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HYDROGEOLOGICAL AND LEGAL ASPECTS OF DROUGHT IN POLAND[1]

Abstract

The issue of drought is an interdisciplinary and multifaceted topic. Two disciplines, in particular, that have an interest in solving the problem of drought are hydrogeology and law. These two seemingly distant disciplines have to work closely together in order to find the right tools to solve the problem of drought. In order to possibly prevent its occurrence and, above all, to counteract its effects, interdisciplinary cooperation is needed not only between the world of science, but also between public authorities, entrepreneurs, and citizens. One important aspect is the preparation of a legal framework that can ensure maximum action related not only to eliminating the effects of drought, but also to its prevention and the role of public administration in this process.[2] However, in terms of possible solutions, lawyers need the expertise that only hydrogeologists can provide.

[1] The article was written as part of the Green Dialogue Platform at the University of Warsaw.
[2] M. Jabłoński, *Prawno-administracyjne aspekty ochrony wód w Polsce*, "Studia Ecologiae et Bioethicae" 2011, Vol. 9/4, pp. 49-62.

KEYWORDS

drought, legal aspects of drought, hydrogeological aspects of drought, Water Law

SŁOWA KLUCZOWE

susza, prawne aspekty suszy, hydrogeologiczne aspekty suszy, prawo wodne

This article will present a hydrogeological and legal analysis of drought in Poland, covering the most important issues related to drought prevention and control. It does not exhaust the whole issue, but is only a contribution to identifying fields of cooperation, as well as a scientific discussion and public discourse. Awareness of drought problems is becoming widespread, although there are still few solutions to minimise its effects. Drought has also recently become an element of education at all levels. However, knowledge, dissemination of information, and accessible presentation of research results are needed to awaken properly targeted awareness, initiating action at the global or individual level.

One of the main further research questions is how comprehensive regulation of drought prevention is possible. The study calls for the need to amend the Water Law in line with EU law, in particular, the European Water Directive. In addition, other legal acts that deal with water management in the broadest sense should be examined. In this respect, the question arises whether we can create a legal water management system that prevents natural disasters such as drought.

Another research question is how to standardise the drought phenomenon in research and decision-making. Are the current regulations sufficient to protect citizens and above all farmers from the effects of drought? The creation of an adequate system of economic security, including credits and compensation and the speed of their awarding[3] is a challenge not only for legal researchers, but also an important issue in the field of property insurance. Solving or mitigating the drought problem significantly impacts the issue of food security. Without an appropriate legal standard and solutions based on hydrogeological knowledge, we may end up not only with a climatic disaster, but also with food shortages.

Finally, the research question is also to what extent can public authorities interfere with private property ownership in order to prevent drought and later to counteract the effects of drought? What is required is the development of a legal framework that allows state authorities to act quickly and in a relatively conflict-free manner, also on private land. At the same time, this requires the creation

[3] P. Mikos, *Szybciej zostanie stwierdzona susza rolnicza*, "*Tygodnik Poradnik Rolniczy*", 2019, No. 18-19, pp. 780-781.

of a broad system for the protection of property rights and a system to compensate for possible violations.

WHAT IS DROUGHT - HYDROGEOLOGICAL AND LEGAL CONSIDERATIONS

Drought is a multifaceted phenomenon, with physical and social dimensions, of universal significance and yet difficult to define. In law, there are several interpretations of the term or terms from which the meaning of drought can be derived. However, these are formulated for the purposes of specific legal acts, so their universal applicability is impossible. At the same time, the decoding of drought norms requires the application of systemic and sometimes even functional interpretation. The lack of an unambiguous legal definition of drought poses problems in determining exactly what constitutes a drought.

According to Article 3(1)(2) of the Act of 18 April 2002 on the state of natural disasters,[4] drought is defined as a natural catastrophe (an event related to natural forces) that can escalate to a natural disaster.

The Communication from the Commission to the European Parliament and the Council on addressing the challenge of water scarcity and droughts in the European Union, (COM(2007) 414), and in the text of the Report on the Review of the European Water Scarcity and Drought Policy, (COM(2012) 672), considers drought to be a natural phenomenon, i.e. a temporary decrease in water availability linked, *inter alia*, to the lack of rainfall. "Drought is a continuous phenomenon, regional in extent and means the availability of water below average under certain natural conditions" (https://www.imgw.pl/). At the same time, it is a soft law act that does not directly affect the application process of the law.

