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CASE STUDY

Analysis of legislative acts in water management

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ABSTRACT

BACKGROUND AND OBJECTIVES: This paper focuses on the development of Czech laws of water resource protection. The presented research examines the statistical data of the number and type of legislative acts concerning to water protection issued in the Czech Republic during the period 1990-2019. Several types of legislative acts are followed in administrative law and statistically compared by the development in time and its type. The survey focuses on general water protection acts, water sewage management, agriculture sector, hygiene standards, and the protection of the basins of Czech rivers (e.g., blue water and gray water).
METHODS: The analysis firstly concerns to the development of the number of legislative acts during 1990-2019 and secondly discusses a diversification of the legislative acts types (laws, decrees, resolutions, regulations, and strategic plans). A total of 12,272 legislative acts is analyzed during three phases of Czech modern history: 1990-1992 (Czechoslovakia), 1993-2003 (Czech Republic before its accession to the European Union), and 2004-2019 (Czech Republic in the European Union).
FINDINGS: Statistical elaboration of legislative acts proves that it is possible to determine different types of water management over time. Protection of water resource management in the Czech Republic was forming from crisis management (1990-1992), via operational management (1993-2003) to strategic management (2004-2019). Current trends after 2020 show a new trend towards integral management.
CONCLUSION: Findings provide better understanding of changeable importance of water protection and management attitudes in the Czech Republic in reaction to the development of society.

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INTRODUCTION

Environmental state protection can be monitored from the volume of individual laws and their impact compared to other regulations that accompany them (Keizer and Shapiro, 2019). The nature of the regulations reflects the quality of government decision-making (Povitkina and Bolkvatze, 2019). The statistical comparison of laws reflects the long-term quality of the government approaches to water conservation issues. The presented case study focuses on the development of Czech laws of water resource protection and statistically observes all Czech administrative and legislative acts about water protection (laws, decrees, regulations, resolutions, strategic plans) focusing on blue water (i.e., freshwater surface and groundwater), and gray water (i.e., polluted water, sewerage problematics). The study primarily focuses on the quantitative evaluation of legislative acts. The examined period of legislative acts (1990-2019) is divided according to the milestones represented by major political events in Czech history: 1989 (the end of the socialist regime), 1993 (the establishment of an independent Czech Republic), and 2004 (Czech accession to the EU). A comparison of the legislative processes in the surveyed stages reveals a different approach to water protection issue. A research question (Q1) asks whether there are differences in the relative statistical evaluation of all Czech adopted legislative acts documenting different approaches to drinking water protection management in individual periods (1990-1992, 1993-2003, 2004-2019). Statistical analysis of publicly available data has been chosen as a main criterion for evaluation of all administrative and legislative regulations associated with the protection of drinking water in the Czech Republic (Czechoslovakia) from public sources. The final evaluation of administrative law is based on 12,272 legislative acts. Table 1 presents the classification of legislative acts from 1945 till 2019 according to administrative sectors.

Relevant data for the observed period (1990 - 2019) were selected from the set of legislative acts of the Czech Law. According to political changes of the country, such as a split of Czechoslovakia in 1993 and the entry to EU in 2004, the presented approach uses a differentiation of three periods (1990-1992, 1993-2003, 2004-2019) for a relative data comparison. The international Water Exploitation Index (WEI) stands for a dependent indicator (Dikovitsky and Shishaev, 2019). The analysis is considering a relation between individual laws, e.g. how many laws has an EU Member State adopted from the EU administration. This kind of data analysis is applied much more often in political science, sociology of law and also in management. The applied method is based on modern trends in the sociology of law (DeGroot *et al*., 1994). Statistics in legislative acts and openly accessible meta data can be used to identify new multilevel dimensions of law (Dikovitsky and Shishaev, 2019). A quantitative survey of legislative acts and their comparison by the legislative type and the WEI indicator in observed periods is used for the analysis. Different approaches to water protection have been demonstrated by quantitative statistics. According to the mutual ratio of individual legislative acts in three periods, different approaches to water protection can be interpreted by using management tools. Discussions about functional models that are implemented in the management of public institutions evoke another issue. According to the current studies (Boin and Christensen, 2008), the public sector is focusing on new ways of managing and defining “public interest.” One of the factors

