

Public Education as a Factor Contributing to Minimizing Losses Caused by Natural Disasters*

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Abstract

The paper presents educational and information measures, targeted at the residents of Poland, adopted to reduce the losses caused by natural calamities. It is particularly important to increase the awareness of children and older people about natural hazards and proper behavior in the event of danger. It is ultimately up to the individual citizens whether the proposed crisis management solutions are implemented, thereby increasing the effectiveness and efficiency of the efforts to minimize disaster-related losses. Given the anticipated forms of climate change-related hazards and current space management policy, we should get ready for the occurrence of natural disasters, as the better an individual preparation for disasters, the lower the losses and the risks to life and human health. The article presents the activities of Polish local governments, NGOs and state institutions in the scope of raising awareness among children, young people and adults about the ways to prepare for a natural disaster, strategies for survival and restoration of the ensuing damage.

Keywords: Public education in Poland, Emergency communication systems, Natural disasters-Research; Mass media-Social aspects

1. Introduction

The number of natural disasters taking place in Poland and worldwide is on the rise year by year. Over the past twenty years, the vast majority of disasters (90%) has been caused by floods, storms, heat waves and other weather events. The CRED's Emergency Events Database reports that there were 6 457 weather catastrophes worldwide between 1995 and 2015. In the aforementioned period, 606,000 people lost their lives - an average of 30,000 a year, and an additional 4.1 billion people suffered and were left without a roof over their heads. (The Human Cost of... (online).

One should therefore ask the following questions: what measures should be taken to improve the protection against natural disasters and how to ensure their high social approval? Are these measures supposed to focus solely on reducing greenhouse gases, building hydrological infrastructure etc. or should they also incorporate educational activities aimed at general public?

2. Method

The article presents the results of the research carried out by the author in 2013 within the framework of the project 'UR-Modernity and the Future of the Region' and financed by the European Social Fund. The research gathered information from:

(i) 500 people who experienced the detrimental effects of the floods in 2010 - surveyed by means of a questionnaire survey. Deliberate sampling was used due to the scale of damage suffered by the flood victims from rural areas: Szczurowa, Wilków, Cisek and municipalities: Sandomierz, Jasło, Bogatynia.

(ii) 25 flood victims and 25 people who provided assistance to victims - respondents answered the questions during individual in-depth interviews (IDI).

The study covered mainly the description of the floods and the support received by the victims. The most important research problems included: difficulties caused by a disaster, description of survivors and assistance strategies (Kinal, Wilk 2014).

Additionally, the article includes an analysis of the documents of the Ministry of National Education (core curricula) in the scope of educating students about natural disasters. It also gives an overview of available textbooks and educational campaigns aimed at raising awareness about the protection against impending threats caused by nature.

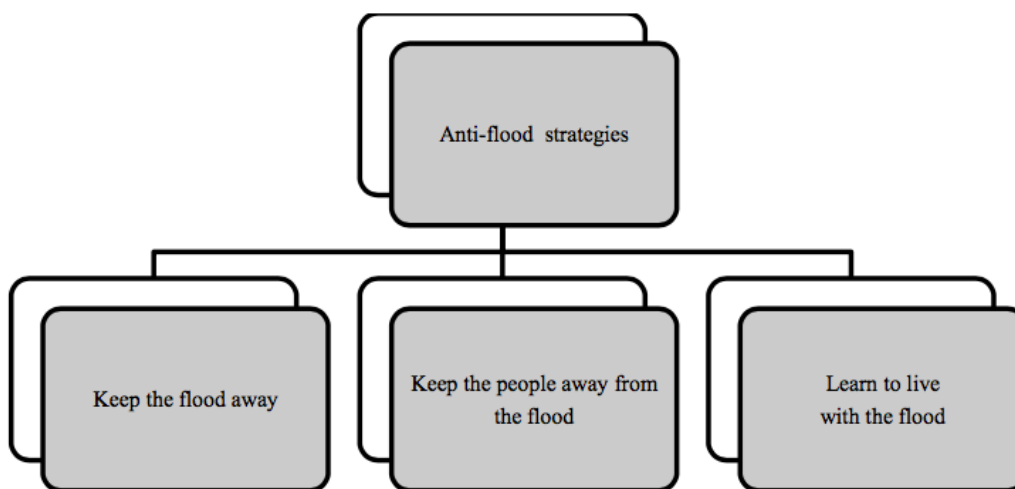
3. Findings

The article will present the measures implemented mainly by schools, non-governmental organizations and local governments in the scope of providing information and education about the most common

