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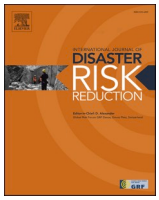

Analysis of the integrity of district crisis management plans in Poland

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ABSTRACT

This paper discusses the integrity of Crisis Management Plans (CMP) in Poland. Integrity is understood as the unified way of developing the CMP by different public administration entities. On the one hand, quantifying the scale of CMPs discrepancies is essential for estimating public administration readiness to assess threat risk on a national scale. On the other hand, recognizing the nature of the discrepancy may allow one to identify corrective actions to raise the level of CMPs effectiveness. However, there are no quantitative measurements of discrepancies of CMPs elements in Poland. Here, we fill this gap in the body of knowledge and quantify integrity and the scale of CMPs discrepancies. We analyze the scope of collected data and the form of their presentation in different CMP components. The study includes an analysis of CMPs developed at the district level in 2013–2015. To quantify integrity, we develop an evaluation template based on the formal and legal conditions in force. We use it to quantify the integrity in terms of the data presentation form and the completeness of the data set. The National Crisis Management Plan from the same period was used as a reference. We show that CMPs differ from the adopted benchmark in data presentation and the collected data set. It is worth emphasizing that the observed differences in data collection are mainly due to the lack of the element under consideration in CMPs. The observed differences may cause difficulties in the flow and aggregation of data and impede assessing the risk of threats.

1. Introduction

Ensuring public safety, defined as keeping the risk of threats affecting the public at an acceptable level, is a fundamental responsibility of the state. It means decreasing the impact of a crisis situation[1] – to achieve a level of impact caused by the occurrence of a threat that businesses or households can cope with using the standard instruments available in the economic system. Ensuring public safety in this context relies on the constant readiness of state authorities to identify, monitor, and respond to potential threats. That helps to ensure the stability of the living conditions and development of society. An efficiently managed state can ensure public safety by implementing a proper system of prevention and response procedures. The system must effectively deal with a threat and work independently of the individual competence of those implementing the procedures.

Activities related to ensuring public safety are carried out, among other things, within the framework of the process of civil planning[2] and crisis management[3] by the emergency services (fire brigade, ambulance, gas, water supply, police, etc.), crisis management structures (province crisis management centers, district and commune crisis management

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[1] Emergency situation - a situation affecting the level of security of people, property of considerable size or the environment, resulting in significant constraints on the operation of the competent public administration due to inadequacy of available forces and resources ([39], Article 3, point 1).

[2] Civil planning is the whole range of organizational undertakings aimed at preparing public administration for crisis management, as well as planning to support the Armed Forces of the Republic of Poland in case of their use and planning to use the Armed Forces of the Republic of Poland for crisis management tasks ([39], Article 3, point 4).

[3] Crisis management is the activity of public administrations as part of the management of national security, which consists in preventing crises, preparing to take control of them by means of planned actions, reacting in the event of a crisis, dealing with its effects and restoring assets and critical infrastructure ([39], Article 2).

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teams, public administration entities, private enterprises classified as the so-called critical infrastructure operators[4] and essential service operators[5]) and in exceptional cases by the military. One of the primary aims of the process of civil planning and crisis management is to coordinate the work of services, institutions, and organizations that do not usually cooperate and that have to proceed according to their emergency response procedures [[1]; p. 28].

Determining the appropriate set of entities to respond to an adverse event requires a prior analysis of the threats to which the region or organization under consideration is vulnerable. This type of analysis is conducted with a risk assessment. It considers the likelihood of an event occurring, its impact, the safeguards in place, and the resources available to respond to the threat. Therefore, risk assessment is an essential part of the civil planning and emergency management process. In this context, the uniformity of data necessary to carry out a risk assessment becomes essential. Uniformity of data form accelerates its analysis, and uniformity of scope facilitates data aggregation from different sources. Especially in recent years, crisis management began to be perceived in systemic terms, which means an effort to integrate, but not centralize, all elements, links, microsystems, and subsystems into a single, integrated system involving all actors of the security scene of all verticals (government, local authorities, NGO, commercial and non-profit organizations), all sectors (public, private, cooperative and municipal), in all phases and concerning all threats [[2]; p. 67]. In the concept of crisis management referred to, the intensification of communication and information transfer processes and an increase in the level of coordination of multidimensional activities become essential [[3]; p. 125].

Public safety activities always present a challenge for emergency services and crisis management structures. This challenge escalates when resources from different areas of the country's administrative division need to be involved. Therefore, preparing the Crisis Management Plan (CMP), which indicates actions and necessary resources to respond to the identified threats, becomes crucial. The time of responding to the threat in the conditions of cooperation between the emergency services and crisis management structures from different areas of the country's administrative division depends on keeping a uniform standard of elaborate of the CMP [[4]]. Maintaining a single CMP standard facilitates the collection and aggregation of risk data and, consequently, increases the reliability of risk assessment [[5]], the level of which determines the strategy for dealing with risk [[6]].

In so far, research on the civilian planning process conducted carried out in Poland in the years 2013–2018 observed a lot of structural differences in CMPs [[7]; pp. 77–79]. The research provides qualitative results indicating the existence of a disparity problem in CMPs. However, there is a need for quantitative research to determine the scale of the problem. According to Decision No. 1313/2013/EU of the European Parliament and of the Council of December 17, 2013 on EU CMPs, as of 2016, EU members are required to present CMPs as an instrument for anticipating risks, assessing their impact, and developing, selecting and cost-effectively implementing risk reduction measures. Differences between CMPs make it difficult to efficient crisis management. Therefore, determining the scale of this phenomenon is essential. CMPs integrity shows the ability of a country's crisis management structures to manage risk within the governance functions: planning, organizing, effective implementation, and control.

Another reason for further research is the need to determine the nature of the discrepancies. Crisis management teams need to integrate available information quickly to make informed decisions on the spot and update their decisions as new information becomes available [[8]]. Moreover, teams with If-then plans consistently made more informed decisions when information was in a similar form. Preliminary experimental evidence indicates that assigning simple If-then plans had similar positive effects as providing a leader to steer team processes.

This paper discusses the integrity of CMPs in Poland. Integrity is understood as the unified way of developing the CMP by different public administration entities. On the one hand, quantifying the scale of CMPs discrepancies is essential for estimating public administration readiness to assess threat risk on a national scale. On the other hand, recognizing the nature of the discrepancy may allow one to identify corrective actions to raise the level of CMP effectiveness. However, there are no quantitative measurements of discrepancies of CMPs elements in Poland. Here, we fill this gap and quantify integrity and the scale of the CMPs discrepancies. We analyze the scope of collected data and the form of their presentation in different CMPs components.

