

Drivers of the ecosystem services approach in Poland and perception by practitioners

Małgorzata Stępniewska*, Piotr Lupa, Andrzej Mizgajski

Department of Integrated Geography, Faculty of Geographical and Geological Sciences, Adam Mickiewicz University, ul. Bogumiła Krygowskiego 10, 61-680 Poznań, Poland

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ABSTRACT

The uptake of the Ecosystem Services (ES) Approach in Poland with emphasis on the drivers stimulating the research and activity of the authorities, as well as the perception of this approach by the practitioners, are presented in this paper. The study focused on the identification of the stimulus for the activities concerning mapping and assessment of ecosystems and their services (MAES). The survey carried out among practitioners allowed to define the main challenges for ES implementation.

Two pairs of dichotomic drivers of the MAES process in Poland have been identified: scientific and administrative, as well as international and national. With regard to science, the most important drivers were found to be large international research projects. The inclusion of the ES approach in strategic documents of the European Union was of mobilising importance for the administration.

Currently, there is no wider interest in the ES approach at a regional and local level. The results of the survey showed that there is a deficit in knowledge on the practical way of using this approach.

In general, it may be said that there is a large potential for the development of ES applications in Poland. Activating it depends on political decisions.

1. Introduction

Twenty years ago, two inspirational publications (Costanza et al., 1997; Daily, 1997) kicked off the concept of ecosystem services (ES) as a subject of applied research and policy. Just two years later, the first Polish papers appeared on the economic valuation of nature (Markowska and Zylicz, 1999). However, in the Polish geographical bibliography, the idea of material and non-material benefits from the environment appeared already in the 1970s. The precursor of the ES approach in Poland was T. Bartkowski who formulated the following requirement as early as the mid-1970s: “... it is necessary to develop geographical information in such way as to enable the transition to economic valuation. It is the first step towards research, in which it will be possible to establish relationships between physical-geographic parameters and their economically tangible impact” (Bartkowski, 1973). Another paper (Marszałek and Podgórski, 1978) directly considered the functions and benefits provided by forest ecosystems. It is worth to notice that the paper of Ryszkowski (1995), even before Costanza’s paper, concerned the question of managing ecosystem services.

Global programs (MEA, 2005; TEEB, 2010) preceded European activities concerning the promotion of the ES approach as a tool for the

improvement of nature conservation and to support the protection of natural capital. The European Union introduced the ES into its Biodiversity Strategy for 2020 (EC, 2011) specifying Target 2, Action 5 as the mapping and assessment of ecosystems and their services (MAES). The activities of the European Commission, especially the MAES Working Group and its reports (Erhard et al., 2016; Maes et al., 2018, 2016, 2014, 2013), contributed to the implementation of this action; however, the uptake of the ES approach in Member States varies (Maes, 2016).

Therefore, we have to ask about the factors deciding about the uptake of the ES approach in individual countries. The subject of this paper is to present the development of MAES in Poland with emphasis on drivers stimulating the research and activity of authorities as well as the perception of this approach by practitioners. The analytical work was focused on identifying milestones for MAES actions in Poland. These milestones were connected with the activity of Polish researchers and with actions of policy makers. The survey carried out among practitioners on the regional and local level allowed to assess the perception of the ES approach and to define the main challenges for ES implementation. Many of the findings could be interesting for other countries, which have to implement action 5 of the EU Biodiversity

* Corresponding author.

E-mail addresses: malgorzata.stepniewska@amu.edu.pl (M. Stępniewska), piotr.lupa@amu.edu.pl (P. Lupa), andrzej.mizgajski@amu.edu.pl (A. Mizgajski).

Strategy to 2020.

2. Materials and methods

We used a set of analytical techniques, including a content analysis of literature databases, a survey on practitioners using a structured questionnaire, as well as the frequency tables for statistical analysis of the survey results. Generally, we carried out the discourse on drivers for the development of the ES approach in Poland and the process itself based on our experience as scientists and experts acting internationally, on the country level and the regional level.

The widely used quantitative content analysis (Graneheim and Lundman, 2004; Hsieh and Shannon, 2005; Kabisch, 2015; Piwowarczyk et al., 2013) was adopted for the bibliometric description of the development of research on ES in Poland. We calculated the number of documents devoted to ES, published by the authors affiliated in Poland in the years between 1995 and 2017 based on information collected through Scopus and Google Scholar. Scopus is a database of only peer-reviewed literature, taking a broad range of papers covering physical, life, health and social sciences into consideration. Google Scholar also includes other documents like grey literature and non-reviewed materials. The selection, which was performed in February 2018, covers all kinds of documents containing the term “ecosystem services” (in English or in Polish) in the title, abstract, or keywords.