Polish natural disaster, i.e. flood. This natural phenomenon causes a lot of harm in the area of occurrence, but we can try to limit potential losses both in terms of infrastructure (property) and human life. What is important then, apart from building infrastructure, is taking preventive measures implemented through appropriate educational policy. The literature on the subject mentions three strategies aimed at protecting the citizens from the effects of floods (Siudak, Konieczny, Tyralska-Wojtycz 2012).tion of tourism students (Grade 3,Grade 4 and postgraduate) and their ecotourism perceptions.

- i. Strategy 1 – Keep the flood away from the people – using preventive technical means including the construction of shafts and tanks, as well as leaving the natural, undeveloped space,
- ii. Strategy 2 – Keep people away from floods - reducing the flood risk and the effects of floods by limiting uncontrolled building and land development on floodplains,
- iii. Strategy 3 – - Learn to live with floods – minimizing the losses by reducing flood vulnerability of buildings on floodplains and preparing residents to deal with the hazards before and after the flood.

Diagram 1. Anti-flood strategies



Source: own work based on SIUDAK, Małgorzata; KONIECZNY, Roman,; TYRALSKA-WOJTYCZ Elżbieta., 2013, How to cope with floods, Teaching materials for teachers, Extended 5th edition, IMGW, PIB, Cracow

Information and educational measures are aimed primarily at raising awareness about specific threats and promoting basic principles of behavior in the event of a disaster, as well as education in the scope of prevention of the emergence of threats related to natural processes. In the years 2009-2017 a new geography curriculum was introduced in the Polish education system. The reform provided for developing the following students' skills: scientific thinking, drawing conclusions and distinguishing causes from effects. According to the assumptions of the system improvements, it was more important for students to understand the mechanisms, processes and phenomena than an encyclopedic approach based on memorization of definitions and description of phenomena. When analyzing geography curriculum for lower-secondary schools, it should be pointed out that there was no direct reference in it to the issues connected with natural disasters, but indirectly, in point 3, we read as follows: "The application of geographic knowledge and skills in practice. The student uses geographic knowledge and skills to understand the modern world and his place in it; he uses geographic knowledge and skills in everyday life, e.g. when it comes to a rational use of environmental resources "(Journal of Laws, item 977, 2012, online).

In upper-secondary education (basic level) there was no immediate reference to natural disasters, either but they were reflected in general aims of education "I. Using various sources of information to analyze and present contemporary natural, economic, social, cultural and political problems. II. Formulating and verifying hypotheses about the problems of the modern world. III. Understanding the relationship between the man, nature and society on a global and regional scale "(Journal of Laws, item 977, 2012). Analyzing the curriculum for extended level of upper-secondary education, it should be pointed out that there was only indirect relevance to disaster-related issues, as it pointed to the ability to address problems in a geographic environment in harmony with the principle of sustainable development, as well as the use of Information and Communication Technologies (ICTs) and Geographic Information Systems (GIS) that can be used during natural disasters to monitor and warn the population of the imminent threat.

As pointed out by Maciej Lechowicz and Tomasz Nowacki, what was lacking in the teaching of lower-secondary and upper-secondary schools was the curricula related to the issues of natural disasters,

particularly floods. "There is clearly a lack of content that directly relates to one of the major types of natural disasters occurring in our country - floods. This shortcoming is all the more vivid, as at the same time, the issues related to seismology and volcanism, which do not occur in our country with similar intensity, have been given more attention in the curricula for both types of schools"(Lechowicz, Nowacki 2014, 94). Dorota Rucińska (2012), who comes to similar conclusions after analyzing the curriculum, emphasizes that only the term "natural disaster" was included in the geography curriculum, and it was later introduced into the content of textbooks and atlases with varying levels of detail. It should be noted, however, that the subject of Education for Safety, introduced in 2009 in lower-secondary schools and in 2012 in upper-secondary schools, proved to be of some assistance in shaping educational attitudes (Journal of Laws 2009, No. 4, item 17 (online)).

