

Aleksandra Syryt¹

GEOGRAPHIC INFORMATION SYSTEMS (GIS) AS A VITAL TOOL IN HUMAN RIGHTS WORK

Abstract: In the face of various local, regional, and global threats, the protection of human rights develops and increases its importance. National and international legal acts define catalogues of human rights and create institutional and procedural conditions for their protection. However, apart from that, it is also necessary to use other tools that will support activities for the protection of human rights in various dimensions while respecting the law. Undoubtedly, one of such tools can be GIS. The potential of GIS is in providing information and responding to a threat, and locating the place and extent of human rights violations, which allows for an ex-post response.

GIS can improve geographic literacy and improve our knowledge of where human rights violations are occurring. It can improve public awareness of human rights by placing them geographically. GIS can also support various projects aimed at the protection of human rights. Due to the topicality of the topic and the increase in phenomena affecting human beings and human rights, especially in the context of military operations, it is reasonable to deepen this issue and indicate the detailed scopes of GIS application in the service of human rights. The analysis will also identify the opportunities and risks associated with this tool in achieving human rights objectives.

Keywords: GIS, human rights, humanitarian law, human rights protection

Received: 13 June 2022; accepted: 14 September 2022

© 2022 Authors. This is an open access publication, which can be used, distributed and reproduced in any medium according to the Creative Commons CC-BY 4.0 License.

¹ Cardinal Stefan Wyszyński University in Warsaw, Faculty Law and Administration, Warsaw, Poland, ORCID ID: <https://orcid.org/0000-0002-7501-0786>, a.syryt@uksw.edu.pl.

Introduction

Global threats to humankind caused by various factors necessitate certain entities to take protective measures. The state and its agencies, as well as the international community, are of particular importance here, especially when the specific risks are wide ranging. In this context, relevant are specific legal instruments and mechanisms for the protection of human rights that are being formed both at the national and international levels. Leaving aside the assessment of the rationality and legitimacy of the current directions in the development of the concept of human rights, one cannot underestimate this particular sector, which emerged at the end of the twentieth century from public international law as a separate order and incorporated the law of national minorities and humanitarian law. Criticism of many of these directions is presented in detail by Muszyński (2022). It has also gained wide acceptance, institutionalization, as well as mechanisms for their enforcement. Human rights have become the essence of many legal systems, as well as the link between national and international law intended to harmonize these orders (Muszyński, 2022; Domingo, 2010). Changes in the approach to human rights cannot obscure the original intentions for which they were introduced into legal systems. This is because from the very beginning, human rights were unequivocally grounded axiologically on three fundamental constructs: dignity, personal freedom, and human equality (Muszyński, 2022). Any new trends should not distort this. For this reason, I will direct my reflections on the use of GIS for the purpose of serving human rights primarily to the classical view of human rights, the source of which is dignity.

National and international legal acts define catalogs of human rights and create institutional and procedural conditions for their protection. However, in addition to this, it is also necessary to use other tools that will support efforts to protect human rights in various aspects with respect for the law.

One such tool may be the Geographic Information System (GIS). The potential of GIS lies in providing information and responding to the threat as well as locating the place and extent of human rights violations, allowing for an ex-post response. GIS can improve geographical knowledge and expand our understanding of where human rights violations occur. It can also increase public awareness of human rights through the potential to monitor specific phenomena in geographical terms. GIS can also support various projects aimed at protecting human rights.

While there has been much discussion of the development of human rights and new phenomena in this area in the legal science literature to date, too little has been said so far about the use of specific extra-legal tools, including technology, in the implementation of human rights. Any research focuses primarily on the impact of artificial intelligence on human rights, or the formulation of quasi-human rights related to access to new technologies (e.g. the right to internet access) or the participation of an individual in cyberspace. They also address informational autonomy and the protection of privacy and personal data (Michalski & Syryt, 2018).

In light of this, it is reasonable to refer to GIS as a tool that can affect the implementation and protection of human rights.