The paper is organized as follows. The next section describes the importance of the integrity of Crisis Management Plans for the process of civil planning and crisis management and how this study connects to and supplements previous research. It also provides the importance of risk assessment in Crisis Management Plans and components of Crisis Management Plans, which is a background to hypotheses. Section 3 presents the research method, whereas Section 4 provides an overview of the results. The study's limitations and proposals for future research are discussed in Section 5.

2. Background

2.1. The importance of the integrity of Crisis Management Plans

Contemporary civil planning and emergency management processes should be considered in the context of New Public Management (NPM). The NPM focusing on the organization's aim and mission, meeting the needs of consumers, and promoting participatory governance rather than compliance with rules and regulations [[9]; p. 21 [10]; p. 44]. The concept of NPM is complemented by the concept of Public Governance (PG) [[11]; pp. 254–267 [12]; p. 17]. The PG aims to treat the public sector as part of the public network, linked to other stakeholders through procedures and consultation.

Threats emerging in the public space are becoming the subject of the influence of dedicated authorities, services and inspections, and other organizations, including the NGO. Adverse events such as a flood, epidemic, or lack of electricity often cause a cascade effect in which the materialization of one threat is the cause of the occurrence of another [[13]]. An example of such an effect can be a fire in a power plant, which causes a power outage. As a consequence of the power outage, the possibility of admitting patients to the hospital is limited, and the water supply is interrupted. Both hypothetical events caused by a power failure may have further negative consequences for society, causing difficulties in functioning and even life and health hazards. The multiplicity of these situations and the number of entities operating in the domain of civil planning and crisis management enforces the need for organized action.

On the one hand, these actions will allow preventing adverse events, and on the other hand, to respond to them, ensuring the public's safety as far as possible. Given the scope and diverse involvement of many entities, often NGO, the public administration has a coordinating role in crisis management phases. As a rule, public administration plays a similar role in the European Union and other Western countries. However, detailed solutions, e.g., regarding the formula and scope of emergency services or organizational structure, vary and depend on the country's potential and historical and social conditions [[1]; p. 7].

Poland, as a member of NATO and the European Union, is obliged to participate in planning activities related to collective security in

[4] Critical infrastructure is systems and their related functional facilities, including buildings, equipment, installations, services crucial for the safety of the state and its citizens and to ensure the efficient functioning of public administration entities as well as institutions and entrepreneurs ([39], Article 3, point 2).

[5] An essential service is a service that is essential for the maintenance of critical social or economic activities and is included in the list of essential services ([40], Article 2, point 16).

accordance with the NATO Strategic Concept [[14]] and the EU Civil Protection Mechanism (EUCMP) [41]. Both documents underline the need for a change of approach to public safety. The increase in the frequency of natural disasters, financial crises, epidemics and pandemics, terrorist attacks makes it necessary to change the perception of threats and increase the importance of non-military threats.[6] The philosophy of dealing with the identified threats has also changed. The reactive actions (reaction and recovery stages) that have so far prevailed in members state of the EU are complemented by preventive actions (prevention and preparedness stages) [41]. The scope of crisis management established in this manner can be seen, among others, in the organization of the Polish crisis management process, which has been divided into two parts [[15]; pp. 245–256]:

- stabilization period - a whole range of organizational activities undertaken at all levels of public administration, including preparation and implementation of measures to prevent threats, as well as the development and implementation of operational procedures,
- execution period - all activities undertaken due to the materialization of the threat that led to the emergence of a crisis situation and activities aimed at restoring the state before the threat materialized.

Correct implementation of preventive activities, including action planning, requires integration with other management instruments, especially in the domain of social logistics and cooperation with local communities [[16,17]; s. 86]. The integration tool is CMP, prepared at all levels of public administration: communes, districts, provinces, central government offices, states [39]. CMP is a kind of instruction coordinating the cooperation of emergency services and crisis management structures during the reaction to an adverse event [[18]; p. 181, [9]; s. 33].

An important stakeholder in the civil planning and emergency management process is the public. The response of members of the public during an adverse event can limit or escalate its effects. The literature emphasizes the relationships between threats and the development of security strategies and between the development of desired individual and social behavior and the security system [[19]; p. 12]. Knowledge about desired behavior is the basis for prevention. The members of the public may take this knowledge from the CMP.

In Poland, information about CMP is not promoted among the public. Emergency services, public administration entities, and critical infrastructure operators, and essential services are known about them. However, public members can be asked to learn about the CMP through the emergency notification system operated by the Government Centre for Security. In the event of a threat to the entire country or a specific region, the system sends SMS alerts that may include a request to read a specific section of the CMP. In Poland, the public can access the CMP in three ways: through the office's website, a public information request, and a personal visit to the local authority. Access to the CMP is difficult if it is not placed on the website of the local authority. Unfortunately, this is a frequent situation confirmed by the results of this research. In the case of a request for public information, the office has 14 days to respond. Also, a personal visit to the office in an emergency situation does not provide proper access to the CMP.

Because CMP is a tool that allows to the integration of actions taken by the emergency services, crisis management structures, and members of the public, it becomes a necessary condition of their effectiveness to keep the integrity of these documents in the scope of data collected and the form of their presentation. For example, the CMP studied components are the Procedures for the Execution of Crisis Management Tasks, Including those Related to Critical Infrastructure Protection. In the National Crisis Management Plan, adopted in the study as a benchmark, mentioned element is presented in tabular form, including data on the purpose of the procedure, the coordinator of the activity, the activity of participants, input data, output data, the legal basis, the course of the activity and its executor. The CMP under assessment will be considered compliant with the template in the area of Procedures for the Execution of Crisis Management Tasks, Including those Related to Critical Infrastructure Protection, if it contains a specified set of data and if it is prepared in the form indicated.

On the one hand, maintaining a single method of developing the CMP and a single set of data does not contradict the need to reflect in the CMP the region's specificity to which the plan applies. The region's specificity is reflected in the specific provisions of the applied procedures, or the list of threats to the considered region is vulnerable. On the other hand, the uniform form makes it easier for rescue services and crisis management structures to react to an adverse event.

Keeping a uniform CMP structure is essential when an adverse event involves emergency services, crisis management structures, and the public from different territorial areas. In such a situation, the response to the adverse event often escalates to a higher administrative level. That makes it possible to deploy resources and services available to other administrative entities, e.g., municipalities bordering the area affected by the adverse event. Response to the adverse event escalation occurs because a significant part of the tasks related to crisis management is carried out at the local (commune) level [[20]; p. 59]. The local level often has insufficient resources to limit the effects of threats such as flooding effectively.

