GREENERY AS A MATTER OF SECURITY FOR CITIZENS INVOLVED IN DIGITAL CRIME MAPPING BY THE USE OF GIS-BASED TOOL IN POLAND

Kinga Kimic [1], Paulina Polko [2]
[1] Department of Landscape Architecture, Institute of Environmental Engineering, Warsaw University of Life Sciences – SGGW, Nowoursynowska Street 159, 02-776 Warsaw, Poland
[2] Faculty of Applied Sciences, WSB University, Cieplaka Street 1C, 41-300 Dabrowa Gornicza, Poland

https://doi.org/10.11118/978-80-7509-831-3-0152

Abstract
National Map of Security Threats (NMST), implemented in Poland in 2016, is a GIS-based tool for digital crime and threat mapping involving citizens in shaping local security by reporting neighborhood hazards. Among 26 categories of threats possible to report, 5 are directly related to greenery. The study aimed to identify the advantages and disadvantages of this tool related to data collection and its practical use as a source supporting security in the category of greenery. The advantages of the NMST include modern (online) and an anonymous way of reporting dangers by respondents as part of joint involvement in shaping local safety, etc. The disadvantages include limited data and restricted access, resulting in difficulty in analyzing the detailed information and no possibility of comparative analysis due to limited data storage time. Due to the predominance of limitations, this tool should be developed in the direction of tracking long-term trends by access to older data, the possibility of assessing the effectiveness of actions taken against threats, the opportunity of reporting threats also out of the current list to increase the social usefulness of the NMST related to access and usage of urban green areas.

Key words: urban green spaces, public safety, digital crime mapping, social participation, placemaking, Poland

Introduction

Advanced crime mapping methods have been used for a dozen years to analyze, prevent, and combat crime. Initially served only specialized formations dealing with fighting crimes, they became sources of public information on the level of security in particular locations. Developing these methods in the 21st century is related to interacting with citizens, who turn from data recipients to their co-creators. Modern crime mapping is used to visualize crime, analyze already collected records, and make the data available to the public. Its crucial goal is to involve city residents in reporting dangerous places and events (which do not require immediate intervention) in the neighborhood, thus shaping local security (Szyszka and Polko 2020).

National Map of Security Threats (NMST) (Krajowa Mapa Zagrożeń Bezpieczeństwa, 2022) is a tool implemented in 2016 by the Police in Poland. The map lists specific, most common threats to the safety of human life and health, property, and public order, taking into account their spatial distribution. Their occurrence is essential from the point of view of society, the Police, and other bodies and institutions and affects the feeling and enforcement of security (Stawnicka and Klonowska 2018). Reports made by citizens are visible down to the exact street and number (if this can be indicated). The map allows for statements to be made in 26 hazard examples. Reports in a given location are marked with different colors indicating their status: new, verification, confirmed, approved and transferred to other institutions, authorized and eliminated, unconfirmed.

After five years of operating the NMST in Poland, 2.122.772 reports were recorded at the end of 2021. On average, over a thousand threats are placed every day, and according to police statistics, about half of them are confirmed.

The data available for an external website user allows seeing only threats placed within the last 30 days. Threats from the publicly accessible part of the map are removed depending on status: threats considered a joke or a mistake are removed when this status is granted, threats considered unconfirmed - after seven days from granting such status, while the eliminated threats are visible for 30 days. At the same time, selected categories (the use of drugs, animal abuse) are not available for external users of the map.

Selected threats recorded through the NMST are related to popularly visited urban green areas. Identifying hazards, including the scope and access to the collected data, is crucial to eliminating undesirable behaviors from those places. It may also be helpful for both supporting the revitalization and rehabilitation of existing green areas, as well as planning and designing new ones. Therefore, in

the first stage, the study aimed to recognize the diversity of possible threats assigned to the category of greenery through the NMST. In the second stage, it was crucial to identify the advantages and disadvantages of this tool related to the scope of data collection and accessibility and its practical use as a source supporting safety in this particular category.