Given the timeliness of the topic and the increase in phenomena affecting humans and human rights, especially in the context of military operations, it is warranted to take a deeper look at this issue. The purpose of this article is to indicate the scopes of application of GIS in relation to human rights. In addition, an attempt will be made to recognize the opportunities and threats associated with the use of GIS in achieving the goals in the area of human rights. The assumptions made require a general explanation of the essence of the concept of human rights, followed by an indication of how they can be implemented with the help of GIS tools. The main research method used to make relevant findings will be the analysis of literature and documents.

Transformations in the understanding of human rights

Human rights are one of the central issues in contemporary societies. Although there are differences as to the details of how they are framed, these rights are seen as a universal gauge of respect for human dignity and as a basis for the legitimacy of the social order accepted in pluralistic societies not only from a worldview perspective but also from an axiological one (Fel, 2007). Wiktor Osiatyński points out that "Human rights are universal moral rights of a fundamental nature, inherent to every individual in their relations with the state. The concept of human rights is based on three theses: first, that all authority has limits; second, that each individual has a sphere of autonomy to which no authority has access; and third, that each individual can justifiably demand that the state protect their rights" (Osiatyński, 2004).

The concept of human rights first appeared in an enactment in 1776, in the "Bill of Rights" of Virginia. It was based on the mindset of the Enlightenment period. At the time, they were understood as the rights of the individual primary in relation to the state and society. In that perspective, the starting point was the individual's freedom of action and their freedom to decide their own affairs. The state was seen as the greatest threat to human rights. The concept of the Enlightenment period arose from the opposition of the individual to the state. Today, it's different. It is the state that is seen as the guarantor of fundamental rights (Piechowiak, 2009).

In legal studies, the concept of human rights is understood in various ways (i.e. Michalska, 1982; Encyclopedia of Public International Law, 1985; Mik, 1994; Banaszak, 1995; Osiatyński, 1996; Kuźniar, 2000; Łopatka, 2002; Jabłoński & Jarosz-Żukowska, 2004; Gronowska et al., 2010; Marks, 2016; Malczyńska-Biały & Żarna, 2019).

The development of instruments for protection of human rights in international law was observed in the 19th century. However, during this period no coherent catalog of rights of the individual protected in international law emerged, nor did any instruments for comprehensive protection of the rights of the individual develop (Banaszak & Preisner, 2002).

After World War II, the foundation for the development of a universal and regional system for the protection of human rights was established under the United Nations

Charter. The codification process of the development of international human rights law began with the Universal Declaration of Human Rights.

Human rights after World War II as part of the regime of international law were intended to address the lack of reference to the law of nature in positivist law (Muszyński, 2022; Pietrzykowski, 2013). In practice, one can observe a far-reaching relativization of human rights, and their conceptualization is distant from that which stood at the origin of the formulation of human rights catalogs. Paradoxically, what was meant to emphasize the connection to the law of nature, namely the normativization of human rights, has the opposite effect. In fact, one can observe that the positivization of the idea of "natural human rights" has led to their transformation from "natural" privileges into positive law rights, granted by certain norms of international and national law. Thus, their link to the belief in the legal-naturalistic sources of their origin and their inherent character has been severed in a way (Pietrzykowski, 2013; Stępnia, 2019). This does not mean that it is the right direction. The separation of human rights from the human being and the focus on other contexts that are an expression of the implementation of specific policies is not a good thing, because it reinforces social divisions and, consequently, does not promote the implementation of the protection of the human being and their rights, but, on the contrary, can lead to even greater violations by causing secondary illegality of the actions of public authorities.

For this reason, I adopt an understanding of human rights that is equated with the basic, natural prerogatives to which every human being is entitled by virtue of their humanity. The fact that they have been expressed in normative acts is evidence that they constitute socially important values that should be subject to special protection by the authorities, and not because the legislator has created them, and if they were not regulated they would not exist.