The definitions in the legislation are inconclusive as to whether drought is an extreme natural phenomenon or is already a disaster. For the most part, it is treated as a natural phenomenon, regional in scope, manifesting itself as a temporary reduction in water availability (below average under certain natural conditions). However, if water availability is linked to anthropogenic causes, the phenomenon itself may also be a consequence of anthropogenic pressure. The overlap in the timing of droughts with existing water shortages very often determines the occurrence of extreme droughts in terms of their intensity as well as their duration. Over-exploitation of water, drainage and melioration systems as well as mining activities can cause temporary or permanent water shortages, but by definition do not constitute a drought. A major influence on the occurrence and development of drought is the so-called anthropogenic transformation, which

[4] Act of 18 April 2002 on the state of natural disaster (Journal of Laws of 2017, item 1897).

alters the water storage capacity. Considering the definitions and analysis of the causes of its occurrence, drought should not only be treated as a natural phenomenon, as it is the consequence of a synergy of natural conditions and human activities. The law can influence this human activity through appropriate instruments.

Drought is a developing, slow process. Its first phase is associated with a long-term lack of rainfall or its deficiency and the accompanying high air temperature. It can continue through soil drought (phase 2), hydrological drought (phase 3) to hydrogeological drought (phase 4). In the conceptual approach, the phenomenon of drought, in the first 3 phases of development, is described using parameters in the form of various indices and coefficients, e.g. Palmer Drought Severity Index (PDSI), Standardised Precipitation Index (SPI), Effective Drought Index (EDI), Surface Water Supply Index (SWSI), etc. Mawdsley[5] divides coefficients into two groups, i.e. environmental coefficients that include any hydro-meteorological indicators (e.g. PDSI, SPI) and hydrological coefficients (e.g. EDI) that directly affect the hydrological cycle (rainfall, flow, soil moisture). These indicators can be used to analyse the frequency of low periods in the hydrological cycle. They most often report the deviation from the mean value. The second type are indicators that characterise water resources (e.g. SWSI). They define the severity of a drought in terms of its impact on water supply for domestic, agricultural, industrial, recreational purposes, etc. They characterise both the impact of human activity on the increase in water consumption and the decrease in precipitation or lack of precipitation, i.e., in general, they determine the scarcity of water in relation to needs.

To assess the phenomenon of drought different approaches can be noted. For drought phase 3 (hydrological drought), sometimes for drought phase 4 (hydrogeological drought), they use:

- analysis of time series of multi-year or period precipitation or flow, n-day minimum flow or flow with a specified probability of not being exceeded from a duration sum curve, groundwater levels. This approach allows, for example, for the characterisation of the regime in relation to flows;
- as a time-varying process, identifying low-flow periods described by parameters characterising duration, deficit volume and low flow. The boundary flow method is commonly used to separate the periods;[6]
- statistical and geostatistical parameters.[7]

[5] H. Hisdal, L.M. Tallaksen, *Drought Event Definition. Assessment of Regional Impact of Droughts in Europe (ARIDE) Technical Report* 6, 2000.

[6] T. Tokarczyk, W. Jakubowski, *Temporal and spatial variability of drought in mountain catchments of the Nysa Klodzka basin*, "IAHS publication", Vol. 308, 2006, p. 139.

[7] E. Krogulec, *Evaluating the risk of groundwater drought in groundwater-dependent ecosystems in the central part of the Vistula River Valley, Poland*, "Ecohydrol. & Hydrobiol.", 2018, Vol. 18, pp. 82-91, https://doi.org/10.1016/j.ecohyd.2017.11.003.

Contemporary drought regulations in Polish law are scattered. Comprehensive regulation is lacking primarily in two areas. The first is the prevention of drought and the second is counteracting the effects of drought, including giving assistance to those affected, primarily farmers.

The second problem is regulated by the Act of 20 July 2017, Water Law.[8] Chapter 2 Counteracting the effects of drought in Section IV Flood Risk Management and Counteracting the effects of drought regulates the main principles of how to counteract the effects of drought.[9] This chapter comprises a total of three articles. These provisions implement the regulations of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.[10] Article 13(5) of the aforementioned Water Directive indicates that "River basin management plans may be supplemented by the development of more detailed programmes and management plans for a basin, sector, issue or type of water, in order to deal with particular aspects of water management. The implementation of these activities does not absolve Member States from fulfilling any obligations under other parts of this Directive". Therefore, the origins of national drought activity should be traced primarily to European legislation and the objectives set for Member States in the Water Directive.