To identify the perception of the ES approach among Polish practitioners, we conducted the survey among representatives of authorities and institutions dealing with spatial planning and environmental management. We distributed the questionnaires among participants of the conference on “Ecosystem services in spatial planning” held on 13th June 2017 in Poznań. The event gathered representatives of regional and local public administration from the Greater Poland Region in Western Poland. The questionnaire was completed by 55 out of 85 participants of the conference. The sample is probably under-representing the entire Polish spatial planning community; therefore, the outcomes should be interpreted with some caution. Despite this fact, in the authors’ opinion, the conducted research provides a valuable insight into the challenges and rewards of mainstreaming ES in the policy and decision making. The survey findings are similar to the convictions of experts from other regions and cities of Poland concerning the development of the ES approach (e.g. Mizgajski et al., 2014; Stepniewska et al., 2017).

The survey objectives included: (1) determining how many spatial planners and officials had heard before about the ES approach and what was the source of this knowledge; (2) recognition of the potential of the ES approach for application in environmental management procedures and (3) determining constraints in the implementation of ES. The

questionnaire also covered the professional position of the respondents, including the level of administration they are dealing with (see survey template in [Supplementary material](#)).

The data were analysed using frequency tables (Hill and Lewicki, 2006; Stanisiz, 2007). This allowed to order and summarise the answers, while making it easier to interpret the obtained results.

3. Development of ES approach in Poland and its drivers

Two pairs of dichotomic drivers of the mapping and assessment of ecosystems and their services in Poland have been identified: scientific and administrative as well as international and national. These factors are discussed below.

The ground-breaking papers of Costanza et al. (1997) and Daily (1997) generated limited response among Polish scholars; however, individual publications appeared at the turn of century (Buszko-Briggs et al., 2004; Markowska and Zylicz, 1999; Zalewski, 2004, 2002; Żylicz, 2000). Thus, we can conclude that a small group of Polish scholars developed basic knowledge that underpinned further absorption of the ES approach quite early. The Millennium Ecosystem Assessment (MEA, 2005) carried out in the period of 2001–2005 under the umbrella of the United Nations played a crucial role for the dissemination of the ES concept in Poland during the last decade.

The rising global interest in ES was expressed by a rapid increase of scientific papers (Costanza et al., 2017; Costanza and Kubiszewski, 2012). During conferences in Wrocław (2006), Janów Lubelski (2008), Białystok (2008), single presentations appeared, and then publications concerning ES (Mizgajski, 2004; Mizgajski and Stepniewska, 2009; Ryszkowski, 2007; Solon, 2008).

Growing interest among Polish researchers concerning ES started in 2010 in connection with the Symposium on “Ecosystem services in transdisciplinary approach” – ECOSERV. It was the first nationwide conference devoted fully to ES. Apart from scientists, the representatives of the Polish Ministry of Environment, the National Council for Nature Conservation and the Directorate for Environmental Protection took part in this event. The success of ECOSERV 2010 resulted in the organisation of subsequent symposia in Poznań every two years (ECOSERV 2012, 2014, 2016, 2018). About 100 scientists and representatives of various levels of administration attend these symposia every time. Those meetings hosted prominent scientists, who presented current problems of research on ES (Baat, 2014; Costanza, 2012; Maes, 2016). Anne Teller from the European Commission showed actions of the MAES Working Group for the development of the ES approach in the European Union and Member States. The ECOSERV symposia have played a key role for the dissemination of the ES approach in Poland as well as for leveraging the research quality (Mizgajski

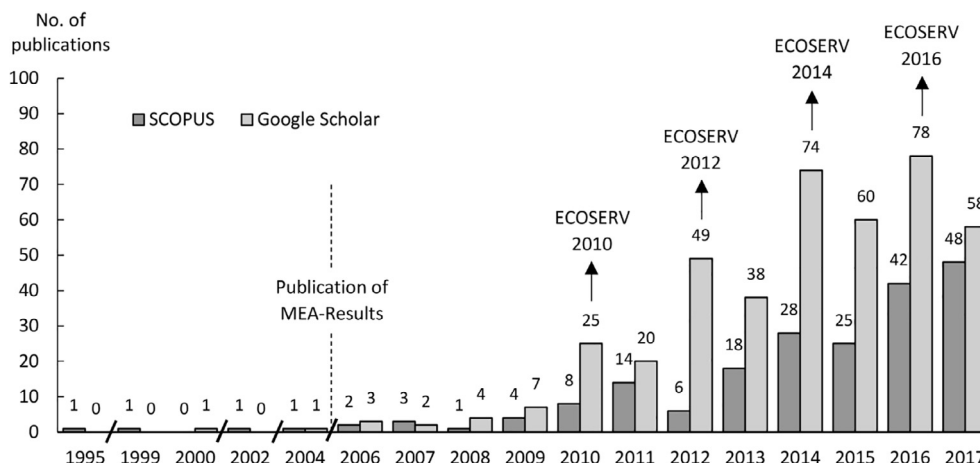


Fig. 1. Number of documents published by authors affiliated in Poland in the years 1995–2017. Source: own elaboration based on SCOPUS and Google Scholar (access 02.2018).

et al., 2014). The number of papers indexed by international databases is indicative of the progress (Fig. 1).