The human privileges that are granted (rather than affirmed) by normative acts and that do not relate to human nature should not be called human rights. This is because they represent the adoption of a particular legislative policy and serve purposes other than the protection of human beings.

GIS and human rights

A Geographic Information System is a collection of spatial data (i.e. data with locations attached to it) and the tools required to work with the data (Reynolds, 1997). It is currently understood as a system of computer software, hardware, and data, personnel that enables the input, manipulation, analysis, and presentation of data and information related to location on the Earth's surface. This system consists of the software, hardware, data, and personnel that enable the input, manipulation, analysis, and presentation of information related to location on the Earth's surface (Ali, 2020).

Geographic information systems (GIS) are important tools for viewing broad-scale patterns of spatial data, organizing and integrating information about an area, and for analyzing this data in order to answer various research questions.

A Geographic Information System is more than just a tool for making pretty maps. GIS provides the user with the ability to store, edit, and display information about a region. What distinguishes GIS from simple mapping software is data that is geographically referenced, can come from multiple sources, and can be manipulated and analyzed in a variety of ways. As such, GIS allows for the exploration of more detailed spatial questions than would be possible with a map alone. Furthermore, along with the actual software, other important parts of a complete GIS are the people and resources required for support. Most people who work with GIS quickly realize that they rely on a computer system administrator (to help them keep the computer running), data that must be accurate for a particular application, and the many combined tools, people, and software that are all needed together to complete the project (Greenberg et al., 2017; Scholten & De Lepper, 1995).

At a wide range of scales, the map is becoming increasingly important as a legal document that supports policy or legislative decision making.

The use of GIS provides various types of information and data that, in relation to human rights, can serve to strengthen their implementation. This is because tools have a broader scope than just that of legislative regulation. Firstly, they can support the activities of specific actors in the increasing fulfilment of human rights. These are not only public entities, but also holders of these rights, who, based on specific spatial information, can realize, among other things, such rights as the right to protection of life and health, the right to mobility, but also the right to obtain information that may affect their decisions on certain ventures in the sphere of personal, private, or public life.

Secondly, GIS can support decision-making processes related to the development of appropriate legal mechanisms and political decision-making regarding the protection of human rights. It has to do with creating conditions for the protection of life and health (Świtała & Sikorski, 2021; Place Matters in the Helping Professions: GIS for Human and Social Services Organizations, An Esri White Paper, 2011), building a system that gives social security in view of various risks (Roszewska, 2021), combating threats that interfere with freedoms and rights. Third, GIS can assist in responding to specific human rights violations, including those related to violations of personal liberty, inhumane treatment, etc.

In view of this, GIS can be considered as being used for digital acquisition, mapping, collection, analysis, processing, including visualization of spatial data (Burrough & McDonnell, 1998). These systems allow data to be compared across time (map data relating to different time periods). Data can refer to physical, natural, political, social, ethnic, and cultural elements and can come from a variety of sources. GIS enable spatial coordination of resources from different systems (Enders & Brandt, 2007). GIS are faster and more accurate to use than paper maps, and data can be shared online. Overlaying different types of data can reveal not only the problem of interference with a particular human right, but also its source and cause (Roszewska, 2021).

In particular, GIS can be used to map phenomena related to human rights. Mapping is a technique used in many disciplines. In the context of social mapping processes, mapping can be defined as a participatory or collaborative technique through which

a problem or current issue is translated and presented in a visual illustration to facilitate an in-depth and systematic analysis (Mapping for Human Rights).

Mapping can particularly address human rights violations and abuses. It can also be used to design social change. Factors that are mapped in relation to the human rights situations include, in particular:

- 1) violence (by state officials, criminal violence, domestic violence);
- 2) violations or abuses of human rights (e.g., in terms of restricting or prohibiting the exercise of freedom of assembly, or in relation to actions affecting the protection of life and health);
- 3) tendencies and patterns of human rights violations or abuses (both negative phenomena and positive trends);
- 4) participation of the individual in social, economic and cultural life;
- 5) authority structures, and control of information and resources.