Material and methods

For the pilot study, the data obtained from the NMST on 27/03/2022 were used. The available 26 types of threats were assigned to 7 categories: 1) demoralization/vandalism, 2) threats related to water, 3) threats related to the greenery devastation, 4) threats related to road traffic, 5) threats related to poverty, 6) threats related to using alcohol or drugs, and 7) threats related to animals (Table 1). Detailed identification of threats allowed assigning 5 of their types in the greenery category. Then, the NMST tool was characterized in terms of available information and the scope of its processing. It included data on reports, such as: general number, new and under verification, confirmed, confirmed and transferred to other services, confirmed and eliminated, unconfirmed. The percentage amounts of total confirmed and eliminated reports compared to all reports in each category were also presented.
Data obtained from the NMST in the category of greenery include 5 types of threats: 'the burning of grass', 'wild waste dumps', 'illegal logging', 'destruction of greenery', 'driving quads in forest areas' (Table 2).

Results

According to the analysis of the collected data, greenery is the second category, after traffic, in which the most cases of threats were reported. It also has a high rate of confirmed submissions (82.09% = third place overall), which shows that applicants take the NMST and the subject matter they report seriously.
Regarding individual threats assigned to the greenery category (its devastation), it should be noted that there are only 5 of them, which is a small share about the available 26. At the same time, among those listed (Table 2), the most notifications (3638) were recorded in the case of 'wild waste dumps'. This threat is higher than others in this category. The following threats reported by map users were: 'destruction of greenery', 'burning of grass' and 'driving quads in forest areas', which obtained much fewer reports – between 158 and 283. The least numerous group is represented by 'illegal logging' with only 82 reports.

Tab. 1: List of notifications regarding possible categories of threats placed on the NMST (Source: own study, data from: Krajowa Mapa Zagrożeń Bezpieczeństwa, 2022, https://mapy.geoportal.gov.pl/iMapLite/KMZBPublic.html, accessed on 27.03.2022)

CATEGORY	Number of reports (general)	New and under verification reports	Reports confirmed	Confirmed, transferred to other services	Reports confirmed and eliminated	Unconfirmed	Confirmed total	Confirmed % of all reports in the category	Eliminated % of confirmed reports in the category
DEMORALISATION/ VANDALISM	2158	394	961	239	336	239	1507	69,83%	15,57%
WATER	20	2	2	6	9	1	17	85%	45%
GREENERY	**4322**	486	992	1973	583	286	3548	82,09%	13,48%
TRAFFIC	**39634**	3514	16434	7245	10283	2132	33962	85,68%	25,94%
POVERTY	379	51	208	17	70	33	295	77,83%	18,46%
ALCOHOL/DRUGS	**4178**	629	1862	26	1330	331	3218	77,02%	31,83%

Tab. 2: Main characteristics of threats in the category of greenery (Source: own study, data from Krajowa Mapa Zagrożeń Bezpieczeństwa, 2022, https://mapy.geoportal.gov.pl/iMapLite/KMZBPublic.html, accessed on 27.03.2022)

CATEGORY / HAZARD		Number of reports (general)	New and under verification reports	Reports confirmed	Confirmed, transferred to other services	Reports confirmed and eliminated	Unconfirmed	Confirmed total	Confirmed % of all reports	Eliminated % of confirmed reports
GREENERY	The burning of grass	161	61	30	4	9	57	43	26,71%	5,59%
	Wild waste dumps	**3638**	294	822	1902	482	138	3206	88,12%	13,25%
	Illegal logging	82	25	10	15	13	17	38	46,34%	15,85%
	Destruction of greenery	283	49	95	21	76	42	192	67,84%	26,85%
	Driving quads in forest areas	158	57	35	31	3	32	69	43,67%	1,89%
GREENERY TOTAL:		4322	386	992	1973	583	286	3548	82,09%	13,48%

Discussion

The positioning of the greenery category as the second among the 7 in the ranking in terms of the number of applications indicates that there are many threats in green areas, which may significantly reduce the sense of security of their users. The impact of undesirable behaviors on the sense of security in urban greenery is confirmed by many studies from European countries (Maruthaveraan and Kronijndendijk 2014; Mak and Jim 2021), including those concerning the use of Polish green areas (Lis et al. 2019; Polko and Kimic 2022).