Within the framework of the curriculum, students went through an annual training cycle (an hour of training per week). It is worth mentioning that the formerly taught subject - Civil Defense Training was implemented in upper-secondary schools in a two-hour cycle. During Education for Safety classes, lower- and upper-secondary school students learned how to deal with fire, flood, terrorist attacks or road accidents. They were also trained in first aid, and this was the issue that was implemented in the most extensive way, as the limited number of classes made it difficult to cover the issues concerning the methods of protection against various hazards and preparedness for natural disasters.

Another reform of education, which will be implemented in 2017, assumes the transformation of current elementary schools (grades 1-6) and lower-secondary schools (grades 1-3) into 8-grade elementary schools. In the new primary school, geography will be taught in grades 5-8. When analyzing the assumptions of the core curriculum, it should be pointed out that in the scope of the issues regarding relations between the elements of geographic environment in selected areas of Poland, pupils will learn about the ways of managing the river basin to prevent the occurrence of water swellings and floods. According to the curriculum, pupils "will determine the impact of river basin deforestation, river channel regulation, the state of flood embankment, floodplain development and artificial water reservoirs on the occurrence and effects of water swellings and flood on the example of Lower Silesia and Małopolska" (Geography curriculum for primary schools, online). Additionally, the curriculum includes the issues related to cyclones and floods in North and South America. In 8th grade of elementary school the subject of Education for Safety will be introduced, in the scope of which students will get acquainted with "the principles of dealing with environmental hazards such as fire, floods, construction disasters, traffic accidents, radioactive contamination, heavy snowstorms, leaks of dangerous chemicals, and terrorist incidents. Students learn to follow the rules in the event of danger " Education for Safety curriculum for primary schools , online). At the time of writing the article, social consultations were carried out on the assumptions of post-primary education in the scope of a 4-year general secondary school, a 5-year technical school, and a 3-year-vocational school, so the final shape of flood prevention education is unknown. However, teachers can derive from the publication (which has reached 5 versions) discussing the strategies to prepare for floods (Siudak, Konieczny, Tyralska-Wojtycz 2012). It provides practical information on the measures that should be taken to safeguard houses and families against floods, the methods of response to flood warnings and ways to minimize the losses caused by natural disasters. The handbook contains lesson plans on how to deal with floods, as well as short workshops for children, thanks to which they learn about the flood occurrence characteristics .

What is essential from the point of view of protection against floods is building local monitoring systems, warning residents of an imminent threat. In the publication (Barszczyńska et al. 2005), the Polish 1997 flood experience was adopted as the starting point. The authors describe the ways to build a local flood monitoring and warning system (LSOP), as well as the ways to collect the data necessary to run the system. The handbook highlights one of the most important elements that guarantee the effectiveness of the system, i.e. the cooperation between local leaders, local governments and inhabitants. Local government officials are encouraged to participate in the public consultations that should accompany LSOP's construction, thereby enhancing its effectiveness. It also describes how to contact the media and local communities directly threatened by the possibility of flooding. Providing a constant update on the situation is particularly important in the context of the upcoming flood, during and after it. The discussed area of information activities –the cooperation between local governments, the media and the society is examined in the publication by the Institute of Meteorology and Water Management (IMGW) (Podraza 2003). It should be stressed that crisis centers are responsible for the design and implementation of crisis response plans, and local governments conduct educational programs, but the flow of

information depends on cooperation between the representatives of the press, radio, television and the Internet, including the social media. The content of the handbook is a result of experiences, studies and analyzes (interviews, meetings, discussions) conducted by IMGW employees, as well as professional

activities of the author (Urszula Podraza) and other journalists. The publication is aimed at improving the cooperation between the media, the institutions engaged in safety promotion programs and the inhabitants of disaster-prone areas.