The main objectives of mapping may include identifying the various dynamics of the situation regarding human rights and the key actors involved; developing a deeper understanding of the prevailing situation; conducting a critical analysis of the situation regarding human rights that can be used in decision-making processes; involving the local community in human rights activities; stimulating collective action against human rights violations; facilitating monitoring and evaluation of change.

Mapping of human rights covering specific violations and abuses aims to identify relevant factors, key actors and their interconnections in order to determine steps that can be taken to improve the state of respecting human rights.

From the perspective of the use of GIS in relation to human rights, the following should be pointed out in particular:

- 1) navigation, i.e. routing and planning. They facilitate the exercise of freedom of movement, but also information about migration. Given information can be useful, for example, in planning humanitarian corridors in relation to warfare;
- 2) obtaining information on threats to life and health such as natural disasters like earthquakes, volcanic eruptions, floods, tsunamis, landslides, etc.;
- 3) planning and development of the community. GIS allows data to be presented at macro and micro scales, allowing it to facilitate responses to global challenges. Knowledge gained from GIS tools allows geographic intelligence to be integrated into how we think and behave;
- 4) tracking and planning the use of energy resources that serve the fulfillment of an individual's needs and therefore provide them with a dignified life;
- 5) response to emergency situations, such as fires, explosions, hazardous material spills, and other unforeseen events;
- 6) monitoring access to water and food, the quality of the environment (especially in the context of its pollution) in order to protect the right to the protection of life and health;
- 7) population density analyses that affect living standards. They can influence undertaking projects to improve people's lives, etc.

In social research, GIS is used to analyze spatially changing population attributes such as income, crime, health, or housing quality. GIS also provides the opportunity to fully model public utility networks, such as ones that deliver water, energy, and telecommunications to large numbers of consumers, which affects the realization of social rights that are a derivative of the right to the protection of life.

An example of the practical use of GIS in human rights protection is the initiative of Ariel Low and Christoph Koettl, who created the Human Rights Mapping website, (<https://humanrightsmapping.wordpress.com/>), which presents and explains a variety of online mapping resources. Researchers, activists and others can use them to support human rights activities. They hypothesized that digital mapping is suitable for documenting human rights violations given that human rights violations are intrinsically linked to geographical context.

As part of the project, the maps were divided into several categories, i.e.:

- 1) social maps created based on information shared by users;
- 2) story maps – containing a story that is geographically linked to various contemporary pieces of history, as the viewer navigates the map along a predetermined path (e.g. Lee, 2022);
- 3) rapid response maps – quick and easy to execute in situations where information spreading requires an immediate response;
- 4) data visualizations typically available online that allow the user to explore the data at different zoom levels, at different time points, and with different attributes that can be turned on or off depending on the map settings;
- 5) static (non-interactive) maps that present data in a preset way that allows the person creating the map to choose which geographic areas and attributes the map focuses on (Low, 2015).

Similar tools are used to monitor specific violations. Thanks to partnerships with local communities and interactive platforms, data can be collected to help illustrate the situation (Brinkhurst, 2018).

Satellite imagery and geographic information systems (GIS) can be an important tool in the work for human rights, helping to provide evidence of human rights violations. This is confirmed by the practice and actions taken, also in terms of regulating certain issues. In 2020, Andrew Palmer, who leads the Early Warning and Information Support Unit at the U.N. Human Rights Office, confirmed that the U.N.'s partner organization, the UNITAR's Operational Satellite Applications Programme (UNOSAT), has signed an agreement with the Office to provide greater access to information and training in the use of technology. The goal of this outreach is to expand the use of satellite imagery and GIS maps at OHCHR and provide the knowledge and skills to fully realize its potential.