At the same time, the Water Framework Directive was preceded by soft law acts such as the Communication from the Commission to the European Parliament and the Council "Addressing the challenge of water scarcity and droughts in the European Union" of 18 July 2007, (COM(2007) 414). In this communication, continuing the implementation of the WFD was identified as a means of tackling drought, in particular, by establishing an appropriate price for water in line with the 'user pays' principle; allocating water more efficiently among water users; prioritising possible solutions to water scarcity problems; using and promoting technologies and practices that enable rational and economical water use; improving knowledge and data collection on drought. The regulation so far through the so-called soft law also shows the lack of a unified position across the EU for an EU-wide legal solution. This may result in a lack of coordination of actions in individual states and thus ineffective implementation of certain mechanisms, especially in border areas.

In 2012, the Report on the Review of the European Water Scarcity and Drought Policy of 14 November 2012 (COM(2012) 672) was published. It assessed the implementation of the 2007 Communication. In line with the recommendations set out in the report, the European Commission in the next planning cycles of the WFD implementation should ensure and further integrate water scarcity and drought issues into the different sectoral policies. When planning to under-

[8] Journal of Laws of 2021, item 2233, as amended.

[9] B. Rakoczy, *Prawo wodne. Praktyczny przewodnik*, Warsaw 2018.

[10] OJ. EU. L. of 2000 No. 327, p. 1, as amended.

take legal research on drought issues, it is very important to read these documents in detail, as they contain a number of assessments and measures that have proven to be ineffective, or not very effective in preventing drought.

According to Article 183 of the Water Law, counteracting the effects of drought is the task of the governmental and self-governmental authorities and the Polish Waters. This means that the state is liable for failure to fulfil this task. At the same time, there is a lack of compensation provisions to pursue possible claims against the state for the non-fulfilment of Article 183 of the Water Law. For this, the provision is more of a programmatic norm and not a viable guideline to enable the enforcement of damages from state bodies. These damages, however, can be claimed under general principles.

Another article of the Water Law indicates that drought mitigation is carried out in accordance with the Drought Mitigation Plan. Such a plan in Poland has been prepared and adopted in the Regulation of the Minister of Infrastructure of 15 July 2021 on the adoption of the Plan for Counteracting the Effects of Drought.[11] Pursuant to Article 184(2) of the Water Law, it includes an analysis of the possibility of increasing available water resources; proposals for the construction or reconstruction of water facilities; proposals for necessary changes in the use of water resources and changes in natural and artificial retention and measures to counteract the effects of drought.

The 105 pages of the regulation indicate the main assumptions for counteracting the effects of drought. At the same time, there is a rather limited assessment of the potential for the development of projects that can help prevent drought. According to the Plan, "measures to strengthen and restore the retention capacity of an area, such as:

1) protection and restoration of ecosystems,
2) protection and restoration of biodiversity, *inter alia*, through renaturalisation of aquatic and water-dependent ecosystems and wetlands, afforestation, biologisation of soils,
3) implementing the principle of sustainable urban planning and design (smart city, introducing elements of blue-green infrastructure),
4) changes to reduce the water intensity of the economy

– effectively counteract the effects of drought, but also have a positive impact on creating a climate-neutral economy. Thus, the adaptation measures used to counter the effects of drought not only minimise the impact of drought, but also contribute to lowering the risk of drought occurrence".[12]

The examples cited above are only one of more than a dozen drought mitigation proposals described in the Plan.[13] It should also be pointed out that some of

[11] Journal of Laws of 2021, item 1615.

[12] Drought Plan, p. 9.

[13] Pursuant to Article 185 of the Water Law, a draft plan to counteract the effects of drought is prepared by Polish Waters (Wody Polskie) in consultation with the minister in charge of agricul-

the recommendations relate to drought prevention. These may include a description of the possibility of increasing disposable water resources, proposals for the construction or reconstruction of water facilities, proposals for necessary changes in the use of water resources and changes in natural and artificial retention. At the same time, there is a lack of answers to possible compensation claims and aid measures for those affected by drought, primarily farmers.