An important publication on the support of victims of catastrophe is the study by Agnieszka Skowrońska (2014). The beneficiaries of the publication are mainly social workers, working in social assistance centers and implementing statutory goals in the scope of support following natural disasters (Journal of Laws 2004 No. 64 item 593, Article 7). The publication presents the issues related to social work in crisis situations. The handbook addresses the gaps in the scope of the studies devoted to educational and information measures aimed at representatives of aid institutions in disaster-prone areas. After the floods in 2010, non-governmental organizations, the Rural Development Foundation and 'For Better' Project Foundation implemented the project "Let's get ready together! Social consultations on flood risk management." Its purpose was to prepare residents and local authorities to participate in flood risk management consultations required by the Flood Management Directive. On the basis of gathered experiences, a handbook (Koniczny, Siudak 2015) was prepared to help rural communities understand the importance of public participation in preventing and minimizing flood damage. Among the initiatives that raise awareness and the level of activity of local communities, educational programs organized by local governments should be pointed out. One of them is an initiative of the Marshal Office of the West Pomeranian Voivodship in cooperation with local partners, i.e. the Education Board in Szczecin, 5th Engineering Regiment in Szczecin, West Pomeranian Board of Land Reclamation and Water Facilities in Szczecin, and the Water Volunteer Rescue Service in Szczecin. In 2017, 9th edition of the program was implemented, culminating in a contest. The initiative is addressed to students of 5th and 6th grades of primary school and 1st, 2nd and 3rd grades of lower-secondary school. The program ends with an inter-class contest after running a course in the flood education (during general educational classes, civic education or safety education classes).

"The aim of the contest is to broaden the knowledge of pupils and adults living in flood-prone areas on the phenomenon of floods and to help them realize that floods are inevitable, that they must take care of their own safety and that there are effective methods of limiting individual losses. The purpose of the contest is also to acquaint people with local flood risks in the past and present." (Marshal's Office (online)) There are also many other local initiatives in the field of flood education, e.g. a visual contest conducted in 2016 for elementary school students from Wyszaków municipality entitled Flood !!! - I keep a cool head. The project is being implemented as a part of a larger measure called Creating a Comprehensive Early Warning System in Wyszaków Municipality - Phase I, realized within the framework of the Program 'Together for the Sake of the Climate'. (Wyszaków Municipal office, online). Another example of educational activities addressed to children and teachers is the measure implemented by the Voivode of Lodz entitled I have a plan for the flood. Thanks to the funding obtained from the Provincial Fund for Environmental Protection and Water Management in Łódź in 2013, it was possible to carry out demonstration lessons on flood safety in 16 educational institutions in the Lodz province, attended by children living in flood-prone areas. More than 500 children were given information on how to behave before, during, and after the flood. In 2014 and 2015, the project was targeted at teachers who acquired the knowledge, materials and teaching aids needed to conduct flood safety classes. (Lodz Office, online)

Nowadays, the dominant role of the media in informing is undisputed. ICT development has an impact on society and possibilities to minimize disaster-related losses. (Bird, Ling, Haynes 2012, Perng, Büscher, et al. 2012, Houston, J. Brian, et al. 2015). Regional Warning System (RSO), which has been in operation in Poland since 2015, issues notifications of floods, strong winds, etc., appearing on TV and phone screens. The RSO system provides electronic messages, which are introduced into the system directly by the Regional Crisis Management Centers. The service of notifying citizens about local threats is carried out not only on the websites of provincial offices but also on television and mobile applications, as well as by sending alerts via text messages. The August 2017 hurricanes made it clear that the system was not working well. Representatives of the government administration are planning to review and improve it. As far as information measures are concerned, what seems to be most important is all the actions taken immediately before the occurrence of a natural disaster. The study conducted by the author (Wilk 2015) among people in 6 municipalities where the floods occurred in 2010 concluded that the people affected by floods irrespective of their area of residence agree that the most effective way of informing the inhabitants of the threat of flooding is announcing warnings from sound trucks (62.4% of respondents indicated this method as effective) and sending text messages on mobile phones (44.7%).