Since 2000, UNOSAT has provided UN agencies, member states and non-governmental organizations with access to satellite imagery and analysis. Through the development and delivery of Earth observation and geographic information systems (GIS), its information has helped areas as diverse as humanitarian relief, security, emergency management, and reconstruction.

The type of information that satellite imagery can show is both broad and targeted. Images have been used to provide information on possible mass graves, details regarding the destruction of civilian homes and infrastructure during a conflict or natural disaster, and the location of detention centers.

When OHCHR receives reports of allegations of human rights violations and abuses, immediate access to some locations may prove difficult or even impossible. Before initiating on-site monitoring activities, satellite imagery can greatly assist in confirming this information and help verify details (Emergency Live, 2020).

The above findings confirm that GIS can and does have a wide range of applications in the field of human rights, whether at the stage of their exercise or in the sphere of their preventive and subsequent protection. It seems that while the potential in this area is very high, it is necessary to raise awareness about the importance of given tools in the protection of human rights. It is particularly important to develop competencies in the handling and use of the tools in question, and not only among those working directly on human rights, but also among individuals in general. As the information presented above indicated, it is the human who, by submitting specific data on a platform using GIS, can contribute to speeding up the response to either a threat or a human rights violation.

Conclusions

The complexity of social relations, the emergence of new threats to the individual and its existence, both those arising from the work of nature and those caused by human activity, make it necessary to search for means and tools to support human welfare and dignity. Mere political declarations or even written guarantees contained in normative acts are not sufficient for this. Efforts for the implementation and protection of human rights, in addition to legal instruments, must also make use of other tools that will provide information and data allowing for appropriate decisions to be taken in the sphere of the protection of human rights or their limitation, both at the legislative level, in the process of applying the law, as well as within the framework of directional decisions on specific policies.

Undoubtedly, GIS is a tool that can fulfill the tasks indicated above. Firstly, the tools and data provided as part of it can serve individuals to better exercise their fundamental rights (e.g., right to mobility, right to health care access). Secondly, the tools in question can be used by entities responsible for ensuring and protecting human rights, which includes addressing threats and remediation. In the latter case, GIS provides data that can be used both for rapid response to threats, but also for analysis of staggered phenomena involving human rights such as humanitarian treatment, meeting welfare needs (including water, food or shelter), migration monitoring, population support during armed conflicts, etc. Such analyses, based on continuously updated data, can be used both to describe the current state of the observance of human rights and to forecast the future. At the same time, they can be used to devise activities that support the protection of human rights.

Possible risks that may arise while using GIS in relation to human rights are associated with the reliability of the data provided and its proper interpretation, with the timeliness of the data, and with the manner in which it is collected, stored, and processed, especially considering that it is not uncommon that the acquisition of such data will raise questions about compliance with human rights (e.g., the right to privacy). This, in turn, prompts the question of the extent to which the use of certain tools to protect one of the human rights may be in violation of another. This is an issue of proportionality and should also be considered when deciding to use GIS and when applying it.

Another risk is that certain data may be used for purposes other than intended, especially if access to certain platforms is widespread and public. In some cases, excessive availability of information may impede operational activities that serve human rights. For the above reasons, it would be appropriate to consider, at the international, EU but also national levels, systemic legal solutions on how to use GIS tools to enhance and protect human rights, respecting the principles of subsidiarity and proportionality.

The right to privacy and the protection of personal data must be respected. When considering the systemic use of GIS in protecting human rights, it would need to be reviewed whether the existing arrangements for data protection and the right to privacy are sufficient to use the tools in question. If there are deficits, appropriate legal solutions would need to be implemented. Human rights are a universal matter, so possible legislation should be broader than just at the national level; at least, individual countries' legal solutions should be harmonised. Otherwise, the usefulness of GIS tools in protecting human rights will be low.