Following interests on this research field, Polish scientists have been increasingly involved in diverse research projects. Attention concerning services of urban ecosystems appeared in Poland relatively early. In 2011, a seminar and workshop on “Synthesising different perspectives on the value of urban ecosystem services” took place in Łódź (Hubacek and Kronenberg, 2013). Also, the “TEEB Manual for Cities: Ecosystem Services in Urban Management”, which was published in Polish in 2011 (TEEB, 2011), was a significant step for the dissemination of this approach.

The perception of nature and landscape from an ES perspective was one of the key points of the Polish-Norwegian Project LINKAGE (“LINKing systems, perspectives and disciplines for Active Biodiversity Governance”), which was carried in the period 2013–2016 (Pietrzyk-Kaszyńska et al., 2016).

The first large research project financed from Polish public sources concerned “Ecosystem services in the young glacial landscape – assessment of resources, threats and utilisation”, and was carried out in the period of 2013–2017 at the Institute of Geography and Spatial Organisation of the Polish Academy of Sciences in Warsaw. The extended monography summarises this wide-ranging project based on investigations on selected municipalities in north-eastern Poland (Solon et al., 2017).

The absence of Polish scientists at the first pan European projects supporting the ES approach OPERAS (Operational Potential of Ecosystem Research Applications) and OpenNESS (Operationalization of Natural Capital and Ecosystem Services: from Concepts to Real-World Applications) limited their access to the applied research at an early stage. In the years 2015–2018, the team from the Adam Mickiewicz University in Poznań has been taking part in the multi-lateral project Enhancing ecoSystem sERVICES mApping for poLicy and Decision mAKing – ESMEALDA within Horizon 2020 Programme (Burkhard et al., in review). The Polish group has contributed to recognising and testing biophysical methods of mapping and assessment of ES, evaluation of stakeholders’ needs as well as creating the case study database.

The Ecosystem Services Partnership (ESP) as a network of scientists, policy makers and practitioners facilitates the exchange and dissemination of knowledge on ES worldwide. In July 2015, the team of the Department of Integrated Geography at the Adam Mickiewicz University in Poznań established the National ESP Network in Poland and they facilitate it (<https://www.es-partnership.org/community/regional-chapters/europe/poland/>).

The development of research on ES in Poland was not sufficient to stimulate dedicated actions by the authorities; however, it was the condition *sine qua non* for any action. The fact that EU strategic documents widely refer to the ES approach was an important stimulus for its adoption into Polish strategic documents. A similar role is played by supporting and mobilising activities of the European Commission for the mapping and assessment of ecosystems and their services in Member States. Since 2013, Polish representatives are active in the MAES Working Group.

The first official step to the adoption of the ES concept into the Polish environmental policy was the *National Spatial Development Concept 2030* (NSDC 2030, 2011). The document says that intensifying the pressure on ecosystems affects their ability to provide ES; target arrangement of nature protected areas should take areas of necessary ES in urban functional areas into account. The content related to ES can also be found in the *Polish National Strategy for Adaptation to Climate Change by 2020 – with the perspective by 2030* (NAS 2020, 2013). The document shows that climate change will affect the ES, and the action of horizontal character should be developing the methodology of nature valuation, taking domestic specificity and climate change into consideration. The importance of considering ES in spatial management was pointed out by *Strategy on Energy Security and Environment –*

perspective to 2020 (ESE 2020, 2014). The necessity of ES valuation is seen by the strategy as a challenge for water management. Also, tools allowing monetary valuation of regulating services provided by forests should be elaborated and implemented.

Another strategic document recognising ES is the *Programme of conservation and sustainable use of biodiversity along with an Action Plan for the period 2015–2020* (PCSUB, 2015), which includes the following directions of intervention taking into account the ES approach:

- assigning a socio-economic value to the ecosystems and the implementation of the green infrastructure concept as a tool allowing maintenance,
- strengthening of the existing ecosystems and their services.

Several other strategic documents on a national level allow to take ES concept into consideration; however, they do not use the term “ecosystem services” (Maczka et al., 2016).

As a result of European stimulus and a growing understanding among officials, the Ministry of Environment commissioned some expert elaborations. The mapping and assessment of ecosystems and their services on the national level were the most significant of them. This work, based on biophysical valuation, has been completed in 2015 (UNEP/GRID-Warszawa, 2015). However, the first concept of the countrywide study was presented a few years earlier (Mizgajski and Stepniewska, 2012). In parallel, the Ministry ordered a pilot study on the Mapping and Assessment of Urban Ecosystems for 10 biggest agglomerations in Poland (Mizgajski et al., 2015). As a result, the report of the MAES Working Group concerning urban ecosystem services (Maes et al., 2016) has taken the case study from Poland into consideration. Polish “*National Urban Policy 2023*” (NUP 2023, 2015) considers the results of Urban MAES for Poland, requiring local authorities to take formulated recommendations into consideration when they prepare studies and plans for spatial management. Since January 2015, the Environmental Monitoring Programme in Poland has been carrying out the mapping and assessment of ES in different types of ecosystems representative for Polish landscapes (see Kostrzewski et al., 2014). It is an action which allows elaborating operational indicators based on empirical biophysical data.