The evaluation of the MNST tool shows that the main advantages include: modern (online) and an anonymous way of reporting dangers by respondents as part of joint involvement in shaping local safety, showing trends in increasing and reducing risks in locations' greenery. However, the map has some limitations regarding the scope and use of collected data. First, it only gives the current stage of threats and makes it impossible to track changes in time (annual and multi-year) or seasonal terms. Data should be collected regularly and submitted for comparative analysis to provide a long-term perspective. Also, there is no information about re-reports in the place of already eliminated threats - only the Police have access to this data.

Secondly, the tool's design that allows reporting threats only from a closed list prevents citizens from submitting other real hazards. Only 5 of 26 types of threats are directly related to the category of greenery and its devastation. However, they do not exhaust many other potential hazards, such as acts of vandalism resulting in the devastation of equipment and architectural objects, littering the space (Hilborn 2009; Polko and Kimic 2021), contamination with dog feces (Corti et al. 1996; Bedimo-Rung et al. 2005), maintenance and condition of greenery in general, not only in the context of its devastation (Bixler 1997; Suchocka and Kimic 2019; Kimic and Polko 2021), and many others. Although the Police declare that new types of threats can be added to the menu in MNST during the evaluation process of this tool.

Conclusions

The results of the pilot study presented in this paper show that the greenery category, as one of very important for identifying threats through the National Map of Security Threats, requires extending the list of available options (types of threats). This is key to popularizing this tool by encouraging applicants to use it more often as more compatible with the actual situation and to increase the social usefulness of the NMST related to access and usage of urban green areas. At the same time, it is crucial to expand the scope of the collected information about potential threats and their location to accelerate, in practical terms, rehabilitation and revitalization of green areas through more effective prevention and taking actions to transform them into more safe spaces. Due to the predominance of

limitations, the MNST tool should also be developed to increase access to collected information to allow tracking of long-term trends by access to older data and assessing the effectiveness of actions taken against threats.

References

Bedimo-Rung A.L., Mowen A.J., Cohen D.A., (2005). The significance of parks to physical activity and public health: a conceptual model, American Journal of Preventive Medicine, 28 (Suppl 2), 159-168. doi: 10.1016/j.amepre.2004.10.024

Bixler R.D.; Floyd M.F., (1997). Nature is Scary, Disgusting, and Uncomfortable, Environment and Behavior, 29, 443-467. https://doi.org/10.1177/001391659702900401

Corti B., Donovan R., Holman C., (1996). Factors influencing the use of physical activity facilities: results from qualitative research, Health Promotion Journal of Australia, 6(1), 16-21. doi: https://search.informit.org/doi/10.3316/ielapa.461582631812285

Hilborn J., (2009). Dealing With Crime and Disorder in Urban Parks. Office of Community Oriented Policing Services, U.S. Department of Justice.

Kimic K., Polko P., (2021). Perception of natural elements by park users in the context of security. In: Fialová J. (ed.) Public recreation and landscape protection – with sense hand in hand! Conference proceedings, 10th-11th May 2021, Křtiny. Brno: Mendel University in Brno, 354-357. ISBN 978-80-7509-779-8.