Table 1: Legislative Acts Classification Based on Administrative Sector

Administrative Sector (1945-2019)	Laws (including amendments)	Public regulations	Governmental decrees	All legislative acts
Environment	135	1036	470	1641
Water	58	198	60	316
Waste	42	112	50	204
Agriculture	289	894	572	1755
Forestry	39	131	85	255
Healthcare	256	736	511	1503
Other Sections	458	3456	2684	6598
Total	1277	6563	4432	12 272

shaping new management approaches is based on written documents guaranteeing a central role in the performance of the governmental power to the administration. Public management is inspired from private management in a way of "New Public Management". A view in one specific sector can survey several diverse goals and methods of public management. There is also a trend of empirical accounts of public institutions consistently identifying leadership as a crucial explanatory variable (Deverell, 2012). The division of management into crisis, operational, and strategic components means that a sustainable and responsible organization can be maintained. A similar management process in the number of decisions on a specific topic can be observed in a legislative act within the EU. One of the criteria for dividing management into crisis, operational or strategic is the volume and type of legislative acts issued in the specified sector. Therefore, this approach also applies to political decisions professionally driven to solve real problems. Water supply as well as the policy of protection of drinking water resources in today's state are subjects to professional supervision. The protection of water resources in democratic states is not burdened by the ideology but rather by maximalization of the "public good" protection (Schmidt and Matthews, 2017). The aim of the current study is to find out whether there are statistical differences in all adopted legislative acts regarding to water protection topics demonstrating different approaches towards drinking water protection management. The study was performed in the Czech Republic for three time periods (1990-1992, 1993-2003 and 2004-2019).

Background of water protection in postwar Czechoslovakia (1945-1989)

A specific political interest for protection of water resources did not exist in Czechoslovakia after 1945. Subordination of water protection to economic and industrial development was expressed after 1948 by so-called Five-Year Plans where water was primarily defined as a secondary raw material for industry or agriculture. Furthermore, the socialist system did not deal with this topic in any detail (Palát *et al.*, 2010). Several partial decrees of the Czechoslovak Government were the first impulses of water protection in the early 1950s. The construction of waterworks and water supply municipal and agricultural networks was massively supported as an indicator of improving the local economy and life in a centrally planned economy. In line with this upward trend, the need for conceptual management of natural resources arose in the middle of the 1950s (Nesiba and Smolik, 2019). The first specific laws (Czechoslovakia Act No. 1/1955, Act. No. 11/1955, Act. No. 25/1955) regarding to nature and water protection were approved that time together with the declaration of the first National Nature Parks of Czechoslovakia (e.g., "National Park of High Tatras" proclaimed by the Slovak National Council in 1948). Subsequently, the National Assembly of the Republic of Czechoslovakia issued the State Nature Protection Act No. 40/1956 on August 1, 1956. Only nineteen paragraphs however dealt with the protection of nature and the water management of Czechoslovakia insufficiently. The law continuously introduced specific sanction mechanisms for the control. This first approach towards protection can be called as a "passive" legislation, with a very small strategic framework. Other national parks and a network of protected landscape areas were gradually created. Nature protection was subsequently issued in the Constitutional Act of the Czechoslovak Republic in 1960 where it was defined by the public property – primary forest fund, watercourses, and natural healing resources (Czechoslovakia Act. No. 100/1960). Several ecological disasters, such as the release of poisonous substances into water or air, are associated with the lack of control at that time. It became apparent from the 1960s that the laws and institutions of the 1950s were no longer sufficient to water protection. Simultaneously, new scientific findings were made on the ecosystems function (Carson, 1962). Even the United Nations began to establish nature protection departments. These ideas became popular political themes across national borders so-called "Iron Curtain." Environmental problems that required a comprehensive approach have been gradually accepted as a topic of international meetings during the Cold War. After the first environmental conference in Stockholm in 1972, the strategic document "Action Plan" concerning to the environmental protection and defining the framework for the future joint action of the international community, including the Czechoslovak Socialist Republic, was adopted. The UN General Assembly followed up the Stockholm Conference by adopting several resolutions to

address among other things the absence of a more substantial institutional background. That is why the first-ever UN coordinating, consulting, and expert body dedicated to environmental protection, the UN Environment Program, was created. Water protection became a public issue across the international environment. The environment began to be so damaged by massive production that the public started to control political actions and approved laws in this regard. New scientific findings and models of development also served as a basis for the Stockholm Conference (Meadows *et al.,* 1972). In connection to this development, some associations were naturally engaged in nature conservation in Czechoslovakia (e.g., the "Slovak Union of Nature and Landscape Conservation" was established in 1969, and the "Czech Union for Nature Conservation" was established in 1979). In the 1970s and 1980s, the Government established majority of protected landscape areas and national parks (in function till nowadays). In 1978, the "Ecological Society" was established at the Academy of Sciences. The protection zones of drinking water were increasing together with the development of towns and their supply management. In the second half of the 1980s, water protection has become a society-wide standard with more explicit rules and sanctions of limited managerial instruments under the socialist regime. The Five-Year Plan of the Czechoslovak Socialist Republic in 1986 committed to expand and protect all water sources as well as to ensure water protection against pollution (Czechoslovakia Act. No 81/1986) were however insufficient. The actual strategic nature and water conservation planning did not exist. Therefore, it was necessary to pass completely new laws to protect water after the fall of the communist regime in 1989. The emergence of completely new laws after 1989 demonstrates a deep change in the water management style.