An example illustrating the importance of keeping a uniform structure of CMPs are activities undertaken in response to Hurricane Sandy [[21]]. Thanks to the cooperation of services from different states of the USA, it allowed limiting its effects through the ability to cooperate effectively. This ability is achieved through the use of uniform procedures [[21]]. This ability was achieved by using standard procedures by all services involved in the rescue operation [[22]].

The need to maintain a uniform structure of CMP is also indicated by:

- The National Security System Development Strategy of the Republic of Poland 2022 - where the need to improve the effectiveness and integrity of the excessively dispersed national safety system is emphasized [44],
- provisions of the Crisis Management Act, among others: art. 9, item. 1, which indicates the coordination of the activities of government administration entities, state institutions, and services in crisis situations and art. 11, item 1, point 1. 2, which refers to agreeing on the CMP and preparing and initiating, in case of threats, procedures related to crisis management [39],
- conclusions from the "Report on the work of the inter-ministerial team to assess the functioning of the rescue and crisis management system" indicating the need for introducing agreements on joint implementation of tasks in the event of a crisis situation and the need to use the Polish Armed Forces to implement the tasks of the crisis management process [43 p. 41].

Maintaining a standard form of elaboration and a uniform set of data not only allows the effective introduction, collection, and sharing of information. It also provides support in identifying and analyzing threats. A uniform data standard (data form and data set) reduces the need to clean data before using it in analyses. Data cleaning accounts for two-thirds of analysts' time and involves removing redundant data, unifying the analyzed dataset, and adding missing data [[23]]. The data obtained in this way are a source of information for the conducted analyses. In particular, they are related to the occurrence of emergency situations, which may affect the effectiveness of the work of services involved in preventing and neutralizing threats. In addition, crisis

[6] Non-military threats - threats involving a combination of events in international relations where the conditions for the undisturbed existence and development of a country are likely to be reduced or lost, or where the sovereignty of the country is violated by non-armed violence against it [[38]; p. 176].

response procedures, operational procedures, or procedures for mobilizing state reserves, developed by recommendations, allow for more effective coordination of actions taken by different kinds of services and their standardization based on replication of good practices.

Research on the civilian planning process implemented in Poland which was conduct as part of the project "Highly specialized platform supporting civil emergency planning and rescue in the Polish public administration and organizational units of the National Firefighting and Rescue System" financed from the National Center of Research and Development funds in the years 2013–2018, identified a lot of structural differences in CMPs [[7]; pp. 77–79]. However, the survey results do not provide quantitative assessments to indicate the extent of the phenomenon. Furthermore, the qualitative assessments used, for example, incomplete, lack of information, high discrepancy, do not indicate the nature of the discrepancy of CMP components.

The issue of CMPs integrity has also been studied in Sweden. Research has shown that discrepancies with respect to how public administration authorities describe risks undermine their possibilities of using each other's assessments and hamper the prospect of attaining comprehensive pictures of risk at various levels of society [24]. Moreover demonstrated that uncommon categorization (different forms of data presentation) makes it difficult to compare and integrate information from various sources [25]. However, we cannot claim the opposite. A low degree of uncommon categorization does not necessarily mean that it will be easy to synthesize information from different sources. The set of data are also essential. For instance, if all actors omit assessments of how likely scenarios are, the extent of uncommon categorization would be low, but it would be difficult to estimate the overall risk within a geographical or functional area. Comparisons between individual assessments are enhanced if they are related to scales that include common reference points or if they include sufficient context in the form of motivation (i.e., background knowledge) to enable external actors to understand and validate the assessments. For these reasons, an ideal situation would entail a combination of a low degree of uncommon categorization (a similar form of data presentation) and a high degree of precision (same range of data), where assessments are supported by background information.

The degree of integrity of CMPs, which will be the result of the research, can be used to measure the degree of implementation of EU CMP records in Poland. According to Decision No 1313/2013/EU of the European Parliament and of the Council of December 17, 2013 on EU CMP, from 2016 EU members are obliged to present CMP as an instrument for predicting risks, assessing their impact, and developing, selecting, and cost-effectively implementing risk reduction measures. Showing that the Crisis Management Plans keeps integrity will prove the capacity of State crisis management structures to manage risk in management functions: planning, organizing, effective implementation, and control.

2.2. Importance of risk assessment in CMP

The prerequisite for initiating the planning process for emergency management is threat identification and risk assessment associated with them. That is supported by the research results on National Risk Assessment Methodologies for Emergency Management, including Australia, Sweden, Germany, Ireland, the Netherlands, and the USA [26]; pp. 21–22]. The manner of response to an identified threat depends on the level of risk that is associated with the identified threat. Civil planning and emergency management risk assessment are commonly carried out according to the principles outlined in the ISO 31000 family of standards addressed to the public, private or cooperative enterprises, associations, groups, and even individuals. ISO 31000 has been adopted by 41 countries, where it is the standard for risk management in the public sector of organizations [[27]; p. 11]. This standard indicates that risk is usually expressed in terms of risk source, potential event, consequence, and likelihood. Both the likelihood of a threat and its consequences can be expressed in different ways:

- No description of the likelihood
- Mere descriptions in words, without the use of scales
- Qualitative ordinal scale
- Semi-quantitative ordinal scale
- Quantitative scale

Findings indicate difficulties in integrating data on the probability of a threat and its effects developed according to heterogeneous descriptions. For example, combining the Quantitative scale with the Mere descriptions in words, without the use of scales [[4,28]]. Mixing different types of risk descriptions has a negative impact, particularly when it is used as a basis for comparing levels of risk in different parts of systems that exceed the analytical scope of single assessments (e.g., a geographical area, a functional sector, or a large company) [[25,29,30]]. In particular, it is difficult to compare and aggregate the risk assessments prepared in the first case quantitative scale and the second case mere descriptions in words without the use of scales. Discrepancies in the form and scope of the data also make the analyses of the cascade effect difficult. In a study devoted to scenarios of unfavorable events development, the author using data from two CMPs of neighboring provinces proposes a model allowing simulation of cascade effect for fire and epidemic threats. In both cases, there are differences in the CMP studies. In the case of the fire risk, the differences relate to the form of the data presented. In the case of province A, the risk of fire is defined in several categories, such as forest fire, city fire, etc. In the case of province B, there is only one category. The fire risk differences also relate to the adopted probability scale. In the case of province A, there is a five-level scale; in the case of province B, there is a three-level scale) [[31]]. Eventually, the data can be combined. However, it requires additional work, which lengthens the entire analysis process and increases costs.