The *Act on Marine Zones of the Republic of Poland and Marine Administration* (Act on Marine Zones..., 1991) can be seen as the early bird of the adoption of ES terminology by national law. Generally, Polish legal acts do not use the term “ecosystem services”; however, the Polish legal system has the capability to incorporate this approach (Stepniewska et al., 2018). The absence of explicit ES terminology in legal provisions may not be a barrier for frontrunners of ES implementation, but it is not a stimulus for a broader uptake of the ES approach in decision-making. An indication of aspirations to expand ES into the law are the comments by the Ministry of Environment on drafting the Urban-Architectonic Code. Its official statement underlines the necessity to include the concepts of ES and the concept of green infrastructure into this act. Thus, the Polish policy is close to adoption of the ES concept into the law system. However, experts warn against the introduction of ES to legal acts using only general statements, without specifying a transparent and comprehensive vision of the incorporation of the ES approach into environmental policy. Such a tactic may result in the creation of regulations, which are too general and chaotic, and which would be difficult to use and ineffective (Stepniewska et al., 2017).

One can say that the process of the uptake of ES approach in Poland is growing gradually (Fig. 2); the European projects of applied research, as well as stimulus and efforts from the EU, play a key role in supporting this dynamic.

4. Perception of ecosystem services approach by practitioners

The survey has been carried out in June 2017 among participants of

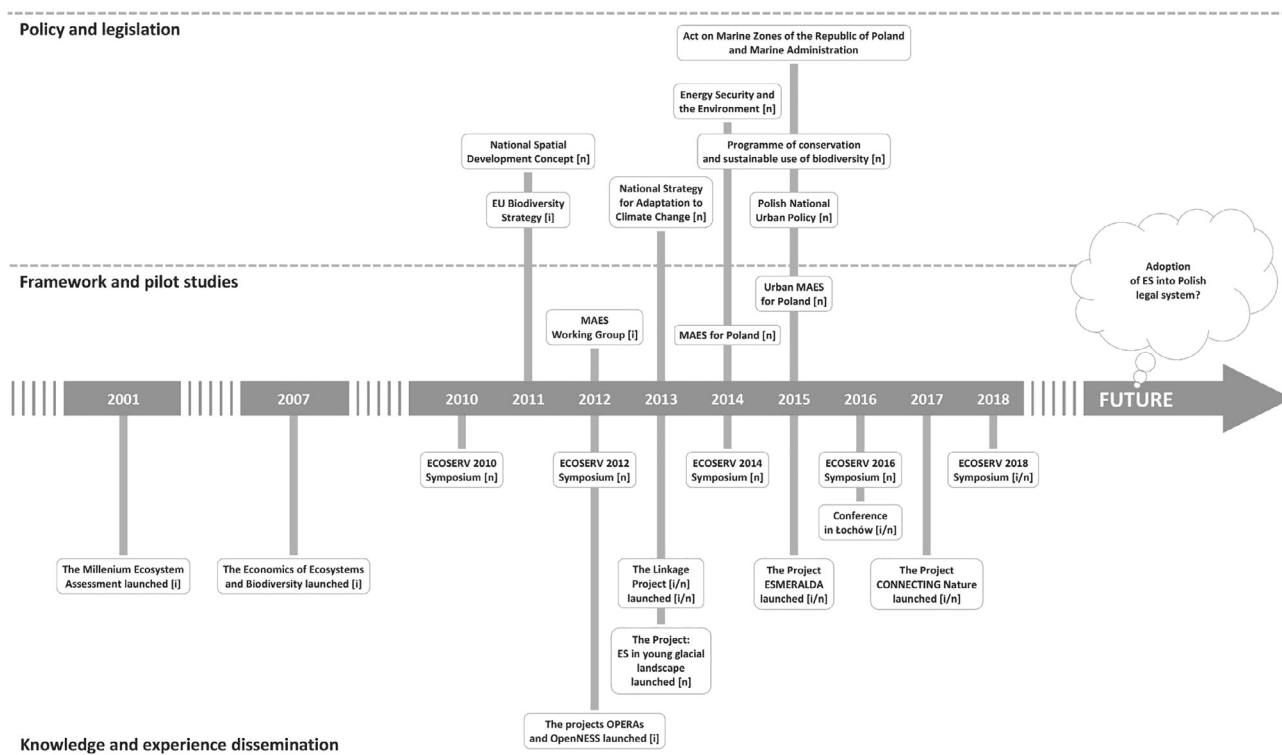


Fig. 2. Milestones for development of Ecosystem Services Approach in Poland [i] – international stimulus; [n] – national stimulus. Source: own elaboration.

the conference on the operationalisation of ES in spatial planning organised in Poznań. People participating in the research represented the regional level of administration of the Greater Poland Region as well as communes from this region. Most of the respondents were professional spatial planners (43 people). Twelve respondents dealt with another area of environmental management.

4.1. Knowledge dissemination

The conference “Ecosystem services in spatial planning” undoubtedly contributed to the dissemination of knowledge about ES, because nearly half of the respondents heard about this approach for the first time during this conference. Spatial planners at a regional level declared that they had previously heard about the notion of ES more often (60%), whereas, for officers working in communes, it was only 40%.