However, the barriers identified above do not detract from the advantages of using GIS in protecting human rights. This is because the responsible use of mapping in the context of human rights provides a great opportunity to document and report on human rights violations occurring across the globe. As with any form of research on human rights, it is important to collect data with the utmost care, respecting legislation, including that on human rights, especially the right to privacy and the protection of informational autonomy. Education and the formation of appropriate competencies and attitudes are also important in this regard. It will then be possible to use the tools reliably and effectively and to apply them for the benefit of humankind.

References

- Ali E. (2020). Geographic Information System (GIS): Definition, Development, Applications & Components.
https://www.academia.edu/42329737/Geographic_Information_System_GIS_Definition_Development_Applications_and_Components [access: 05.05.2022].
- Banaszak B. (1995). Prawa jednostki i systemy ich ochrony (*Individual rights and systems of their protection*). Wrocław.
- Banaszak B., Preisner, A. (2002). Prawa i wolności obywatelskie w Konstytucji RP (*Civil rights and freedoms in the Polish Constitution*). Warsaw.

- Brinkhurst M. (2018). Mapping human rights abuse, Mapbox, 28 June 2018. <https://blog.mapbox.com/mapping-human-rights-abuse-cbdda8e3c68d> [access: 30.04.2022].
- Burrough P.A., McDonnell R.A. (1998). Principles of Geographical Information Systems. Oxford University Press, Oxford.
- Domingo R. (2010). The New Global Law. Oxford.
- Emergency Live: GIS And Satellite Imagery to Assist Human Rights Work. <https://www.emergency-live.com/news/more-satellite-images-to-assist-human-rights-work/>, 28 August 2020 [access: 04.05.2022].
- Bernhardt R. (ed.). Encyclopedia of Public International Law (1985), vol. 8. Amsterdam-New York-Oxford.
- Enders A., Brandt Z. (2007). Using Geographic Information System Technology to Improve Emergency Management and Disaster Response for People with Disabilities. *Journal of Disability Policy Studies*, vol. 17 ,no. 4, pp. 223–229.
- Fel S. (2007). Prawa człowieka – rozwój idei, podstawa, treść i ochrona (*Human rights - development of ideas, basis, content and protection*). In: S. Fel, J. Kupny (ed.). *Katolicka nauka społeczna. Podstawowe zagadnienia z życia społecznego i politycznego (Catholic Social Teaching. Basic issues in social and political life)*, Katowice, pp. 57–75.
- Greenberg J.D., Logsdon M.G., Franklin J.F. (2017). Introduction to Geographic Information Systems (GIS). In: S.E. Gergel, M.G. Turner (ed.), *Learning Landscape Ecology*. Springer, New York, pp. 17–31.
- Gronowska E., Jasudowicz T., Balcerzak M., Lubiszewski M., Mizerski R. (2010). Prawa człowieka i ich ochrona (*Human rights and their protection*). Toruń.
- Human Rights Mapping, <https://humanrightsmapping.wordpress.com/> [access: 10.05.2022].
- Jabłoński M., Jarosz-Żukowska S. (2004). Prawa człowieka i systemy ich ochrony. Zarys wykładu (*Human rights and systems of their protection. Lecture outline*). Wrocław.
- Jurczyk T. (2009). Geneza rozwoju praw człowieka (*The origins of the development of human rights*). *Homines Hominibus*, no. 1, pp. 29–43.
- Kuźniar R. (2000). Prawa człowieka. Prawo, instytucje, stosunki międzynarodowe (*Human Rights. Law, institutions, international relations*). Warsaw.
- Lee N. (2022). Story Map: The use of GIS and Tracking Human Rights Abuses, 15 May 2022 <https://storymaps.arcgis.com/stories/71cacbfd36084f47b580881dd7040433> [access: 15.09.2022].
- Low A. (2015). Digital Mapping for Human Rights, FXB Center for Health & Human Rights at Harvard University, 10 April 2015. <https://fxb.harvard.edu/2015/04/10/digital-mapping-for-human-rights/>) [access: 25.04.2022].
- Łopatka A. (2002). Jednostka, jej prawa człowieka (*The individual, his human rights*). Warsaw.
- Malczyńska-Biały M., Żarna K. (ed.) (2019). Prawa człowieka i ich ochrona (*Human rights and their protection*). Rzeszów.