In the municipalities of Szczurowa, Jasło, Wilków and Sandomierz a higher percentage of respondents pointed to the effectiveness of announcements from sound trucks, in Cisek municipality both forms of providing

information were considered most effective by a similar percentage of respondents, whereas in the municipality of Bogatynia, the effectiveness was significantly more often attributed to text messages (almost 70% of respondents). Every fourth participant attributed high efficiency to radio announcements, and almost one in five - announcements on local television. Organizing information meetings with local emergency services is also worth noting - this solution has been rated as an effective way to warn about the upcoming floods by 12.1% of respondents, however, its popularity in the various municipalities covered by the survey is very diverse. Other forms of notifying residents (such as information leaflets, information in the local press and the Internet as well as the information provided to children in schools) are considered to be significantly less effective –they were indicated by fewer than 10% of the respondents. Detailed distribution of responses is presented in Table 1.

Table 1. The most effective ways to inform about the upcoming flood

Information on local TV	16,7	16,8	26,9	19,7	8,3	21,8	18,9
Information provided to children in schools	3,3	2,7	17,2	5,6	8,3	12,8	8,3
Announcements from sound trucks	80,0	76,5	72,0	63,4	41,7	32,1	62,4
Text message sent on mobile phone	40,0	45,6	24,7	43,7	45,0	69,2	44,7
I do not see the need to take such actions	0,0	0,7	2,2	1,4	0,0	3,8	1,5
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Types of measures	Municipality (in %)						Total
	Szczurowa	Jasło	Wilków	Sandomierz	Cisek	Bogatynia	
	N=30	N=149	N=93	N=71	N=60	N=78	N=481
Information meetings with local emergency services	16,7	9,4	17,2	8,5	18,3	7,7	12,1
Information leaflets	0,0	6,0	10,8	4,2	6,7	5,1	6,2
Information in local papers	0,0	2,0	8,6	4,2	3,3	1,3	3,5
Information on the radio	13,3	23,5	31,2	33,8	25,0	23,1	26,0
Information on the Internet	10,0	9,4	3,2	14,1	8,3	5,1	8,1

As the above results show, the information provided immediately before the occurrence of the disaster is very important. The fastest notification can be delivered via RSO, hence it is necessary to take actions promoting the system, so that as many people as possible receive information via text messages. After the storms of August 2017, the Polish government announced that plans would be made to improve the system for notification of impending natural hazards. Additionally, an educational campaign will be implemented as to how to behave in the event of natural disasters.

3. Results, Conclusions and Recommendations

Residents of the areas where floods may occur should be informed about the extent to which they are threatened, who and how will warn them of the impending cataclysm and where to evacuate in life-threatening situations. It is important to raise the awareness of both children and adults about natural hazards and proper behavior in disaster-related situations. It is up to the citizens whether the proposed solutions to crisis management will be put into effect, thereby increasing efficiency and effectiveness of actions aimed at minimizing catastrophic losses. The better individual preparation for disasters, the smaller the loss and the less threat to life and human health. Preparing the community to cope in the event of a natural disaster should be considered a major challenge for the authorities, national security institutions, education system, and individual inhabitants. As local community researchers point out "The

actions taken by the authorities or other institutions should take into account differences in perception of the threat, that is they should refer to specific local conditions rather than general patterns. Therefore, both the characteristics of natural disasters themselves and the history of their occurrence in the area, as well as the characteristics of local communities and their possible responses to natural disasters should be taken into account by the authorities in decision-making process" (Biernacki et al., 2009). The storms that occurred in August 2017 in Poland have shown that it is necessary to work with local communities to educate the public as to how to behave in a situation of imminent danger caused by nature.