The phase of crisis management (1990-1992)

The period 1990-1992 asked for a big change in the approach to water protection. Proposition of new laws representing a complete change the way water protection is approached quickly emerged. Crisis management is defined as the identification of threats to an organization and its stakeholders and it requires decisions to be made within a short time frame (Bundy *et al.,* 2016). It should prevent the crisis itself or respond to the first signals of the coming problems (Kouzmin, 2008). Another definition evaluates crisis management as a process of crisis identification and the enterprise's subsequent stabilization (Pedersen *et al.,* 2020). Crisis management manifests in more practical steps rather than theory and it is therefore necessary to look for clear criteria of crisis and crisis management (Deverell, 2012). During the period of crisis, increasing communication, and one-way direction of orders to solve problems can be observed from top to bottom (Frandsen and Johansen, 2011). The crisis means that new and precisely targeted legislative acts are being issued. Czechoslovak legislative acts were not sufficient to protect nature and water which resulted in increasing volume of approved legislative acts. In order to protect nature as quickly as possible, there was a pressure to intensively adopt many laws in the shortest possible time. During 1990-1992, a political representation, a civic movement, and a specialized institution for nature protection were established. After an insufficient approach of the socialist government, pressure on water protection standards in Czechoslovakia emerged. Many laws, regulations, or restrictions had been created to replace the unsatisfactory socialist norms. Specialized environmental institutions were established, e.g. the Ministry of the Environment. From all legislative acts of that time, the "Nature and Landscape Protection Act" (Act No 114/1992) is the most significant document. It defined protected areas as well as sanction mechanisms. Its quality is demonstrated by the variations of this law till nowadays. During the whole measured period (1990-2019), the most legislative measures on average per year were carried out.

The phase of operational management (1993-2003)

Before the establishment of the independent Czech Republic (1.1.1993), it was directly settled into the principle of the Czech Constitution that this supreme law protects natural resources and their careful use (Czech Republic Act No. 1/1993). The Charter of Fundamental Rights and Freedoms in the Czech Republic states that everyone has the right to a favorable environment and the right for complete information on the state of the environment and natural resources (Czech Republic Act No. 2/1993). A new conceptual direction of nature and water protection began to emerge. This approach can be

called as operational management, generally capable of rapid change. Operational management is involved in coordinating and developing new processes while reevaluating current structures. Operational management enable a gradual transition from one management style to another, depending on the conditions, within a time frame of three to five years (Ansoff *et al.*, 2019). This situation occurred with the Czech Republic's accession negotiations to the EU. Due to the adopted legislative acts, Czech legislative acts moved to a harmonization stage with European law. Therefore, this transition can be observed as operational management. In the second half of the 1990s, there were two political tendencies in the Czech Republic concerning to water protection. On the one hand, privatization of waterworks took place, on the other hand, the adoption of European laws happened. Mass privatization of Czech municipal (regional, state) waterworks took the effective control instrument away. Public political power lost the opportunity to effectively manage waterworks in large part of Czech cities (Nesiba and Smolík, 2018). This situation was overwhelmed by the Czech future membership in the EU. The politicians focused on operational management and Czech and European law needed to be operationally harmonized. Therefore, at the end of the 1990', the gradual implementation of operative management in the whole system of legislative standards could be observed. Operational management manifested itself in several European operational regulations that were growing. The effort to unify with European water protection law was also based on the experts analyzes of the time (McAdam *et al*., 2011). Several legislative acts concerning to the EU requirements (Council Directive 98/83/EC, 2000/60/ES, Czech Republic Act No 258/2000) have been approved. It was a parallel process together with harmonization of European legislative standards. The obligation to change basic national standards for wastewater management upon accession to the EU was a typical example that required changes in principal legislative Acts in the country (Council Directive 91/271/EEC, Czech Republic Act No. 185/2001, Act No. 254/2001, Act No. 274/2001). These laws were followed by several changes that clarified the paragraph wording and responded to the needs of water protection (especially with the development of new technologies and industrial risks) (Czech Republic Act No. 20/2004). Among other dozens of standards concerning to water protection, it is necessary to mention the Act introducing protection into the Czech legislation within the framework of the Natura 2000 system (Czech Republic Act No. 218/2004). Generally, the Czech Republic has committed itself to complete the harmonization of water protection into EU legislation as a condition for Czech accession to the EU which also concerned the unification of water protection conditions, namely Annex V, Sections 7b-7c.