Pursuant to Article 185 of the Water Law, the Plan may be amended and there is an obligation to update it every 6 years. According to the cited provision, the minister in charge of water management, ensuring active participation of all the interested parties in the preparation and updating of the Drought Plan, shall make public, under the principles and in the mode specified in the provisions of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments, in order to obtain comments: the timetable and work programme for the preparation of the draft drought plan; the draft drought plan at least one year before the start of the period to which the plan applies. This means that any interested party can submit their comments and objections to the draft plan and its update.

Article 185(5) indicates that the provision of source materials used for the preparation of the draft drought plan by Polish Waters (Wody Polskie) shall be made available under the principles and in the mode specified in the provisions of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments. In the possible new legal framework, the use of materials held by the state authorities in the preparation of the legislative project is essential. Therefore, it will be very important for legislative work on a comprehensive solution to the problem of drought in Poland to cooperate closely with all public authorities.[14]

Undoubtedly, the effectiveness of drought prevention is not affected by the lengthiness of planning procedures. In the Water Law, according to Article 185(5), within 6 months of the date of public disclosure of the draft plan, interested parties may submit comments on the arrangements contained in these documents to the minister responsible for water management. The complicated and lengthy procedure for adopting the plan is intended to promote transparency and accuracy of

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ture, the minister in charge of rural development, the minister in charge of fisheries, the minister in charge of inland navigation and voivodes, taking into account the division of the country into river basin districts. Polish Waters (Wody Polskie) shall submit the draft of the drought plan to the minister in charge of water management. The minister in charge of water management shall adopt and update the plan for counteracting the effects of drought by means of a regulation, guided by the need to counteract the effects of drought.

[14] Pursuant to Article 185(7) of the Water Law, Governmental and self-governmental administrative bodies and research institutes are obliged to provide, free of charge, the data in their possession necessary for the preparation of the drought plan to the entities preparing and drafting this document.

the regulations adopted. At the same time, it makes it impossible to react quickly to the rapidly changing reality of natural disasters.

There are currently no regulations in place to prevent drought. The government is presenting a drought bill, described below, which is only concerned with accelerating investments in drought prevention. However, this does not address many of the fundamental problems of drought and violates existing planning regulations, including the planning authority of the municipality.

To sum up this part of the discussion, the main legal problem in combating drought is the legal chaos both in terms of drought prevention and counteracting the effects of drought. The residual regulations of the Water Law in force, the rather imprecise Plan, as well as the controversial draft of the Drought Act (about which you will read more below) are not good indicators of the success of drought reduction in Poland. At the same time, it should be noted that similar legal chaos exists at the European level. Several pieces of soft law and the Water Framework Directive are legal mechanisms far short of meeting the challenge of drought prevention.

DROUGHT DEVELOPMENT

There are four genetic phases of drought, namely atmospheric, soil (agricultural), hydrological, and hydrogeological. The aforementioned types determine the successive stages of the development of this phenomenon and their course and processes of formation are presented in the diagram of drought propagation in the hydrological cycle.

ATMOSPHERIC (METEOROLOGICAL) DROUGHT

It occurs when there is a precipitation deficit. The direct result of a precipitation deficit is a moisture deficiency that builds up over time. Precipitation deficits in the warm season during the period of intense evaporation intensify the drought phenomenon. Depending on the conditions of the natural environment, its spatial variability as well as land use and water demand, atmospheric drought may cause subsequent phases of drought.

AGRICULTURAL (SOIL) DROUGHT

It occurs when soil moisture is insufficient to meet the water needs of plants and carry out normal agricultural management. It is a direct consequence of pro-

longed atmospheric drought. Defined as a period when soil moisture is insufficient to meet the needs of plants in the soil profile and to carry out normal agricultural management. Agricultural drought leads to the generation of direct losses in natural ecosystems, but primarily results in losses in agricultural and forestry production.

HYDROLOGICAL DROUGHT (HYDROLOGICAL LOW)

Manifests itself in the long-term reduction of water quantity in rivers and lakes. Applies to surface waters. It occurs when the flow in rivers falls below the flow of the multi-year average value. It is a period of reduced surface water resources relative to the multi-year average value. Hydrological drought is the next stage of worsening atmospheric and agricultural drought.