Thirty-two people answered a question about when they had heard about ES for the first time. The most important source of information about ES was science, including scientific conferences, academic education and scientific publications. Professional meetings and the Internet were sources of knowledge less frequently.

The structure of the answers on the both questions shows the importance of academic centres for knowledge dissemination. It also confirms the diagnosis that the practical implementation of ES concept in Poland is in an initial phase.

The questionnaire also included the question about benefits for people as a result of processes in ecosystems and their functions. It was addressed to professionals that had not heard about ES before. In total, the respondents indicated 48 examples of benefits. Depending on the degree of precision in the formulation of the answers by the respondents, we matched particular examples with the most possible detailed level of Common International Classification of Ecosystem Services CICES v5.1 (Haines-Young and Potschin, 2018).

Cultural services (42%) and regulating services (35%) were identified more frequently, whereas provisioning services were indicated by 23% of the respondents. In the case of cultural ES, the respondents

distinguished recreational and aesthetic values of ecosystems. Many studies show that the perception of cultural services results from their uniqueness and irreplaceability in a landscape (e.g. Plieninger et al., 2013; Stålhammar and Pedersen, 2017; Szűcs et al., 2015). The fact that the respondents perceived regulating services may result from their profession, because the issues of natural capital and its protection are basic determinants of spatial planning and environmental management. The low position of provisioning ES may be justified by the fact that they are usually goods that, in the case of relatively well-organised and accessible markets, may be obtained from various regions (Darvill and Lindo, 2015; Geijzendorffer and Roche, 2014).

4.2. The reasons for the implementation of ES in spatial planning

We asked about the usefulness of the ES approach in spatial planning using a 5-point Likert scale. We also asked the respondents to justify their choice. The answers of the respondents were grouped into nine groups (A-I, Fig. 3).

Most of the respondents attributed a very high or high importance to the use of ES in spatial planning (over 71% of answers). According to these respondents, the ES approach may support sustainable development, allowing its implementation through more effective environmental management. They also indicated additional premises for protecting the environment and preventing against environmental degradation by sensitising the society to the value of nature in their life. People treating ES as very important or important also expressed opinions that this approach may facilitate the valorisation of landscape and selection of areas for recreation. According to the respondents, the use of the ES approach while working out spatial plans may help decision-makers to recognise the effects of their decisions. Some participants indicated the potential of the ES approach for the Environmental Impact Assessment and for solving conflicts between stakeholders. It concerned mainly the issue of the pressure of development on flood plains of river valleys and areas of great natural value. According to the respondents, taking ES into consideration may contribute to an optimisation of the decisions thanks to the forecast of changes in ES supply

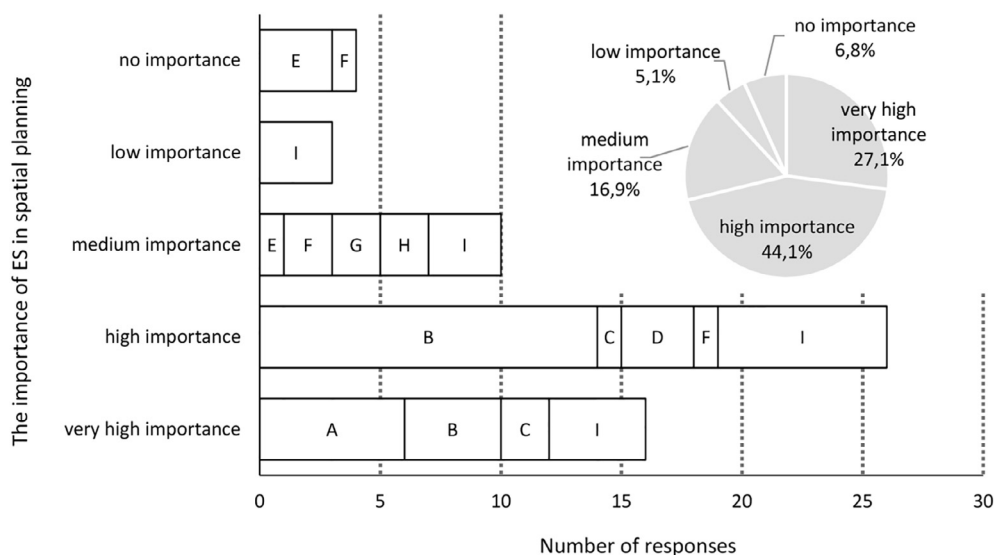


Fig. 3. The answers of the respondents to the question “Do you think that taking ES into consideration in spatial planning may be of practical importance? Why?”. A to I are groups created as a result of grouping answers justifying assessment (“Why do you think so?”): A – supporting sustainable development; B – additional arguments for environmental protection in decision-making process; C – assessment of investment impacts; D – solving conflicts between stakeholders; E – lack of transparent methodology of measuring ES; F – lack of legal regulations; G – lack of knowledge and insufficient education; H – it depends on goals and practices of decision-makers; I – no justification for assessment. The respondents could give more than one justifications for their opinion; thus, the sum of answers is higher than the number of respondents. Source: own work based on questionnaire survey.

for various scenarios of future land development.