The same research shows a positive correlation between combining quantitative and qualitative data to more accurately understand the phenomenon under consideration. Research in Sweden has shown that quantitative data supplemented with qualitative descriptions are more useful to decision-makers than analyses prepared based on qualitative data alone or quantitative data alone [[5]].

The government administration in Poland has so far not taken risk assessment issues into account in its tasks. Concerning adverse events, the activities of the administration generally came down to the appointment and maintenance of specialized services (State Fire Service, Police) and the development of plans to combat a given threat (anti-epidemic, flood control plans) [[32]; p. 41].

The term "risk" itself in national legislation concerned issues related to risk at work (i.e., factors that could endanger the life and health of a worker) and the activities of financial institutions. In a broader sense, the term "risk" did not appear until 2007 with the EU Directive on the Assessment and Management of Flood Risks [42, Article 2, point 2]. Another attempt to include issues related to risk management in public administration tasks was the enactment of the Crisis Management Act. The Act itself did not define the term "risk" but introduced the term "risk map" as a description depicting the potentially negative effects of the threat on people, the environment, property, and infrastructure. A situation resulting from the materialization of a threat was also described. Such an event was called a crisis situation understood as a situation that adversely affects the level of security of people, property in significant sizes or the environment, causing significant limitations in the operation of the relevant public administration bodies due to the inadequacy of their forces and resources [39, Article 3.1].

The above definition of a crisis situation is important because it is not the size of the event's effect but the limitation in the operation of public administration bodies that is the primary factor determining whether an event is a crisis. In this aspect, it is necessary to determine the overall impact of the occurrence of a threat on public administration structures.

Determining the overall impact of a threat, along with cascading effect analysis, requires cleaning data from multiple sources (multiple CMPs) in the analysis process. The data cleansing process will be much faster if the CMPs are developed to a uniform standard (data form and data set) [[33]]. The purpose of this activity is to provide a basis for decision-making concerning, e.g., the allocation of resources and prioritizing between risks, functional and geographical areas, and risk-reducing measures.

Previous research also indicates that one factor that has the potential to affect different stakeholders' ability to integrate information significantly is an uncommon categorization. The uncommon categorization means a situation when information sharing or ex-change is impeded by differences in how information is coded and categorized [[34]]. The term was used to describe the breakdown of communication in the intelligence community preceding the 11 September terrorist attack on the United States. A similar effect was observed in the 1997 floods covering Poland, Germany, and the Czech Republic [[35]; pp. 162–163]. Kramer's understanding of uncommon categorization is consistent with the study's understanding of the integrity of CMP, which refers to the form of CMP component development and the set of data collected.

In Poland, the document in which risk assessment is made is the National Security Danger Report [39, Article 5a]. Based on the reports, CMPs are prepared [39, Article 5]. These plans contain elements that allow their implementation to be ready for all required aspects (technical, organizational, and financial).

Since the Crisis Management Act does not define the term risk, the method of its determination is also not defined. This fact introduces discretion in characterizing the probability of the threat and its consequences by the public administration entities responsible for making the risk assessment in the National Security Danger Report. The Government Centre for Security attempted to standardize the process of risk assessment for security by issuing a recommendation and providing the public administration entities with a risk assessment sheet [39]. From the recommendation, it follows that the characteristics of the threat should include: the definition of the threat, the causes of its occurrence, an indication of the areas of occurrence, and the characteristics of the consequences in relation to the people, the economy, and the environment. On the other hand, the level of risk is calculated using the Semi-quantitative ordinal scale both in relation to the probability of the occurrence of the threat (for example, a frequent occurrence once a year) and the effects of the occurrence of the threat (for example, severe effects - the effects of the event include more than 1000 people, losses for the economy exceeding PLN 1 000 000, contamination of the environment within a radius of 20 km).

Overview of available papers indicates there is no coherent theory addressing the CMP integrity analyses. They indirectly indicate a positive correlation between the uniform development of data sets (uniform form of data presentation and uniform set of collected data) and the efficiency of data use. These studies are in the area of risk analysis, handling of adverse events, and data preparation in machine learning. Previous research indicates that how a risk assessment (or a CMP) is constructed does matter how it can be used. There are also studies indicating that the best analytical results come from a mix of quantitative data supplemented by explanations from qualitative data. In addition, previous research indicates that the more differences in ways of expression in two or more risk assessments, the harder it will be to integrate information from them. It consequently limits their usefulness to the decision-maker.

The previous research indicates that differences in how risk assessments and CMPs are developed are important. There is currently a lack of papers to determine the scale and nature of discrepancies in CMPs being developed in Poland and the EU. The lack of description of the nature of the discrepancies limits the ability to determine if the observed discrepancies limit the ability to aggregate data and conduct analyses to prepare response plans for adverse events, including those causing cascading effects.

Findings regarding the importance of maintaining the integrity of CMP and the role of risk assessment in CMP development led to the formulation of the following research questions:

- How high is the level of discrepancies of CMPs?
- What is the nature of the discrepancies observed?

3. Research method

The research was carried out on district CMPs approved in 2013–2015. The research covered districts from five provinces: Opolskie, Warmińsko-Mazurskie, Świętokrzyskie and Kujawsko-Pomorskie, Podlaskie. Eight districts were randomly selected in each province. The source of the CMP was the website of the district office or the office's response to a request for public information.

The CMP used in the crisis management process in Poland is a product of a complementary civil planning process executed in a two-year cycle. This process develops the CMP at all levels of public administration in the country and the emergency plans used by emergency services such as fire departments and ambulance services. In the first phase, National Security Threat Reports are prepared to begin with the commune level. Commune Reports on National Security Threats are the basis for preparing district Reports on National Security Threats; these form the basis for preparing provincial Reports on National Security Threats, then the governmental Reports on National Security Threats are prepared.

On their basis, the National Crisis Management Plan is developed, which is the basis for developing provincial CMPs, which are the basis for the district CMPs, which are the basis for the commune CMPs.

Different countries have developed their own ideas, traditions, and procedures for operating emergency and law enforcement forces, i.e., police, fire, ambulance, hospitals, or voluntary organizations. In England, the civil planning process develops Emergency Plans, Contingency Plans, Business Continuity Plans, Multi-agency Plans, Major Incident Plans [[9]; p. 33]. The plans that emerge from the civilian planning process also establish the rules for using the state's armed forces under consideration. The possibility of using the state's armed forces in the country is, in this case, sanctioned by appropriate legal acts. For example, in Poland, it is the Crisis Management Act and the Civil Contingencies Act in England.