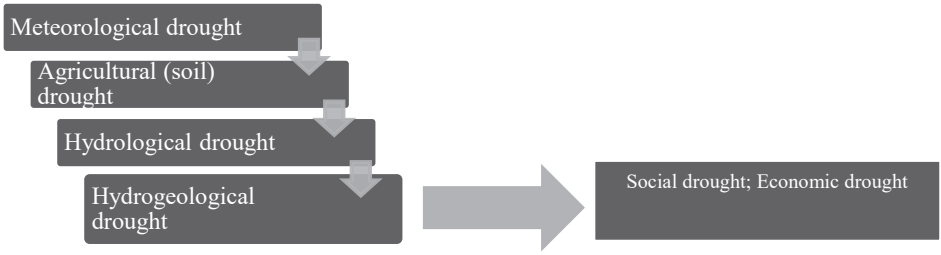
HYDROGEOLOGICAL DROUGHT

Drought is defined as a long-term reduction in groundwater resources. The phenomenon of this type of drought is usually preceded by the above drought phases. Hydrogeological drought is the most severe and the most difficult one to reverse.

Hydrogeological drought is the final stage of drought development and is influenced by a number of factors, including rainfall distribution, the amount of recharge, and the amount of drainage by surface watercourses. Hydrogeological drought is a long-term reduction in groundwater resources in relation to multi-year normal conditions. This reduction affects groundwater users: groundwater-dependent ecosystems, agriculture, forestry, population, and economy. The concept of drought is the same as hydrogeological low, defined as a natural phenomenon characterised by the occurrence and continued existence for a prolonged period of a shallow water table below the conventional limit state, understood as the average of the minimum annual states, which are simultaneously lower than the average low state.

Identification of the problem refers to the assessment of what is essentially a hydrogeological drought. The magnitude of groundwater decline (reduction in water resources, reduction in retention) that could be considered a drought varies regionally and locally due to variability in hydrogeological conditions, volume of exploitation, seasonal conditions and water use. The analysis of hydrogeological drought on a regional scale, together with the recommendation of the assessment method, should refer to an area with similarly defined hydrogeological conditions where the influence of meteorological and climatic factors can be considered similar for the entire study area.

Studies carried out by geologists, indicate the need for an analysis of drought in a broader context and an interdisciplinary approach to water scarcity problems. They show the varying dynamics and trends of changes in groundwater levels and quality over time and space. It is noteworthy that hydrogeological drought, the last phase of drought, directly affects economic and social drought.



WATER SHORTAGES – PREVENTION

The problem that exists in terms of regulation is the lack of comprehensive measures to prevent drought in the sphere of not only law, but also hydrology,[15] land management,[16] the economic system,[17] and others.[18] One of the main issues is the development of a system to counteract drought, not just its effects. Of course, drought is to a large extent an external action for lawyers, so to speak, it can even be considered as a force majeure, but contemporary analyses, if only cited in the regulation, point to the necessity of taking a number of different actions. Undertaking the design of legal solutions, however, must be combined with work in other fields of drought prevention. Only the joint compilation of the results of the studies carried out can produce a legislative effect.

[15] P. Herbich, *Ocena możliwości wykorzystania rezerw zasobów dyspozycyjnych wód podziemnych do łagodzenia skutków suszy w rolnictwie*, "Biuletyn Państwowego Instytutu Geologicznego" 2019, Vol. 475, pp. 51-58.

[16] I. Godyń, *Instrumenty planistyczne i zarządzania dla potrzeb łagodzenia zjawiska suszy*, "Środowisko. Czasopismo Techniczne" 2009, Vol. 1, pp. 59-68.

[17] J. Sołtuniak, *Wpływ suszy hydrologicznej na inwestycje w energetyce wodnej. Możliwości zapobiegania skutkom suszy*, "Gospodarka w Praktyce i Teorii" 2016, Vol. 44/3.

[18] *Drought management plan report including agricultural, drought indicators and climate change aspects*, Technical Report 2008-2023, Office for Official Publications of the European Communities.

In the common opinion of lawyers, the current provisions of the Water Law are not sufficient to prevent water shortages,[19] let alone to counteract drought. It is necessary to undertake research work on the necessity of amending the Water Law in terms of a comprehensive regulation of the coherence of European[20] and national regulations, including the regulation in question, with the current knowledge and possibilities in the field of water management.[21]

The broader systemic and constitutional issue of whether drought is a state of natural disaster also needs to be considered. Both a negative and a positive answer to this question require in-depth legal analyses of the possible consequences of such decisions and the possibilities of assistance for those affected.[22] However, this is a topic that goes far beyond the realm of possible changes to the Water Law or compensation regulations. It requires the involvement of a wide-ranging discussion with constitutionalists to assess such important consequences of making decisions in this area.