The respondents who were sceptical for the ES concept emphasised problems with the operationalisation of this approach in environmental management at a regional and local level. They indicated the lack of legal regulations, which limits the application of ES in planning and decision-making procedures. Some respondents also indicated the lack of knowledge as a factor undermining the role of the ES approach. According to the respondents, decision-makers and the whole society do not appreciate the value of nature, underestimating its contribution to human well-being. The effect is ignoring natural determinants in favour of short-term economic benefits. The participants also raised the argument of the lack of acknowledged methodology of measuring ES. They think that this approach is unnecessary, because environmental conditions have been taken into consideration in spatial planning for a long time.

People who have heard about the notion of ES before more often attributed this concept no or low practical importance in spatial planning. It may be assumed that scepticism towards the ES approach is growing along with knowledge of problems related to its operationalisation.

4.3. The main barriers for the implementation of ES to spatial planning

A separate part of the questionnaire included an assessment of the importance of limitations in the implementation of ES to spatial planning. Previous investigations (Stepniewska et al., 2017) enabled to distinguish three groups of barriers: organisational & legal, lack of knowledge and lack of access to data. Apart from the mentioned barriers, the respondents would also take other barriers into consideration that they treat as important (Fig. 4).

Nearly 8 out of 10 respondents claimed that organisational and legal barriers are very important or important limitation for the use of ES in spatial planning. This field is, to a large extent, regulated by legal regulations; therefore, it is understandable that respondents more often indicated that the condition for using the ES approach by spatial planners is the introduction of such obligation to legal regulations.

The second key factor limiting the application of ES in spatial planning turned out to be knowledge about ecosystems and benefits provided by them. For 69% of the respondents, insufficient knowledge is a very important or an important limitation in the application of the ES concept. The results show a huge need of educational and training actions to support the use of ES in environmental management. The respondents claimed that these actions should be addressed not only to environmental managers and decision-makers, but to the whole society

as users of natural capital.

Access to data is a factor that, according to the respondents, limits the practical application of the ES approach to a lesser extent. It is a result of the development of a widely available database on the environment, including GIS resources and statistical data. However, there is still the issue of suitability and adequacy of such data for the purposes of ES analyses at various levels of environmental management (Burkhard and Maes, 2017; Lupa and Mizgajski, 2014; Martín-López et al., 2009; Zhang et al., 2013). It may be assumed that the barrier of access to data is underestimated due to lack of practical experience of the respondents in the ES analysis.

Other barriers for the implementation of the ES approach were indicated by every fourth respondent. The participants distinguished the lack of standardized methods, procedures and guidelines on ES quantification, unprepared personnel, marginalising environmental issues in development policy, politicised authorities and institutions as well as no willingness among decision-makers. As social barriers, the respondents mentioned conflicts of various groups of interests and low social awareness concerning environmental issues. Within the framework of economic issues, they indicated the lack of financial resources for the implementation of ES into practice, as well as the possibility of manipulation during ES monetary valuation.

5. Discussion – the determinants of ecosystem services operationalization

The outlined course of the MAES process in Poland and its interpretation contribute to the ongoing discussion on the implementation of the ES approach. The factors, which, in our opinion, are key to the course and quality of this process in Poland, are discussed below.

For scientific determinants of the operationalisation of the ES approach, we include in the first place the improvement of ES indicators, quantifications, maps and models (see also Burkhard et al., 2013; Grêt-regamey et al., 2017; Maes et al., 2012). The respondents who had prior knowledge of the ES concept expressed opinions that “knowledge of ES is insufficient”, and “there are no transparent and clear methods of measuring ES”. It is in conformity with the previously formulated view by the representatives of Polish administration and scholars dealing with environmental management that a methodological development for the mapping and assessment of ecosystems and their services is needed (Stepniewska et al., 2017).

As we have presented, the number of papers focusing on ES in Poland has increased substantially over the last years, which is a worldwide trend (see McDonough et al., 2017). However, the choice of

