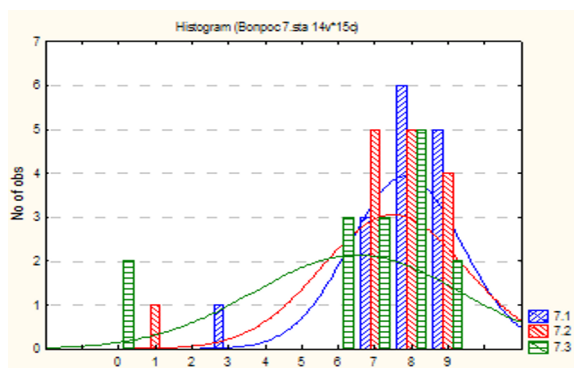


Fig. 13. The results of respondents' answers to the item: "Which segments of ecosystem entrepreneurship regulation in Ukraine, in your opinion, need improvement in order to be adapted to international FAO standards?"

Among the responses of the respondents, as we can see from diagram 13, according to the median indicator, the most important factors that scored higher indicators are such items of the questionnaire as: "7.1. Standards of food products and production technologies", "7.2. Standards for identification and quantitative assessment of the principles of environmental

management at the enterprise", "7.3. Standards for marking goods according to the level of environmental friendliness of production processes" (fig. 14).

Comparing the characteristics of respondents' answers as "Range", it is possible to determine the following items of the questionnaire as: "7.4. Conditions of sale of food and non-food products and their individual names", "7.5. Special conditions of taxation of ecosystem enterprises", "7.6. Standards and criteria of FAO regarding the eco-system of commercial activity", "7.7. FAO standards of agricultural land use conditions", "7.8. Procedure for obtaining licenses", "7.9. International certification" were marked as the least important.

The next stage of the analysis of the questionnaire data is to summarize the data into a single system in order to identify analytical generalizations relevant to the recommendation part. As already mentioned in the previous point of the study, the following indicators were used for mathematical filtering of the obtained data.[12, 13].

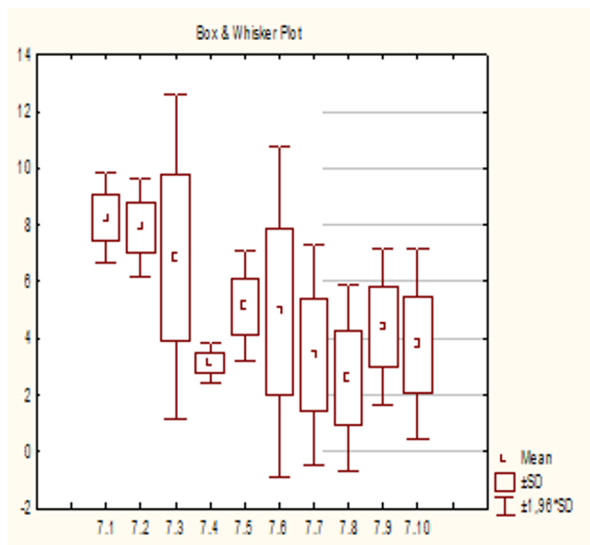


Fig. 14. Dispersion of respondents' answers to the item: "Which segments of ecosystem entrepreneurship regulation in Ukraine, in your opinion, need improvement in order to be adapted to international FAO standards?"

The mode is the value of the variable characterized by the highest frequency of occurrence of the variable in the sample. Typically used to estimate the mean if the variable which is measured on a nominal or ordinal scale. Std.dev. Quartiles range is equal to the difference between the values of the upper and lower quartiles, that is the interval containing the median in which 50% of the sample falls. Skewness (asymmetry) is a measure of the symmetry of a distribution. If the distribution is symmetric, then the asymmetry is equal to zero, if the asymmetry is significantly different from 0, then the distribution is asymmetric. Normal and uniform distributions are absolutely symmetrical. The asymmetry of the distribution with a long right tail is positive. If the distribution has a long left tail, then its asymmetry is negative. Kurtosis (kurtosis) is a measure of the sharpness of the peak of the distribution. If the distribution is normal, then the kurtosis is 0. If the kurtosis is positive, then the peak is pointed, if negative, then the peak is rounded. By summarizing the conducted surveys of questionnaire data with the help of a developed system of statistical and mathematical filtering, it is possible to interpret the entropy of indicators of aggregated questionnaire data and highlight the main information blocks that can be applied for further use in the recommendation part (see Table 2). Thus, categories of tools that will form a