In this regard, the form of civil planning will significantly depend on the style of emergency management adopted in the country [[1]; p. 7]. Therefore, the choice of CMP elements undergoing integrity assessment should be closely related to the country's legislation under consideration. In Poland, the content of the CMP has been defined in Article 5, item 2 of the Crisis Management Act. The plan consists of [39, Article 5, point 2]:

1. Main plan:
   a. Threats characteristics;
   b. Risk assessment of threats;
   c. Risk assessment of threats to Critical Infrastructures;
   d. Risk map;
   e. Threat map;
   f. Tasks and responsibilities of participants in crisis management in the form of a safety net;
   g. List of resources planned for use in crisis situations;
   h. Tasks defined in the short-term action plans referred to in Article 92 of the Law of April 27, 2001 - Environmental law (Dz. U. z dnia 2018 r. Poz. 799);
2. Set of emergency measures:
   a. Risk monitoring tasks;
   b. Mode of mobilization of necessary resources, participating in the execution of planned undertakings in case of a crisis situation;
   c. Crisis response procedures, defining manners to deal with crisis situations;

d. Cooperation between entities participating in the implementation of planned undertakings in case of a crisis situation, defining manners to deal with crisis situations cooperation between entities participating in the implementation of planned undertakings in case of a crisis situation;

3. Functional appendices of the main plan:
   a. Procedures for the execution of crisis management tasks, including those related to critical infrastructure protection;
   b. Organization of communications;
   c. Organization of the threat monitoring, warning, and alert system;
   d. Rules for informing the public about threats and measures to deal with them;
   e. Organization of evacuation from danger zones;
   f. Organization of emergency, medical care, social and psychological support;
   g. Organization of protection against threats for the considered area;
   h. List of agreements and contracts concluded in relation to the implementation of tasks contained in the crisis management plan;
   i. Rules and procedures for assessing and documenting damage;
   j. Procedures for mobilizing, state reserves;
   k. List of critical infrastructure located in a province, district, or commune covered by a crisis management plan;
   l. Priorities for the protection and recovery of critical infrastructure.

It should be noticed that the formal requirements for CMP do not include elements related to prevention focusing on aspects related to preparedness and response to emergencies. This conclusion is consistent with the observation of W. Skomra, who mentioned that the Crisis Management Act does not cover the tasks related to primary risk prevention. No risk management plans are prepared, and no risk prevention measures are being prepared or implemented [[15]; p. 247]. This fact indicates the discrepancy of the CMP content with the accepted definition of crisis management, indicating the equality of stabilization period and execution period. The relevant legislative bodies should eliminate this discrepancy.

Similar conclusions were indicated in the research results on the process of civil planning and crisis management. The authors noted that in the view of planning processes for the purposes of crisis management, the classical approach to the phases of crisis management should be taken into account, taking into account the phases of reconstruction and prevention, which is not always obvious, since the greatest importance is given to the response phase [[7]; p. 62].

An assessment template was used in the CMP Integrity Research. The components of the CMP resulting from the provisions of the Crisis Management Act (chapter of CMP) as defined in Article 5 were assessed. Each item indicated in the Crisis Management Act in this research is considered one CMP element to be assessed. Each element will be assessed in the dimension of the form of elaboration and the data set it contains. Because CMPs are to support actions in emergency situations and serve as a source of analyses of various services, at many administrative levels, the evaluation criteria concern the form of data presentation (unification in this area allows for faster reactions in emergency situations) and the scope of collected data (unification in this area allows for faster analyses).

Considering that the Crisis Management Act provisions are only general guidelines for the content of the CMP, it was assumed that the template to which the assessed CMPs were compared is the National Crisis Management Plan of 2013 (NCMP) [[36]]. The choice of the template was determined by the assumptions of the civil planning process, which indicate that the CMP at all administrative levels is developed in relation to the applicable NCMP.

Based on NCMP, criteria were developed, the fulfillment of which is the basis for recognizing the assessed CMP element as compliant with the benchmark. The criteria concern two areas: the form of data presentation and the scope of collected data. The criterion of the form of data presentation has two-state (same form or another form). Differences in the form of data presentation affect the time spent reviewing CMP records. These differences can also adversely affect the time taken to conduct analyses (e.g., data collected in tables are more quickly analyzed than those placed in a verbal description). The criterion of data coverage also has two states (smaller or comparable - not smaller - data set). Differences in the data set mainly affect the possibility and time required for data aggregation from different sources. The lack of certain categories of data may prevent full analyses (e.g., the lack of data on the probability of a threat occurrence prevents the assessment of risk associated with the considered threat). The absence of some data categories may be filled in from other sources. However, this action lengthens the analysis process.

An example of a defined criterion for a CMP element the Tasks and Responsibilities of Participants in Crisis Management in the Form of a Safety Net is:

- the criterion of the form of data presentation: a table of data categories with a verbal description,
- the criterion of data coverage: threat name, phase of the crisis management process, lead actor, supporting actor, the legal basis.

If the element being assessed in the district CMP is developed in a different manner than in the assessment criterion example above (e.g., it is developed as just a description or list of steps), this will be considered as a different form of development; similarly, for the data set criterion. If an assessed element in a district CMP provides a smaller data set (e.g., does not include lead actor information), this will be considered a smaller data set. Each element of the CMP being assessed will be assessed across two dimensions: form and data set. The two dimensions of assessment are separable. It means that the assessment of the form of data presentation does not affect the assessment of the set of data, e.g., a CMP element whose form of data presentation is assessed as different from the template may receive a positive assessment in the area of data set (comparable - not smaller - data set).

Based on the adopted criteria and their states, a scale was identified and used to assess CMP. Additionally, two ratings were distinguished: absence of the assessed element and additional element - not present in the benchmark:

- A - means that there is no element being assessed,
- B - means a smaller scope of data and another form of presentation,
- C - means a smaller scope of data and a comparable form of presentation,
- D - means an appropriate (not smaller) scope of data and a comparable form of presentation,
- E – means an appropriate (not smaller) scope of data and another form of presentation,
- F - means a situation in which the assessed CMP contains elements added to the benchmark.

Assessment of the CMP element is done by verifying the set of data categories. It is consistent with the benchmark and that the form of data presentation is as in the benchmark. Based on this, one of six ratings is assigned. If the elements assessed were given an F rating, the difference was marked on the Assessment Template, thus creating a list of possible good practices. A grade of F was given only to items whose data set was no less than that in the benchmark.

For confidential appendix o CMP, a 0 or 1 grade will be assigned:

- 0 - means no declaration of the appendix in the CMP under assessment,
- 1 - means declaration of the appendix in the CMP under assessment.