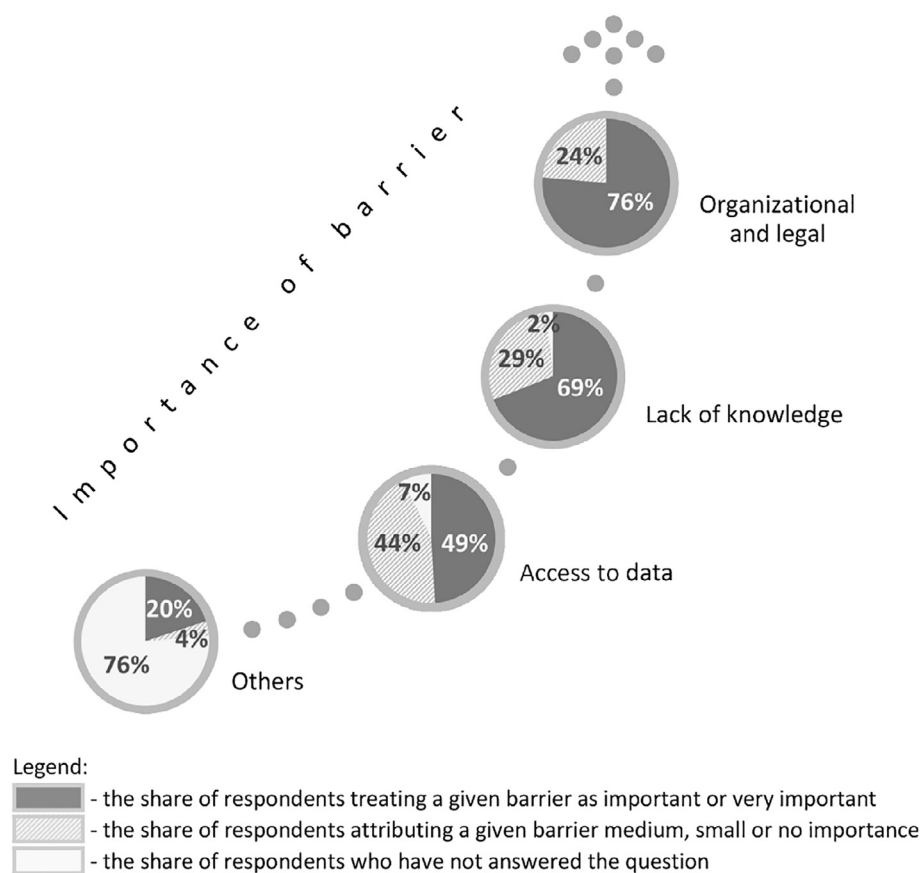


Fig. 4. The barriers for mainstreaming of Ecosystem Services Approach into spatial planning in Poland. The arrow indicates the increasing importance of barriers. Source: own work based on questionnaire survey.

topics still seems to be more dependent on the interest of the teams conducting the investigations as well as on data availability than it is on policy demand (Stepniewska et al., 2017). Moreover, decision-makers require methods and tools that balance quality and feasibility; however, those provided by researchers often do not fully link social, economic and ecological systems, they are too complex, too specific, and costly to use (Loft et al., 2015). The need to shift to a more practical relevant research is often stressed in the discussion on the operationalisation of the ES concept (e.g. Honey-Rosés and Pendleton, 2013; Keune et al., 2015; Spangenberg et al., 2015). The effects of an insufficient understanding of the demand for ES information by decision-makers can be seen in the statement of one of our respondents: “ES analysis is just typical art for art’s sake”. This confirms that, in practice, the implementation of ES requires a better reflection on the usefulness of different MAES products for solving the policy questions faced by potential end-users (Stepniewska, 2016). The results of our survey strongly support the statement of Sitas et al. (2014) that mainstreaming ES works well in practice when the focus is on “real problems, in real places, facing real people”.

The operationalisation of the ES approach requires a management component, which is connected with the translation of scientific findings into actionable knowledge and feeding information back into the natural capital management (Braat and Groot, 2012; Luederitz et al., 2015; Molnar and Kubiszewski, 2012). This ‘feedback loop’ between the mapping and assessment of ES and the subsequent management of ecological structure and functions is lacking in the Polish literature (ESMERALDA database, 2018; Santos-Martin et al. 2018). It leads us to a reflection that ES research contributes meaningfully to the management of ecosystems only when, apart from knowledge collection about ES, the investigations will show how to incorporate the ES approach into environmental management and what are the ecological, social

and economic benefits from using this approach. It is also important that a message from a particular study is tailored to the target audiences in a way they can understand it and link to their concerns and agendas (Sarkki, 2017). The requirements on how to communicate the results are still not considered in Poland in the discussion on operationalising ES concepts. Whereas, as Wright et al. (2017) highlighted, many currently applied formats of presenting ES information are valid for use in conceptual discussions, but only few support instrumental decision-making. As the format of ES information depends heavily on the contexts in which the information is intended to be used and on its specific function (Klein et al., 2016; Klein and Celio, 2015), only by engaging practitioners one can understand how information on ES should be packaged and communicated in the best way (Sitas et al., 2014).

There is no doubt that in order to employ scientific outcomes in decision-making processes, political willingness and a capability of decision-makers to adopt new concepts is required (Loft et al., 2015). As we have drawn up in this paper, the development of MAES processes in Poland is a hybrid combination of top down and bottom up efforts, i.e. EU policy and call for action as well as scientific endeavours concerning the development of ES research and passing ES knowledge to policy makers. Although policy makers and practitioners are still discovering how the ES concept can be beneficiary for them, the valuation of the natural capital has a long history in Poland (Stepniewska et al., 2018). The respondents who were sceptical to the ES approach said that they use environmental arguments in their professional work. The doubts concerning added value of the ES concept are illustrated in a statement of one of the participants: “All these environmental issues have already been taken into consideration in the process of spatial planning. Does the introduction of new notion give any notable effects?” Considering the benefits from ecosystems without using the ES terminology has been also reported for many other countries, which

entered to environmental discourses early (Böck et al., 2015; Hansen et al., 2015; Mascarenhas et al., 2015; Pittock et al., 2012). Thus, we agree with Albert et al. (2014a) that the added value of applying the ES concept depends on the type of environmental information as well as on the management systems already available. The key one is a critical, context-specific evaluation where and when the ES information is necessary in addition to the already existing data in order to justify the additional resources required.