References

- Anonim. (2009). *The Human Cost of Weather-Related Disasters 1995-2015* [online]. https://www.unisdr.org/2015/docs/climatechange/COP21_WeatherDisastersReport_2015_FINAL.pdf.
- Bird, D., Ling, M., & Haynes, K. (2012). Flooding Facebook-the use of social media during the Queensland and Victorian floods. *Australian Journal of Emergency Management, The*, 27(1), 27.
- Barszczyńska, M., Bogdańska-Warmuz, R., Konieczny, R., Madej, P., & Siudak, M. (2005). *Zdążyć przed powodzią. Przewodnik metodyczny na temat lokalnych systemów monitoringu i ostrzeżeń powodziowych*. IMGW, Kraków.
- Biernacki, W., Bokwa, A., Działek, J., & Padło, T. (2009). Społeczności lokalne wobec zagrożeń przyrodniczych i klęsk żywiołowych. *Instytut Geografii i Gospodarki Przestrzennej Uniwersytetu Jagiellońskiego*.
- Education for Safety curriculum for primary schools. (2016). <https://men.gov.pl/wp-content/uploads/2016/11/podstawa-programowa-przedmiotu-edukacja-dla-bezpieczenstwa.pdf>.
- Geography curriculum for primary schools. (2016). <https://men.gov.pl/wp-content/uploads/2016/11/geografia-podstawa.pdf>
- Houston, J. B., Hawthorne, J., Perreault, M. F., Park, E. H., Goldstein Hode, M., Halliwell, M. R., ... & Griffith, S. A. (2015). Social media and disasters: a functional framework for social media use in disaster planning, response, and research. *Disasters*, 39(1), 1-22.
- Journal of Laws, item 977, 2012, Rozporządzenie Ministra Edukacji Narodowej z dnia 27 sierpnia 2012 r. w sprawie podstawy programowej wychowania przedszkolnego oraz kształcenia ogólnego w poszczególnych typach szkół, Warszawa [online]. <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20120000977>
- Journal of Laws 2009, No. 4, item 17. Rozporządzenia Ministra Edukacji Narodowej z dnia 23 grudnia 2008 r. w sprawie podstawy programowej wychowania przedszkolnego oraz kształcenia ogólnego w poszczególnych typach szkół, Warszawa [online]. <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20090040017>
- Journal of Laws 2004 No. 64 item 593, Article 7. (2004), Ustawa z dnia 12 marca 2004 r. o pomocy społecznej, Warszawa [online]. <http://isap.sejm.gov.pl/DetailsServlet?id=WDU20040640593>
- Konieczny, R., Siudak, M. (2015). *Jak się przygotować do powodzi?. Poradnik dla mieszkańców*, Fundacja wspomaganie Wsi, Warszawa.
- Lechowicz, M., & Nowacki, T. (2014). Edukacja szkolna jako element procesu redukcji ryzyka klęsk żywiołowych. *Prace i Studia Geograficzne*, 55.
- Lódź Office [online]. <http://lodzkie.eu/page/3731, Konkurs-na-powodz-mam-plan-2015.html>
- Podraza, U. (2002). *Współpraca z mediami. Poradnik*. Kraków, IMGW.
- Perng, S. Y., Buscher, M., Halvorsrud, R., Wood, L., Stiso, M., Ramirez, L., & Al-Akkad, A. (2012). Peripheral response: Microblogging during the 22/7/2011 Norway attacks.
- Rucińska, D. (2012). Ekstremalne zjawiska przyrodnicze a świadomość społeczna. *Uniwersytet Warszawski, Wydział Geografii i Studiów Regionalnych*.
- Siudak, M., Konieczny, R., Tyralska-Wojtycz, E. (2013). *Jak sobie radzić z powodzią, Materiały dydaktyczne dla nauczycieli*, Wydanie V rozszerzone, Instytut Meteorologii i Gospodarki Wodnej, Państwowy Instytut Badawczy, Kraków,
- Skowrońska, A. (2014). *Pomoc społeczna w obliczu katastrof i kryzysów złożonych*. Centrum Rozwoju Zasobów Ludzkich.
- Wyszków Municipal office [online]. http://www.wyszkow.pl/gmina3/pliki/aktualnosci/2016/zaproszenia/konkurs_powodz.pdf
- Marshal Office Województwa Zachodniopomorskiego [online]. <http://www.stoppowodzi.wzp.pl/stop-powodzi-2017>

Wilk, S.(2015). *Praca socjalna w sytuacji klęsk i katastrof żywiołowych – studium przypadku powodzi w 2010 roku* (in)] Krzyszkowski, J., (ed.) *Praca Socjalna w poszukiwaniu tożsamości*, Wydawnictwo Akademii Pedagogiki Specjalnej, Warszawa.

Wilk, S., & Kinal, J. (2014). Flooding in Poland in 2010 as a Exemplification of Efforts of the Polish Social Work Services in Case of Disaster. *Mediterranean Journal of Social Sciences*, 5(13), 315.

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