The emergence of strategic management (2004-2019)

Strategic management relates to long-term planning. An important factor in strategic management is the precise setting of goals and timeframe. Strategic planning is considered as the cornerstone of any organization, and the institution's strategy also forms the entire structure of the organization (Menguc *et al*., 2010). It is common for all strategic management theories to define objectives and goals and to determine how to achieve them (Gleeson, 2019). Empirical studies confirm that strategic management is the most comprehensive management tool in SME enterprises (Zeemering, 2018), corporations (Monday *et al.,* 2015) as well as public sector (Joyce, 2015). In the case of strategic management, specific and measurable goals are set because they can be compared with the actual situation after the specified time has elapsed (Ansoff *et al.*, 2019). The stability of the main legislative documents in terms of a larger space for their regulations and interpretations is one of the criteria (Menguc *et al*., 2010). This approach is called as sustainable and responsible management (Bryson and George, 2020). After the Czech Republic accessed to the EU in 2004, water protection has been gradually becoming a public topic. It is also a phase of decline of legislative acts and the growth of strategic plans. The number of legal standards has gradually increased (Directive 2006/11/ES Directive 2006/118/EC). Compared to previous periods, a more significant number of legislative measures concerning to the strategic interests of the Czech Republic were approved. Discussed topics of environmental security, food security or strategic national security relate to the protection of water resources and water systems. The surveyed period (2004-2019) is characterized not only by law-making but mainly by national government decrees, public regulations, and strategic plans (Palát

et al., 2010). Several impulses have contributed to the policy of strategic decision-making for water protection management in the Czech Republic as an EU member from 2004. The European Commission sets goals and plans for next five years for each policy sector. Moreover, a multiannual financial framework of the EU (so-called seven-year budget) was set for periods 2000-2006, 2007-2013, 2014-2020. So far, in each programming period, one line was devoted to water protection issues. The second impulse came from scientific research published to investigate the global impact of climate change and the rise of green policy; e.g. "Stern Report on Global Warming on the Impact of Climate Change on the World Economy" and "Fourth Assessment Report of the Intergovernmental Panel on Climate Change" received considerable public attention. For this purpose, many Czech expert platforms have been created to inform the general public about ongoing measurements. The third impulse can be seen in the framework of the United Nations global policy. The UN documents such as the "Paris Climate Change Agreement" of 2015 and the subsequent commitment approved by the UN General Assembly entitled "Transforming our world: the 2030 Agenda for Sustainable Development" are among the most critical decisions. At the heart of this document, the indicators embodied in seventeen "Sustainable Development Goals" are calling for strategic planning of water protection. The number of laws is declining but the number of government regulations, public regulations, and strategic plans is increasing. Strategic plans are the sub-legal norm as an effective instrument for private and public institutions. The goal-setting theory proposes that organizations with set goals perform better as their activities and resources are focused on addressing core issues and employees can understand the firm priorities (Jung and Lee 2013; Locke and Latham, 2002). Studies confirm managerial strategic planning as the most effective instruments (George *et al.*, 2019). Based on the UN decision, the Czech Republic adopted a strategic framework for strategic planning until 2030 (Government Resolution No.292/2017). It had been followed by a long-term preparation process (consultations between political representatives, experts, and the general public) that resulted in the "Implementation Plan of the Czech Republic Strategic Framework 2030" (Government Resolution No.669/2018) and "Implementation the 2030 Agenda for Sustainable Development" (Government Resolution No.670/2018). The "Agenda 2030" was therefore adopted in the Czech Republic. Currently, the Czech Government has approved several types of following strategic plans:

- umbrella strategy papers (12),
- strategic plans and concepts (185),
- implementing strategy papers (82),
- following strategy papers (5)

The number of the strategic documents is increasing as observed by the State Program of Nature Conservation and Landscape Protection of the Czech Republic (2009), Waste Management Plan 2015-2024 (2015), Environmental Security Concept 2016-2020, with a view to 2030 (2016), Czech Republic Action Plan for the Development of Organic Farming 2016-2022 (2016), Concept for the protection against drought consequences for the territory of the Czech Republic (2017). Since 2019, water protection has affected 24 strategic plans, although many of them collide with strategic plans. For the last years, the construction of the Danube-Oder-Labe canal is being prepared in the Czech Republic. It is a case where strategic water protection documents and transport strategies directly contradict each other (Palát *et al.*, 2010). A new type of management is needed to set priorities after 2020.