Despite controversies concerning the relationship of the ES concept with previous approaches in environmental management, our respondents generally recognised a stronger integration of ES information into decision making as useful. The majority of them perceived low efficiency of traditional policy instruments in reducing the degradation of nature. The respondents stressed that, in most cases, economic profits are more important than the protection of ecosystems. Existing legal provisions that regulate the issue of, for example, protection of species do not have a greater significance in spatial planning. The participants acknowledged advantages of using ES information in the decision-making process, similar to stakeholders from other countries, in which discussions about the adoption of the ES concept in ecosystem management take place (see e.g. Albert et al., 2014b; Beery et al., 2016; Ruijs and Egmond, 2017). However, the results of our survey, as well as other studies (Maczka et al., 2016; ME, 2016; Stepniewska et al., 2017), suggest that in order to implement the ES approach effectively, it should be included in standard decision-making procedures. In this way, practitioners would have to apply these procedures in their daily work. Thus, lawmakers should adopt the ES concept into the legal framework.

The complexity of the MAES process makes it essential to establish an effective science-policy interface (Balvanera et al., 2012; Honey-Rosés and Pendleton, 2013; Olander et al., 2017). The importance of the flow of information and cooperation for the quality of the MAES process in Poland was emphasised by the representatives of science, administration and non-governmental organisations (Stepniewska et al., 2017). Active and on-going dialog among all stakeholders can be fruitful for a harmonious connection of decisions to be taken, understanding the timeframes, legal constraints, and limitations in obtaining, analysing and presenting ES information. Ruijs and Egmond (2017) emphasise that collaboration between stakeholders that are unfamiliar to cooperate with each other, work according to different procedures and objectives, requires developing a common language. While some authors pointed at the weaknesses of the ES concept due to its vagueness of definitions and classifications (see Schröter et al., 2014), others emphasise that multiple vocabularies allow to more effectively connect the scientific outcomes with those that stand to benefit from the research (Honey-Rosés and Pendleton, 2013; Mann et al., 2015; Verburg et al., 2016). In Poland, there is some degree of awareness of the benefits provided for human beings by ecosystems. Even the group of our respondents who has never heard about the ES approach before was able to name a range of benefits from ecosystems considered in their professional work. The uptake of the ES approach would be more effective if we used already existing professional jargon. Adherence to the rigid lexicon of ES terminology may make it harder to assimilate this idea. However, the ES notion should not be overly extended – e.g. to include all natural phenomena and processes – as it might become blurred as a result (Mizgajski et al., 2014).

It should also be remembered that mainstreaming the ES concept into policy and decision-making is no ‘silver bullet’ (Schleyer et al., 2015). As it cannot resolve all challenges connected with natural capital degradation, the expectations management is vital to avoid frustration of involved stakeholders. Our investigations showed that practitioners with prior knowledge of the ES concept had somewhat more critical views on the usefulness of the ES approach, which was connected with the recognition of its methodological limits and barriers in operationalisation (for similar results, see Albert et al., 2014b). Generally some critical views, and frequently positive attitude towards ES, could

be a base for a well-balanced and fruitful use of ES information in spatial planning and decision-making.

6. Conclusions

The results of the study show that the uptake of the ES approach in Poland is growing gradually. In the community of researches, it has been proven by a series of conferences concerning this subject, domestic research projects as well as an increase in the number of publications. Within the policy domain, the first heralds of the adoption of ES terminology to strategic documents and legislation emerge, whereas the process of practical implementation of ES is in its initial phase.

One can say that a desirable state would be that the mapping and assessment of ecosystems and their services is transposed in law and then implemented into environmental management, e.g. Environmental Impact Assessment and Strategic Environmental Assessment procedures. This requires political willingness, which determines the introduction of the ES approach into the legal system. Currently, the activity of the administration is more reserved compared to that of scientists and focuses mainly on the fulfilment of the formal requirements of the European Union. Thus, a motivating role for policymakers will certainly be played by the further adoption of the ES approach into the European Union policy, as well as interactions between the European Commission and the Polish government conducted within the MAES process.

Regardless of the policy determinants, a further methodological development in the scope of ES indicators and valuations is necessary, which will make the transposition of existing knowledge into an operational one possible. A better understanding of the demand for ES information by decision-makers is also of fundamental importance, especially the evaluation of context, in which the ES information is useful in addition to already existing data. This requires the establishment of an effective science-policy and practice interface, which will ensure the flow of information and cooperation for the development of the MAES process.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.ecoser.2018.08.010>.

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