In order to consider an assessed element compliant with the benchmark, there had to be compliance of the form of data presentation and compliance of data set (D grade). Other cases are considered as

deviations from the benchmark. Depending on the nature of the deviation (of the form of data presentation or deviation of the data set), their impact on the effectiveness of the CMP or the ability to aggregate data may vary. Assessing the impact of the observed deviation is beyond the scope of this study and is an area for future research.

The CMP Integrity Assessment Template was divided into three parts:

- Part A - containing the administrative data of CMP (level of public administration, name of the entity publishing the CMP, year of issue, source),
- Part B - containing the hypotheses being tested and a list of the ratings that can be assigned to the CMP elements,
- Part C - Assessment Template for the elements of the CMP resulting from the Crisis Management Act.

A list of criteria for determining if the CMP element being evaluated conforms to the benchmark can be found in a separate document. For each assessed CMP element indicated in Article 5 of the Emergency Management Act, an individual assessment criterion was prepared in the area of the form and set of data. An example of such a criterion was given in the earlier part of the paper. Developing criteria for assessing the various elements of the CMP will maintain comparability of the scores obtained when more than one researcher conducts a study.

Two hypotheses resulting from research questions were put forward in the research:

- H1: The form of data elaboration in most of the district CMPs assessed is different from the benchmark,
- H2: The district CMPs are less detailed than the benchmark.

The H1 hypothesis was verified on the assumption that:

- the D, C, and 1 rating given to the elements under assessment mean that there are no significant differences of data form between the analyzed CMP and NCMP,
- the remaining rating indicates differences between the analyzed CMP and NCMP.

The H2 hypothesis was verified on the assumption that:

- the A, B, C, and 0 ratings given to the elements of CMP under assessment mean that it is less detailed than the benchmark (assessment element has a smaller data set),
- the D, E, and 1 rating means a similar level of detail in the CMP compared to the benchmark (assessment element has same data set),
- the F rating means more detail in the CMP than the benchmark (the assessment element has a wider range of data sets).

4. Research findings

The research carried out was preliminary. Therefore the conclusions of its results cannot be extended to the entire population. The research assumed the analysis of CMPs from five provinces, eight randomly selected districts each. The total sample size was 40 CMPs. Access to 17 CMPs were obtained, which constitutes 42.5% of the assumed research sample. Considering that CMP should be open documents available to companies, services, and citizens, the obtained result should be considered insufficient. Eleven CMP were available on the local government website. In addition, six CMPs were accessed as a result of a request for public information. Fig. 1 presents the number of analyzed CMPs by province.

Table 1 presents the summary results of the CMPs assessment.

Hypothesis H1 is related to differences forms of data presentation between county CMP and NCMP. Each of the 28 CMP elements was rated using an adopted scale. In the case of verification of hypothesis H1, only the form of data presentation was taken into account. In this case, compliance in the area of the set of collected data was not assessed.

The elements that received C, D, and 1 were summed up, and their sum was divided by the number of evaluated elements. That determined the proportion of CMP elements with the same form of data presentation for each seventeen CMP assessed. The results obtained range from 0% to 85.71% compliance (Fig. 2). It means that each district CMPs assessed has discrepancies regarding the form of data presentation in at least one CMP element assessed. In one case, discrepancies in data presentation form occurring in every CMP element were noted.

The obtained percentages of items with compliant data presentation were summed and divided by the number of CMP evaluated. The average form of data presentation in the CMP compliance rate was 50.42%, which means that most CMP survey items are made in the same form as the benchmark. In the context of the obtained results, it should be assumed that the H1 hypothesis is false for the test sample. However, an analysis of the individual performance of each CMP reveals that only seven CMP achieved a compliance rate above 70%. Among the remaining CMP, the results below 50% dominate, and in one case, the form of data presentation was completely different from the benchmark.

Table 2 shows a summary of all assessed CMP elements. Column C1 shows the percentage of ratings indicating a discrepancy in the form of data presentation (sum of B and E ratings) across all seventeen CMPs examined.

The obtained results do not indicate a high percentage of discrepancies in the form of data presentation of the assessed CMP elements. The CMP element with the highest degree of discrepancy with the benchmark is Procedure of Evacuation Organization from Danger Zones. In this element, 23.53% of evaluated CMPs have differences from the benchmark. It means that differences in data presentation were observed in four evaluated CMPs.

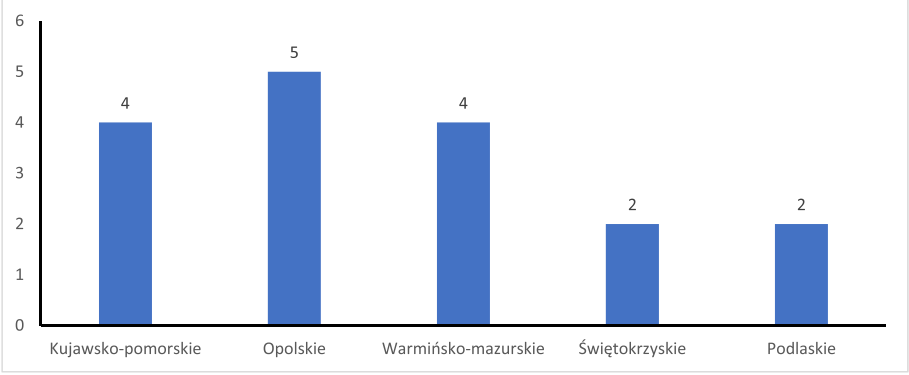

Fig. 1. Number of analyzed CMPs by province.
Source: Own elaboration

Table 1
Summary results of CMP assessment.