In the sphere of agriculture, for example, the melioration of villages[23] and fields and the rational management of water[24] (in particular, the appropriate allocation of it[25]), including groundwater,[26] have been advocated for several decades. There is a lack of legislation to help farmers in this regard. There is also a lack of financial incentives for efforts to improve water management in villages.[27]

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[19] M. Gromiec, *Problemy zaopatrzenia Polski w wodę – zasoby, zagrożenia, rozwiązania*, "Przyszłość. Świat-Europa-Polska" 2014, Vol. 2/30, pp. 64-86.

[20] J. Grela, M. Jelonek, T. Sadąg, *Zrównoważone użytkowanie oraz ochrona ekosystemów wodnych w świetle wymagań prawa europejskiego i polskiego*, "Czasopismo Techniczne" 2009, Vol. 2-A (10), pp. 49-54.

[21] K. Płonka-Bielenin, *Organizacja prawna gospodarki wodnej na poziomie województwa w zakresie zarządzania kryzysowego – analiza prawna*.

[22] A. Bisztyga, K. Płonka-Bielenin, *Instytucja stanu klęski żywiołowej w polskim systemie prawnym*, (in:) (ed.) Ł. Baratyński, P. Ramiączek, K. Spryszak, *Współczesne wyzwania państwa i prawa. Księga jubileuszowa prof. Jerzego Jaskierni z okazji 45-lecia pracy naukowej*, Toruń 2017; M. Kazimierczuk, *Ograniczenie prawa własności podczas stanu klęski żywiołowej*, "Civitas et Lex" 2022, p. 34/2, pp. 47-63.

[23] Z. Suligowski, *Nowe prawo wodne – powodzie, susze i melioracje*, "Inżynieria Morska i Geotechnika", 2019, pp. 3-9.

[24] A. Keikha, H. Mehrabi Boshraabadi, M. Mardani Najafabadi, S. Ziaee, *Evaluation of water market performance and its comparison with different allocation rules of water in drought conditions*, 2021.

[25] X. Liu, P. Guo, Q. Tan, F. Zhang, Y. Huang, Y. Wang, *Drought disaster risk management based on optimal allocation of water resources*, Natural Hazards 2021, Vol. 108(1), pp. 285-308.

[26] M. Woźnicka, E. Przytuła, D Palak-Mazur, *Funkcjonowanie systemu ochrony wód podziemnych w Polsce w świetle przepisów ustawy Prawo wodnych*, (in:) *Wybrane zagadnienia hydrogeologiczne oraz różne aspekty związane z eksploatacją wód podziemnych*, Łódź, 2021; V. Caillet, *Instrumente zur Dürrebewältigung im öffentlichen Wasserrecht-Eine rechtsvergleichende Untersuchung zwischen dem Bundesland Baden-Württemberg und dem US Bundesstaat Kalifornien,* 2021.

[27] In relation to villages, the National Strategic Plan (Strategic Plan for the Common Agricultural Policy 2023-2027) recommends, "Increasing soil water retention by using water resources

Finally, there is a lack of effective legal instruments to act against drought. In this case, dedicated European funds prove to be helpful. For example, it is only in the Strategic Plan for the Common Agricultural Policy 2023-2027 that the intervention envisages covering the purchase of systems to improve water management, through the elements of technical infrastructure necessary for the harvesting, storage in closed tanks and management of rainwater, installations for water recycling or water efficiency.[28]

The starting point for solving the above problems should be the research teams that have identified the most effective methods to combat drought.[29] Next, an analysis of the potential impact assessment is required, which should include an assessment of the rationality of the new regulations. This assessment should also include the financial impact on the state budget. It is obvious that without public aid, the fight against drought will not have the intended effects, which would aim to minimise its impact.