Krajowa Mapa Zagrożeń Bezpieczeństwa, (2022). Available online: https://mapy.geoportal.gov.pl/iMapLite/KMZBPublic.html (Accessed on: 23.02.2022)

Lis A., Pardela Ł., Can W., Katlapa A., Rąbalski Ł., (2019). Perceived Danger and Landscape Preferences of Walking Paths with Trees and Shrubs by Women, Sustainability, 11, 4565. doi: https://doi.org/10.3390/su11174565

Mak B.K.L., Jim C.Y., (2021). Contributions of human and environmental factors to concerns of personal safety and crime in urban parks. Security Journal, 35, 263-293. doi: https://doi.org/10.1057/s41284-020-00277-9

Maruthaveeran S., Konijnendijk van den Bosch C.C., (2014). A socio-ecological exploration of fear of crime in Urban green spaces – a systematic review, Urban Forestry & Urban Greening, 13(1), 1-18. doi: 10.1016/j.ufug.2013.11.006

Polko P., Kimic K., (2021). Condition of urban park infrastructure in the context of perceived security of park users. In: 3rd International Conference: Advances in Environmental Engineering, November 25-26, 2021, Czech Republic, on-line, IOP Conference Series: Earth and Environmental Science, vol. 900, nr 1, 012036.

Polko P., Kimic K., (2022). Gender as a factor differentiating the perceptions of safety in urban parks, Ain Shams Engineering Journal, 13(3), 101608. doi: https://doi.org/10.1016/j.asej.2021.09.032

Stawnicka J., Klonowska I., (2018). Krajowa Mapa Zagrożeń Bezpieczeństwa nową formą dialogu polskiej Policji ze społecznością lokalną na rzecz bezpieczeństwa wewnętrznego – w aspekcie społeczno-pedagogicznym, Humanitas: Sosnowiec.

Suchocka M., Kimic K., (2019). Management of urban forest to ensure the safety of touristic use on the example of Warsaw. In: Fialová J. (ed.) Public recreation and landscape protection – with sense hand in hand! Conference proceedings, 13th-15th May 2019, Křtiny. Brno: Mendel University in Brno, 236-239. ISBN 2336-6311.

Szyszka M., Polko P., (2020). Interactive Maps of Social Problems and Security Threats Illustrated with the Example of Solutions Currently Used in Upper Silesia, Sustainability, 12, 1229. doi: https://doi.org/10.3390/su12031229

Souhrn

Národní mapa bezpečnostních hrozeb (NMST), zavedená v Polsku v roce 2016, je nástroj založený na GIS pro digitální mapování kriminality a hrozeb, který zapojuje občany do utváření místní bezpečnosti tím, že hlásí nebezpečí v okolí. Mapa - otevřená pro externí uživatele - je zdrojem informací o běžných hrozbách pro bezpečnost lidského života a zdraví, majetku a veřejného pořádku s přihlédnutím k jejich prostorovému rozložení podle názoru uživatelů. Z 26 kategorií hrozeb, které je možné nahlásit jako místní nebezpečí, se pouze 5 přímo týká zeleně. Cílem studie bylo zjistit výhody a nevýhody tohoto nástroje související se sběrem dat a jeho praktickým využitím jako zdroje podporujícího bezpečnost v kategorii zeleně. Mezi identifikované výhody patří moderní (online) a anonymní způsob hlášení nebezpečí respondenty v rámci společného zapojení do utváření místní bezpečnosti, který ukazuje konkrétní trendy zvyšování a snižování rizik v lokalitách zeleně. Mezi nevýhody patří omezený počet dat, omezené kategorie hrozeb, omezený přístup, a tedy obtížná analýza podrobných dat, nemožnost srovnávací analýzy vzhledem k omezené době uložení dat apod.

Vzhledem k převažujícím omezením by měl být tento nástroj rozvíjen směrem ke sledování dlouhodobých trendů přístupem ke starším datům, možností vyhodnocování účinnosti přijatých opatření proti hrozbám, možností hlášení hrozeb i mimo aktuální seznam, aby se zvýšila společenská využitelnost NMST související s přístupem a využíváním ploch zeleně.

Contact
Dr. Kinga Kimic
E-mail: kinga_kimic@sggw.edu.pl