Mapping for Human Rights,

https://www.amnesty.nl/content/uploads/2017/01/mapping_for_human_rights.pdf?x56589, p. 2) [access: 9.05.2022].

Marks S.P. (2016.). Human Rights: A Brief Introduction. Harvard University.

Michalska A. (1982). Prawa człowieka w systemie norm międzynarodowych (*Human rights in the system of international norms*). Warszawa-Poznań.

Michalski M., Syryt A. (2018). Historical-Cultural and Legal Aspects of the Right to Privacy and Spatial Information. Challenges Related to the Development of Technology: Constitutional Standards (Polish Case). In: 25th Anniversary Conference Geographic Information Systems Conference and Exhibition "GIS Odyssey 2018", pp. 354–363.

Mik C. (1994). Koncepcja normatywna europejskiego prawa praw człowieka (*The normative concept of European human rights law*). Toruń.

Muszyński M. (2022). Siła. Norma. Idea. Prawo międzynarodowe w ujęciu historycznym (*Strength. Standard. Idea. International law in historical perspective*). Warsaw.

Osiatyński W. (1996). Wprowadzenie do pojęcia praw człowieka (*Introduction to the concept of human rights*). In: Szkoła Praw Człowieka. Teksty wykładów (*School of Human Rights. Lecture texts*). Warsaw.

Osiatyński W. (2004). Wprowadzenie do pojęcia praw człowieka (*Introduction to the concept of human rights*). Law through Experience, 116881-CP-1-2004-SK-GRUNDTVIG-G11.

http://www.psep.pl/grundtvig/1/wprowadzenie_do_pojecia_praw_czlowieka.pdf [access: 02.05.2022].

Piechowiak M. (1997). Pojęcie praw człowieka (*The concept of human rights*). In: L. Wiśniewski (ed.), Podstawowe prawa jednostki i ich sądowa ochrona (*Basic individual rights and their judicial protection*). Warsaw, pp. 7–37.

Pietrzykowski T. (2013). Przeszłość i przyszłość filozoficznoprawnej idei praw człowieka (*The past and future of the philosophical and legal idea of human rights*). Filozofia Publiczna i Edukacja Demokratyczna, vol. II, no. 2, pp. 212–232.

Place Matters in the Helping Professions: GIS for Human and Social Services Organizations, An Esri White Paper, April 2011, <https://www.esri.com/content/dam/esrisites/sitecore-archive/Files/Pdfs/library/whitepapers/pdfs/gis-for-human-svc-and-ssos.pdf>. [access: 07.05.2022].

Reynolds H. (1997). An Introduction to Geographical Information Systems (GIS). https://badpets.net/IntroGIS/GIS_Intro.pdf [access: 07.05.2022].

Roszevska K. (2021). Geographic Information Systems and accessibility for persons with disabilities, GIS Odyssey Journal, vol. 1, no. 2, pp. 21–29.

Scholten H.J., De Lepper M.J.C. (1995). An Introduction to Geographical Information Systems. In: M.J.C. De Lepper, H.J. Scholten, R.M. Stern (ed.), The Added Value of Geographical Information Systems in Public and Environmental Health. The GeoJournal Library, vol 24. Springer, Dordrecht, pp. 53–70.

Stępnia K. (2019). Koncepcja jurydyzacji czwartej generacji praw człowieka w międzynarodowym systemie ochrony (*The concept of juridization of the fourth generation of human rights in the international protection system*). *Przegląd Sejmowy*, vol. 151, no. 2, pp. 97–121.

Świtła K. & Sikorski S. (2021). Use of GIS in Healthcare. *GIS Odyssey Journal*, vol. 1, no. 2, pp. 83–90.