The government has at the same time presented drought special bills twice already. These concern investments to deal with the effects of drought. The first of the drafts was withdrawn in 2021 (formally in 2022).[30] A new draft, under the same title, the Drought Investment Act, is currently under procedure.[31] This law will simultaneously amend the Act of 19 October 1991 on the management of agricultural properties of the State Treasury, the Act of 7 July 1994 Construction Law, the Act of 21 August 1997 on real estate management, the Act of 27 April

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stored in existing drainage systems with an irrigation function or by carrying out the construction or reconstruction of irrigation or irrigation-drainage systems and the conversion of drainage systems into irrigation-drainage systems; Increasing the amount and duration of water retention in agricultural areas (agro-technical treatments, creation of ecosystem services, construction of small water reservoirs); Reducing water consumption by reusing drainage water for fertilisation and irrigation of other field crops; Improving the system of compensation and subsidies and insurance against the risk of drought effects in agriculture by developing methods of in-kind and financial support for those affected by the effects of agricultural drought; Developing and implementing programmes to educate the public about the causes of drought, how to identify it, its effects and, above all, how to prevent it; Educating and creating awareness among farmers about the possibility of creating retention in agricultural areas". - p. 156.

[28] Strategic Plan for the Common Agricultural Policy 2023-2027, p. 334. At the same time, the Plan recommends "that through national and regional operational programmes, as well as with the help of initiatives financed from the state budget, the possibility of financing small retention projects and the development of green-blue public infrastructure in rural settlements should be created (e.g. installation of retention reservoirs with greenery, construction of retention ponds, absorption ponds, hydrophytic systems, rain gardens, installation of facilities for retention and use of rainwater from roofs of public facilities for irrigation of green areas, construction of facilities for retention and use of rainwater and snowmelt on site, and development of public absorption areas covered with vegetation)", p. 1228.

[29] L. Wertmann, *Anpassung an Trockenheit und Dürre-welche wasserrechtlichen Handlungsmöglichkeiten gibt es?*, "Natur und Recht" 2021, Vol. 43/5, pp. 328-329.

[30] https://legislacja.rcl.gov.pl/projekt/12337151.

[31] https://legislacja.rcl.gov.pl/projekt/12356956/katalog/12857592#12857592.

2001 Environmental Protection Law, the Act of 27 March 2003 on spatial planning and development, the Act of 16 April 2004 on nature protection, the Act of 6 December 2006 on the principles of development policy, the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments, the Act of 9 June 2011 Geological and Mining Law, the Act of 20 July 2017Water Law, the Act of 5 July 2018 on facilitations in the preparation and implementation of housing investments and accompanying investments.

The interference with the municipality's planning authority through Article 5(3) of the draft Act should be regarded as particularly worrying. The introduction of the principle according to which obtaining a decision on permission to carry out investments to counteract the effects of drought will be tantamount to obtaining a decision on determining the location of a public purpose investment – within the meaning of the provisions of the Act on spatial planning and development and a building permit – within the meaning of the provisions of the Construction Law. The aim of the project itself is to accelerate investments to counteract the effects of drought, but this cannot be done by violating the basic principles of spatial planning and interfering not only with the powers of municipal authorities, but above all with the rights of property owners.[32]

Already at this stage, an assessment of the presented draft should be expressed not only through the prism of the legislative sphere, but also through the experience of other scientific disciplines in the field of drought control. The presented draft raises a number of controversies due to the deepening of the planning chaos. It causes spatial planning in the municipality to actually become a superfluous element rather than a core task of the municipality. Therefore, one of the tasks of answering the question of the fight against drought is to answer the question of whether this fight should violate the existing regulations and powers of local government units. One of the first steps in the proposed work should be to actively participate in the legislative processes already underway and to clearly expose the scientific basis for convincing the legislator of the irrationality of some of the legislative proposals.

[32] For example, only Article 25(1) of the draft provides for the elimination of the requirement to obtain additional decisions necessary for the implementation of investments concerning the division of real estate, the acquisition of necessary real estate for the implementation of investments, cutting of trees and shrubs (the division of real estate is approved by a decision on the permit for the implementation of investments in the field of counteracting the effects of drought); in Article 17(1) of the draft, in the permit for the realisation of investments in counteracting the effects of drought, the voivode permits, to the extent necessary for the realisation of the investment, the removal of trees or shrubs located on the real estate covered by the decision; moreover, Article 21 of the draft introduces the provision of the possibility to enter the real estate in order to undertake preparatory activities necessary for the realisation of the investment, such as carrying out measurements, surveys or other necessary works.