Situation after 2020

The situation in this area is changing rapidly due to the trends in social and political development in the Czech Republic. Global climate change, temperature, drought, soil quality and ecological problems affect water management in the Czech Republic (Kavan *et al.*, 2021). Restrictions resulting from the pandemic Covid-19 have only frozen this situation for a while, but development trends start to show the need of the Czech government to move to legal action again (towards crisis management). This situation can be documented not only by political decisions. From the regional level, there is a tendency to buy out privatized waterworks back from private sector (municipality, regions, e.g. statutory city Plzeň in 2018, Liberec in 2019, etc.). A number of parliamentary political parties in the Czech Republic are supporting the possibility of amending the entire Constitution of the Czech Republic where water protection rights

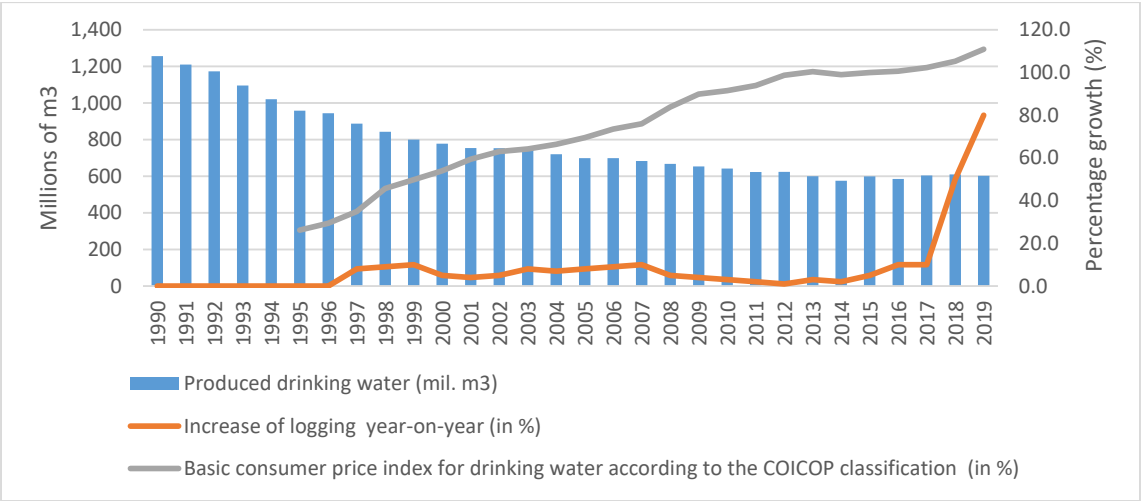


Fig 1. Proportion of drinking water production, prices index and logging

would be defined more strictly. Public regulations and governmental decree are no longer enough, in fact, many of these lower legislative acts are stopped by the Czech Constitutional Court (Judgment of the Czech Constitutional Court 261/2018, 2018). A tendency towards new legislative is accelerated by the current issues in the Czech Republic, namely crisis in forestry called a "bark beetle calamity". The entire Czech Republic must preventively cut down the forest fund against the danger of "bark beetles". The area of forests in the Czech Republic therefore decreases dramatically since 2019. This pushes the cost of water management up because natural cleaning is no longer sufficient (Křeček *et al.*, 2021). As demonstrated below (Fig. 1), the share of drinking water decreases but the price increases (due to the consumer price index according to the specific COICOP methodology). Simultaneously, production of drinking water is decreasing due to lower economical demand.

Developments are moving forward political solutions through new and stricter laws that address the cost and scarcity of water. More than the issue of wastewater treatment itself, the attention is shifting towards the protection of the forest fund and nature overall.

MATERIALS AND METHODS

Survey design and data collection

The research is set to analyze the legislative measures adopted between 1990-2019. These analyzed legislative acts include:

- Laws passed by the Czech Parliament
- A government decree issued by the Czech Government (according to article 78 of Czech Constitution)
- Public regulations issued by the Ministry (according to article 79 of Czech Constitution)
- Governmental resolutions
- Czech National Strategic (Action) plans

The presented study of the legislative measures related to water protection was carried out based on online public sources (collection of laws of Czech Parliament, collection of government resolution and decrees from official websites of Government of Czech Republic, Collection of Public regulation from non-profit organizations' web pages). Firstly, this study gathered all relevant administrative laws dealing with water protection in the Czech Republic. The time frame of 1990-2019 was divided into three stages based on significant political events in past that influenced the legislative action specified for this framework, e.g., period 1990-1992 (after the end of the socialist regime and the current Czechoslovak state), period 1993-2004 (establishment of independent Czech Republic) and the period 2004-2019 (after accession to the EU). The research focused on two sub-questions (SQ):

SQ1: How does the total number of legislative measures in the Czech Republic in each period change?