District	1. Main plan												2. Set of emergency measures				3. Functional appendices of the main plan											
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.8.1	1.8.2	1.8.3	1.8.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	3.11	3.12
	Threats characteristics	Risk assessment of threats	Risk assessment of threats to Critical Infrastructures	Risk map	Threat map	Tasks and responsibilities of participants in crisis management in the form of a safety net	List of resources planned for use in crisis situations	Tasks defined in the short-term action plans referred to in Article 92 of the Law of 27 April 2001 - Environmental law	List of entities using the environment, obliged to limit or stop introducing gases or dust into the air from the installation	Maner of organization and restrictions of movement of vehicles and other devices powered by combustion engines	The behavior of authorities, institutions, and bodies using the environment and the behavior of citizens in the event of exceedances	Determining the mode and manner of announcement of the occurrence of exceedances	Risk monitoring tasks	Procedure for mobilization of necessary resources, participating in the execution of planned undertakings in case of a crisis situation	Crisis response procedures, defining manners to deal with crisis situations	Cooperation between entities participating in the implementation of planned undertakings in case of a crisis situation	Procedures for the execution of crisis management tasks, including those related to critical infrastructure protection	Organization of communications	Organization of the threat monitoring, warning, and alert system	Rules for informing the public about threats and measures to deal with them	Organization of evacuation from danger zones	Organization of emergency, medical care, social and psychological support	Organization of protection against threats for considered area	List of agreements and contracts concluded in relation to the implementation of tasks contained in the crisis management plan	Rules and procedures for assessing and documenting damage	Procedures for mobilizing State reserves	List of critical infrastructure located in a district covered by a crisis management plan	Priorities for the protection and recovery of critical infrastructure
Aleksandrowski	D	D	A	A	A	B	D	A	A	A	A	A	F	F	F	B	D	F	B	D	B	D	D	D	B	A	0	A
Bydgoski	D	D	D	D	D	D	D	A	A	A	A	A	D	D	D	D	B	F	B	F	A	D	A	D	D	A	0	D
Głubczycki	D	D	D	D	D	C	E	A	A	A	A	A	D	A	D	D	A	F	A	E	D	D	D	D	D	D	F	D
Strzelecki	D	D	D	D	D	C	E	A	A	A	A	A	C	D	D	C	D	F	D	D	D	D	D	D	D	D	F	C
Gołdabski	D	D	A	D	B	D	D	C	A	A	A	A	D	D	D	D	D	1	D	F	D	D	D	D	D	D	1	C
Kielecki	B	C	A	A	A	D	E	A	A	A	A	A	B	D	D	C	E	F	C	D	B	B	E	D	B	A	1	A
Krapowicki	B	A	A	A	A	A	A	A	A	A	B	A	A	A	B	A	B	0	A	A	A	A	A	A	A	A	0	A
Lidzbardzki	D	D	A	C	C	D	C	D	A	A	A	C	D	D	D	D	D	1	D	D	D	D	D	C	D	A	1	A
Namysłowski	D	D	E	D	D	A	A	A	A	A	A	A	A	A	A	A	A	F	A	A	A	A	A	A	A	A	1	A
Nowomiejski	D	D	A	A	A	A	A	D	A	A	A	A	D	D	D	D	C	F	D	F	D	D	D	A	D	A	0	A
Oleski	D	D	D	D	D	D	F	A	A	A	A	A	D	D	D	D	D	F	C	C	D	D	D	D	D	D	F	D
Staszowski	C	B	A	A	A	D	F	A	A	A	A	A	B	F	E	C	D	1	C	C	B	C	F	D	C	A	1	D
Toruński	D	D	D	D	D	D	A	D	D	D	D	D	D	D	D	D	D	F	F	F	F	D	D	D	D	A	1	B
Wąbrzeski	D	D	A	A	A	B	A	A	A	A	A	A	B	B	F	C	D	F	B	D	B	D	B	D	D	A	0	D
Węgorzewski	B	D	A	D	A	D	A	B	A	A	A	A	C	A	A	A	A	0	A	A	A	A	A	A	A	A	0	A
Suwalski	D	D	D	A	D	D	D	D	A	A	D	D	D	D	D	C	C	0	D	C	D	D	D	D	D	D	1	D
Białostocki	D	D	D	A	D	C	D	D	A	B	B	D	D	C	D	C	C	1	D	D	D	F	F	C	D	D	0	D

A - means that there is no element being assessed, B - means a smaller scope of data and another form of presentation, C - means a smaller scope of data and a comparable form of presentation, D - means an appropriate (not smaller) scope of data and a comparable form of presentation, E - means an appropriate (not smaller) scope of data and another form of presentation, F - means a situation in which the assessed CMP contains elements added to the benchmark.

Source: Own elaboration

It is disturbing that despite a small percentage of observed differences in the form of data presentation, the most diverse element of CMP is Procedure of Evacuation from Danger Zones. According to the author, this is the element of CMP that should be the most unified because it is directly used during emergency response. In this case, the time spent on understanding the discrepancies may be determinant for the life and health of evacuated people.

The most common difference observed regarding the form of data presentation was using unstructured description in words instead of a tabular form. Another observed discrepancy was the use of only graphic diagrams without additional explanatory descriptions. Both forms of data presentation make it difficult to find the data we were looking for and to assess whether the CMP element being evaluated represented the required data set.

Another observed example of discrepancies in this area was the differences in the categorization of threat effects. The NCMP uses a categorization of economic, environmental, and population impacts. In some of the CMP studies, there were additional categories, for example, impacts on infrastructure or the degree of emergency services involved. Other surveyed CMP introduced their categorization of impacts by referring, for example, to only one element of financial loss or the number of people affected.

Differences were also observed in the scales used to assess the risk. Typically, the differences were in using a three-point scale (the template has a five-point scale).

Differences in the form of data presentation certainly do not facilitate joint actions of emergency services, public administration units, and communities from different territorial division areas. It may increase response time to the threat. Also, it can lead to the increase in negative consequences of the materialization of the threat to the economy, population, or environment. This conclusion is confirmed by research on codifying a crisis and progressing from information sharing to distributed decision-making [[4]].

The occurrence of form discrepancies in data presentation affects emergency response times and the ability to aggregate data. Determining the direction of this influence and its strength requires additional research, which is beyond the scope of this paper. To determine the direction and strength of the impact of form discrepancies in data presentation, the CMP developer interview method used in the study of emergency risk assessment in Sweden can be used [[5]].

The method of interviews with CMP constituents can be supplemented with simulation studies, e.g., simulations of emergency service operations based on staff drills [[37]]. The experiment could measure the time taken to make a decision by the same team operating, first, based on a CMP where the form of data presentation is uniform, and then operating based on a CMP where they are differences in the form of data presentation.

Hypothesis H2 is related to the convergence of the data set between district CMP and NCMP. Each of the 28 CMP elements was rated using an adopted scale. In the case of the verification of hypothesis H2, only the set of data was taken into account. In this case, compliance in the area of the form of data presentation was not assessed.

The percentage of elements with smaller data scope, same data scope, and wider data scope was determined by summing the ratings of the individual CMP elements in the three specified categories (Fig. 3). The resulting totals were then divided by the number of CMPs items assessed. The obtained results of the smaller level of detail of the CMP range from 10.71% to 100%. The same level of detail has from 0% to 67.86% of CMP elements. Wider level of detail has from 0% to 14.29% of CMP elements. The results obtained mean that there is at least one CMPs element with less data than the benchmark in each CMP assessed. In one case, a situation was observed where each CMP element contained less data than the benchmark.