SUMMARY

The solution to the outlined major problems requires the development of a uniform and comprehensive legal model. This requires obtaining analyses, not only legal ones, which will make it possible to formulate regulations preventing drought and counteracting the effects of drought.[33] At the same time, this model should include not only regulations to prevent drought but also measures to counteract its effects. The sphere of possible drought compensation and omissions in this regard on the part of state authorities cannot be left outside the sphere of interest. Drought is of particular importance to farmers, as it is a threat not only to their jobs and lives but also to Poland's food security.

The development of model legal solutions concerning drought in Poland indicates the need to use interdisciplinary cooperation of the representatives of environmental, geological, economic,[34] social, physical or crisis management sciences. The preparation of possible model legal solutions will require the consideration of alternative solutions as well, and thus may prove to be quite time-consuming. In addition, these solutions should be compatible with European law, including the Water Framework Directive presented.[35]

The necessary conditions for the implementation of the legal model of drought prevention and counteracting the effects of drought first require dealing with the existing dysfunctions and deficiencies in the current legal state. Only a few legal solutions have been indicated above, which may raise quite serious doubts as to their correctness. A thorough composition of the legal model requires a multi-faceted discussion, such as the one taking place in some German states.[36]

The changes should start with the preparation of the initial (framework) assumptions for possible amendments to legal acts. Then all possible provisions that need to be adapted to the model system of comprehensive regulation should be identified. It may also become apparent that new legislation will be needed, so the possibility of designing such legislation must be envisaged. In order to initiate changes, not only legal analyses will be needed, but, above all, an overall concept for water management and drought prevention.

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[33] R.W. Adler, *Drought, sustainability, and the law*, "Sustainability" 2010, Vol. 2/7, pp. 2176-2196.

[34] R. Miłaszewski, *Wprowadzenie do analiz ekonomicznych w świetle ramowej Dyrektywy Wodnej 2000/60/WE wraz z oceną ich implikacji dla planowania w gospodarowaniu wodami w Polsce*, Department of Water Resources, Ministry of the Environment, Warsaw October 2003.

[35] E. Zębek, *Legal solutions of lake monitoring systems in Poland in compliance with the Water Framework Directive*, "*Review of European and Comparative Law"* 2022, Vol. 49, pp. 173-201.

[36] Ch. Mayer, *Das Wasserentnahmeentgelt-Eine aktuelle rechtliche Bestandsaufnahme als Grundlage für die Diskussion über die Eignung des Wassercents als Finanzierungsinstrument zum Schutz von Grundwasservorkommen vor klimawandelbedingten Beeinträchtigungen*, "Natur und Recht" 2022, Vol. 44/7, pp. 461-465.

In research related to drought issues, obstacles and threats may be heterogeneity and inconsistency of each other in the identification of the process and the effects of the drought phenomenon. The effects of hydrogeological drought, often indicated in terms of hydrogeological conditions, have a much broader impact, concerning economic, environmental, and legal consequences.[37]

The complexity of the problems associated with the hydrogeological drought phenomenon in terms of threat to groundwater levels and quality is primarily due to:

– a decrease in groundwater levels associated with reduced infiltration (groundwater recharge), reduced groundwater retention and changes in surface water recharge conditions;
– drastic changes in hydrogeochemical conditions associated initially with drainage, resulting in the expansion of the aeration zone and then with the hydration of rock massifs, within which reactions typical of the aeration zone took place, and a number of minerals precipitated.

In conclusion, drought poses serious threats in all the areas mentioned above. However, it is possible to approach drought as a challenge and try to counteract the phenomenon, minimise its effects and even try to adequately protect against it. This requires research on specific and clearly defined elements/aspects/phases of drought. A necessary step should be an interdisciplinary, coherent approach to organising research and interpreting results. However, such an approach requires consistency of work, discussion of results, and synergy of efforts across research disciplines. A possible threat is the lack of consensus resulting from different research workshops in different scientific disciplines and the economic factor, which is very important in research, especially concerning extreme phenomena resulting in possible losses in different branches of the economy.

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[37] E. Krogulec, J. Gurwin, M. Wąsik, *Cost of groundwater protection: major groundwater basin protection zones in Poland*, Journal Name, International Environmental Agreements: Politics, Law and Economics, 2021, DOI:10.1007/s10784-020-09521-4.

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