SQ2: How do the ratios among laws, government decrees, and public regulations at the administrative, and legislative levels change?
The hypotheses are set as:
H1: When the number of laws in the given period increases, it refers to crisis management principles.
H2: When the number of laws decreases, it refers to the principles of strategic management as the number of government decrees, public regulations, and strategic plans (with a clearly defined time frame) increase.

The presented study does not examine water quality (such as contamination or protection methods). The survey is methodologically incorporated with Law and Management Approach that explores legislative opportunities and managerial strategy. Societies can optimize their management legally and develop strategies that give them a competitive advantage (Roquilly, 2009).

RESULTS AND DISCUSSION

Overall, all types of legislative acts can be evaluated on the resulting figure that is compiled from 1948 to 2019. Fig. 2 illustrates the gradual change of the legislative acts.

Apart from these absolute numbers, a different comparison can be observed by a look at the relative numbers, i.e. with respect to the yearly averages. Following Fig. 3 demonstrates the gradually increased number of legislative measures. The statistic sum represents the total number of all legislative measures (laws, government decrees, public restrictions) and the year average, i.e., how many water protection standards in the Czech Republic were approved in relative numbers.

To answer the Q1, the number of legislative acts was increasing gradually on yearly average. In the first examined period 1990-1992, the average is three legislative acts per year. In the second period 1993-2003, 3.4 legislative acts are calculated as the average per year. In the last period 2004-2019, the average increased to 4.7. It can be stated that the adoption of legislative acts in 2004-2019 was mean the most often. Different situation occurs if having a look on type and character of legal norms (Dikovitsky and Shishaev, 2019). Administrative laws are issued as the highest regulatory conduct of the state. The number of laws in one area indicates the urgency of solving an issue and it can be deduced that the area shows the need for a crisis management approach. Therefore, in a longitudinal comparison, if more laws are issued for a specific sector in a certain period, it represents an attitude of crisis management. In the case of ambiguity of specific laws interpretation, insufficient law, or preparation of new laws, government decrees are issued. That is a situation of an operational solution (e.g., harmonization of the interconnection of several management sectors). If the number of laws decreases but the number of Government Decrees increases, it is a situation of operational management (McAdam *et al.*, 2011). To continue, if the number of government regulations in a given