recommendation block for the development of ecosystem corporate entrepreneurship have been selected based on statistical reliability filters. Thus, in the context of the problem of forming modern corporate approaches to the FAO activity model and its implementation in Ukraine, the following items of the questionnaire are valid recommendations: "1.7. Development of international logistics", "1.1. "Actions of the Government of Ukraine to promote the development of ecosystem entrepreneurship", "1.5. Regulation of international trade within the framework of the WTO", which allow us to assert that only the integration of the domestic ecosystem entrepreneurship system into the existing international environment has the highest priority. When analyzing the factors that ensure the development of ecosystem entrepreneurship at the current stage, the following are valid recommendations: "2.3. Optimization of national legal and regulatory-institutional regime of ecosystem entrepreneurship", "2.4. Improvement of the mechanism of financing and crediting of ecosystem entrepreneurship productions", "2.8. Development and implementation of a system of national priorities in the environmental sphere according to FAO standards and their practical implementation by means of state regulation", which make it possible to assert that the external model of development prevails among the analyzed enterprises. Considering the prospects of improving the current conditions for improving the market environment of ecosystem entrepreneurship, valid points that can be used as a recommendation module are: "3.4. Establishing strict limits on emissions and discharges of pollutants and microorganisms, limits on the placement of production and consumption waste and other types of negative impact on the environment", "3.7. Deepening cross-border cooperation in the field of ecosystems entrepreneurship at all borders, expanding the rights of local authorities in this process». Investigating the effectiveness of international and national institutions in the development of ecosystem entrepreneurship, the following can be identified among the most reliable: "4.2. Food and Agricultural Organization of the United Nations", "4.3. UN Economic and Social Council" and "4.9. Public organizations". On the basis of the revealed results, it is justified that the further implementation of the principles of ecosystem entrepreneurship should be based on the cooperation of the specified international organizations and the interaction of public organizations with associations of enterprises, rather than state structures.

During the substantiation of prospective forms of interaction of FAO with public and private sector organizations in the context of ecosystem entrepreneurship, among the responses of the respondents, the following institutions were found to be relevant: "5.1. Verkhovna Rada", "5.2. Enterprises",

Table 2. Interpretation of entropy indicators of aggregate questionnaire data

Questionnaire item	Variable ranking			Severity of deviations			
	Mode	Asymmetry	Quantile range	Kurtosis	Sum	Standard deviation	Harmonic mean
1.1.	3	0,09333	1	-0,6	288	1,08	2,090
1.5.	3	0,13948	1	-0,4	301	1,03	2,272
1.7.	5	-1,09828	1	0,7	480	0,77	4,180
2.3	5	-0,32990	2	-1,2	409	1,16	3,274
2.4	5	-1,03461	1	0,0	437	1,17	3,381

2.8	5	-0,87485	2	-0,1	427	1,19	3,254
3.4	5	-0,21808	4	-1,7	352	1,74	2,602
3.7.	5	-0,69672	3	-1,1	408	1,55	3,247
4.9.	4	-0,46240	1	-0,8	474	0,67	4,193
4.2.	5	-1,03461	1	0,0	437	1,17	3,381
4.3.	5	-0,87485	2	-0,1	427	1,19	3,254
5.1.	4	-0,46240	4	-0,8	474	0,67	4,193
5.2	5	-1,03461	5	0,0	437	1,17	3,381

"5.3. Public organizations", which emphasizes the integrative and alter-conversion directions of building a model of FAO activity and its implementation in Ukraine. Justifying the perspective types of FAO cooperation in the field of ecosystem entrepreneurship, it should be stated that "6.1. Cooperation with the private sector", "6.2. Conducting trainings and seminars", "6.3. Cooperation in the form of cooperatives" have become the main perspective measures that should form the basis of the FAO activity model and its implementation in Ukraine.

Determining the segments of ecosystem entrepreneurship regulation in Ukraine that need improvement in order to adapt to international requirements the points of the questionnaire "7.1. Standards of food products and production technologies", "7.2. Standards for identification and quantitative assessment of the principles of environmental management at the enterprise", "7.3. "7.3. Standards for product labeling according to the level of environmental friendliness of production processes".

4 Conclusion

The recommendations were formed using the developed economic-statistical filtering technique, which is based on the principles of an exclusively public-associative approach and includes elements of interaction at the meso-level [14]. Further use of just such a methodology will make it possible to more accurately and reliably assess the state of the research object, which, unlike existing concepts, takes into account several indicators. The application of such an approach will determine the most effective directions for the introduction of ecosystem entrepreneurship in Ukraine based on the application of FAO requirements and standards.

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