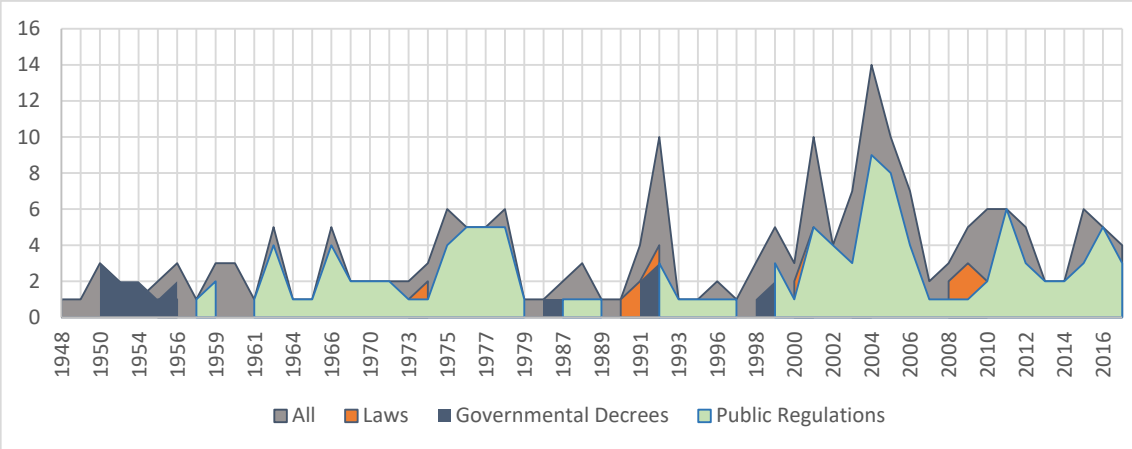


Fig. 2. Legislative acts about water protection in Czech Republic 1948-2019

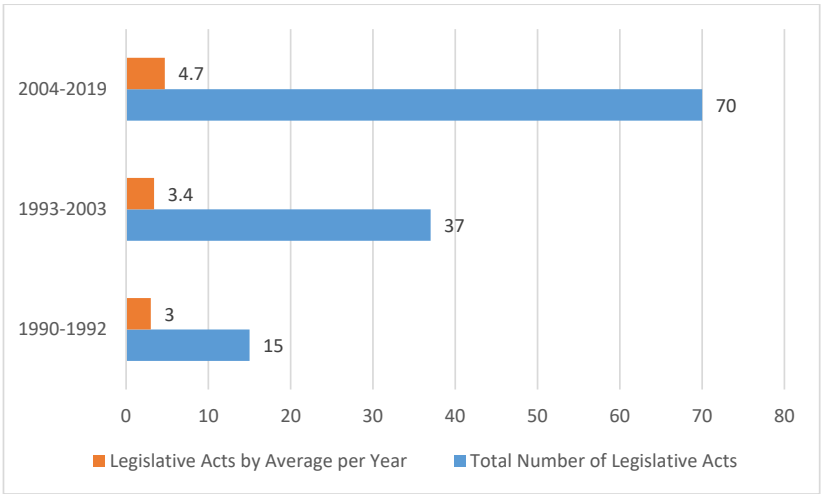
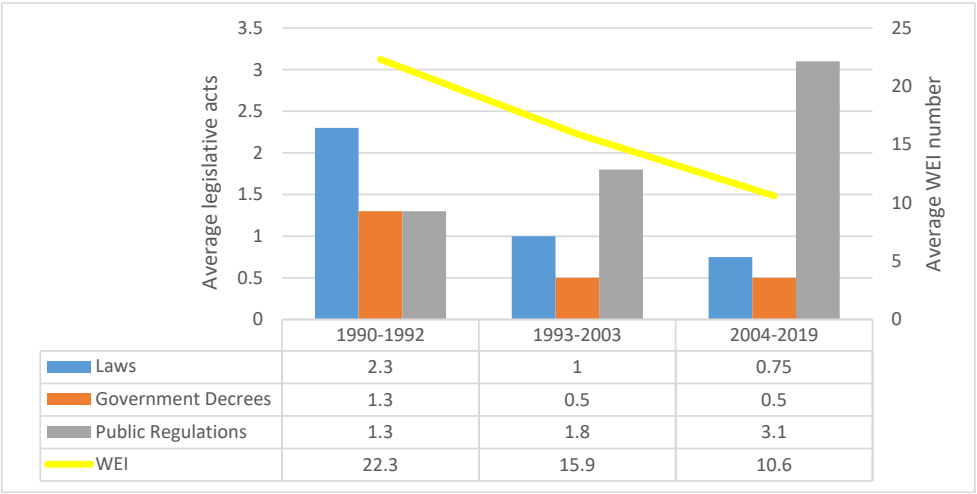


Fig. 3. Increasing number of all legislative acts (laws, government decree, public regulations)



	1990-1992	1993-2003	2004-2019
Laws	2.3	1	0.75
Government Decrees	1.3	0.5	0.5
Public Regulations	1.3	1.8	3.1
WEI	22.3	15.9	10.6

Fig. 4: Changes in legislative acts (average per year) and Water Exploitation Index (WEI)

area decreases but the number of Public Regulations of individual ministries regulations increases, this is another level of management. If the number of national strategic documents grows in this situation, strategic management is demonstrated. The type of legal norms varies according to the political attitude to water protection. It shows the result of the proper legislative acts diversification among other acts in every period and their comparison. The change in the legislative approach is confirmed by the WEI which has been measured by European institutions since 1990. Decreasing WEI indicators identify more responsible and strategic approach to water use in the Czech Republic and correspond to presented average-per-year number of legislative acts (Fig. 4).

Laws

The findings show the most significant number of laws in the period 1990-1992. The lowest number of other legislative acts (decrees, regulations) was passed. Contrary, in the years 2004-2019, the number of laws decreased, and the number of implementing

regulations, government decrees, and public regulations increased. The ratio of laws to regulations and decrees was high in period of crisis management. The function of law is more valid than in terms of decrees or regulations (Schmidt and Matthews, 2017). There is no need to implement the law accurately and adapt it to the changing conditions in a crisis. In the period 1993-2003, the number of laws is declining. These laws were passed in line with EU interests as Czech laws were operationally adapted to European norms. This attitude towards water protection can be called as operational management. In the period 2004-2019, the situation was changing and laws were not issued so often. However, the regulations and decrees gained importance as part of strategical (action) plans.

Government decrees

The government decrees were 1.3 at the yearly average from 1990 till 1992. From 1993 till 2003, the average was reduced to 0.5. This average volume remained the same in the following period 2004–2019. As defined above, this trend illustrates the operational management. Czech legislative acts were implemented with the interest of harmonization with the European law upon the Czech Republic's accession to the EU.

Public regulations

The average number of public regulations in the monitored area proliferated due to both laws and governance decrees. Between 1990 and 1992, the average was 1.3. It gradually increased to 1.8 in the next monitored period 1993-2003 and the average reached even 3.1 in the last period after 2004. That indicates a change in the approach to water protection towards the operational management. However, combined with the fact that strategic national plans are growing in the same period, the role of strategic management should be considered. It was confirmed that the total sum of legislative acts for water protection in the Czech Republic has been increasing from 1990 till 2019. The research positively answered the research question (Q1), whether other types of management for water protection can be found in the statistical evaluation of legislative acts on bird protection. Different management methods can be indicated in the three monitored periods - crisis, operational and strategic management approach. To answer how the number of legislative acts has changed (SQ1); crisis management during 1990-1992 focused on the most potent policy instrument, namely the passage of laws made by Czech (Czechoslovakia) Parliament. Crisis management manifested itself in an attempt to politically change the overall public attitude to water protection in Czechoslovakia. The governmental laws were the common instrument (Roquilly, 2009). On the other side, the least sub-legal standards (Government Decrees, Public Regulations) were used (and any water protection strategy was not formulated at the same time at all). In the following period 1993-2003, the number of governmental decrees and public regulations increased due to the implementation of Czech laws. These were adopted due to the accession negotiations with the EU. Government regulations and public ordinances clarified the new laws to be harmonized with EU law. In the last period 2004-2019, the number of laws was decreasing but the number of strategies and strategic plans was simultaneously growing. It was also shown (SQ2) that in the monitored time, the ratio between individual legislative norms changed, and the number of implemented regulations (government decrees, public regulations) to the already existing laws increased. Moreover, the number of Czech strategic plans has proved to be presented. The research findings demonstrate the development of approved legislative acts. The relationship between laws, regulations and decrees can refer to three types of management - crisis, operational and strategic. These types of management can be assigned to the three stages of legislative development in the Czech Republic by a qualitative evaluation. Crisis management was characterized by the accelerated passing of laws in 1990-1992. Operational management was characterized by an effort to harmonize Czech and European standards in the years 1993-2003. That created an emphasis on the operational alignment of Czech laws with European legislation and the number of government decrees and public regulations increased. In the years 2004-2019, the number of laws decreased but contrary, the number of strategic plans as the basis of strategic management increased. During this period, there were tendencies towards strategic management of water protection in the Czech Republic. After 2020, there is a new period of legislative development in drinking water protection. The Czech Republic is a country with specific location in Europe. No river from foreign territory flows into the Czech Republic. Therefore, water protection is related to the overall protection of

nature (Kavan *et al*., 2021; Křešek *et al*., 2021). Forests in the Czech Republic are now being deforestrated due to the "bark beetle calamity". Therefore, water management in the future should take into account the overall concept of nature and forest protection. The closest characteristic in the field of management is the so-called integral management that combines strategic plans with the creation of specific laws. The incorporation of the protection of drinking water into the Constitution of the Czech Republic is the first and currently happening step.

CONCLUSION

The types, quantities and mutual ratio of legislative acts dealing with water protection are changing in the Czech Republic. The presented analysis examined and evaluated 12,272 legislative acts. The changes in legislative acts correspond with different attitudes towards water protection and water management. As quantitative research standards in the Czech legislation has shown that there have been changes corresponding to three types of management (1990-1992, 1993-2003, 2004-2019). These legislative changes reflect the development of society and correspond to the overall social changes in the approach to nature protection. From a quantitative point of view, these approaches to nature protection can be linked to a qualitative approach where three different stages of water protection in the Czech Republic - crisis, operational and strategic management can be named. In conclusion, the recommendations for future development are delivered. A new type of integrated management should be implemented in water protection decision-making. This approach will link both strategic documents (so they do not contradict to each other), as well as these documents will be associated with the creation of specific laws. Public regulations and governmental decrees will serve as channels for the transfer of information between the strategy and the legislature.

AUTHOR CONTRIBUTIONS

J. Nesiba prepared the research design, analyzed and interpreted the data. R. Cuhlova performed the literature review and prepared the manuscript text.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

ABBREVIATIONS

COICOP	Classification of Individual Consumption by Purpose
e.g.	For example
et al.,	And others
EU	European Union
Fig.	Figure
i.e.	That is
SQ	sub-question
SQ1	Sub-question 1
SQ2	Sub-question 2
Q1	Question 1
UN	United Nations
WEI	Water Exploitation Index

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