In this case, a narrower range of data means that additional efforts are required to fill in the missing data. That makes the process of civil planning and crisis management at higher levels of public administration longer. Additional activities also increase the cost of the whole process. The more important in the case of emergency response is that emergency services, public administration units, and the public cannot find the information in the evaluated CMP. For example, such a situation hinders the functioning of the emergency notification system supervised by the Government Centre for Security. The system may refer the public of the region affected by the materialization of the threat to the data that will be missing in the district CMP. An example would be the lack of contact information for entities notified in the event of a threat materialization, which should be in the Emergency Response Procedures Defining How to Handle Emergency Situations.

Differences in data set also have a negative impact on the risk assessment process, which is the basis of civil planning and crisis management at every level of public administration. Differences in data affect the ability to accurately estimate the probability of a threat occurring and its consequences [[25]]. An example of discrepancies is the lack of defined probability of occurrence of the threat and determination of its causes. The lack of probability of threat occurrence makes it difficult to verify the level of risk associated with the threat in the CMP itself. It also creates a serious problem when aggregating data for a larger area, such as a region or the entire country.

Table 2 shows a summary of all assessed CMP elements. Column C2 shows the percentage of ratings indicating a gap in the data set (sum of A, B, and C ratings) across all seventeen CMPs examined. The data seen in Table 2 indicate that almost all CMP elements contain gaps in the dataset. The largest number of deficiencies in the data set occurs for the element: list of entities using the environment, obliged to limit or stop introducing gases or dust into the air from the installation and manner of organization and restrictions of movement of vehicles and other devices powered by combustion engines (94,1% cases).

The second observation indicates that in most cases, these gaps are due to the situation where the CMP being assessed does not contain the assessed element at all (Table 2 column C3). It is particularly disturbing because the list of elements that should be in the CMP is derived from the provisions of the Emergency Management Act. The absence of the CMP element indicated in the Act indicates the incompleteness of the plan under consideration. In the context of the results obtained, it should be assumed that the H2 hypothesis is true for the researched sample.

The analysis of the collected data also revealed situations in which CMP contained elements defined as confidential in the NCMP. The situation concerns chapter:

- the organization of communication - irregularities were observed in 10 CMP,
- the list of critical infrastructure located in the county covered by the CMP - irregularities were observed in the 3rd CMP.

The results of integrity analysis of CMP include a set of good practices observed in the manner of elaborating of the elements of the CMP, these are, among others:

- a scheme of information about the threat in the threat monitoring system showing the flow of information,
- scheme of activating structure in the scope of directing activities of effects removal of a natural disaster,
- procedures listed and described in the tables, in relation to only a description in the NCMP,
- presentation of the relations of the implemented procedures in the form of a diagram,
- example of warnings and messages,
- example of an evacuation record card.

Column C4 in Table 2 shows the percentage of CMP elements assessed as integral to the NCMP (D rating). It means that both the form of data presentation and the data set are the same as the benchmark. The integrity of the CMP elements likely means less time is required to

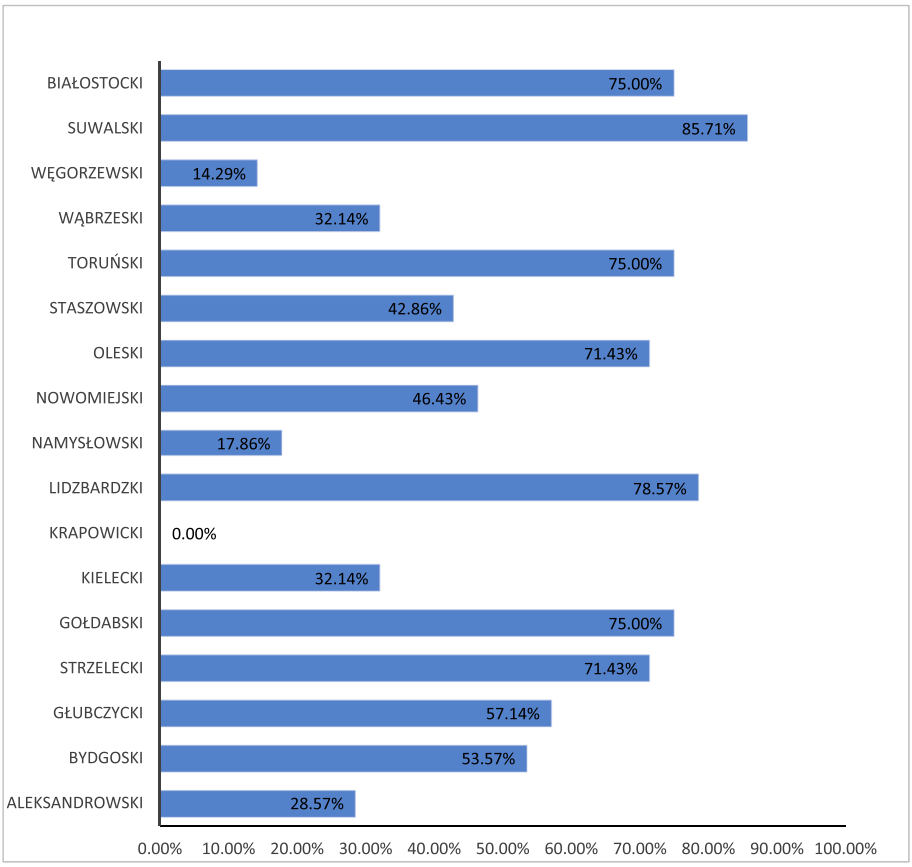

Fig. 2. The degree of compatibility of CMP with NCMP.
Source: Own elaboration

become familiar with the plan in an emergency event response situation. It is commonly believed that a shorter response time to an emergency event has a positive effect on the amount of financial loss, environmental damage, and the number of people affected. The integrity of CMP elements also means less time is required for various kinds of analysis. The time savings come because there is no need to create multiple data aggregation mechanisms for homogeneous data sets. As shown in Table 2, the degree of integrity of the various elements of the CMPs studied with the benchmark varies. The degree ranges from 0% to 82.39%. It indicates that there is a problem of discrepancy in the development of CMP elements. However, the research conducted does not answer questions about the impact of this. In particular, it is not known:

- Do the existing discrepancies cause difficulties in the flow of information (differences in the form of CMP component development), making it difficult to assess the risk of the observed threats?
- Do the discrepancies cause difficulties in data integration (differences in data collection), making it difficult to assess the risk of the observed threats?

In the author's opinion, the collected data justify the need to research the entire population of more than 2600 CMPs. Future studies should be supplemented with additional measures to answer questions about the impact of the observed disparities. Additional activities can be accomplished using the interview method and staff exercises.

5. Discussion of findings

Overview of available papers indicates there is no coherent theory addressing the CMP integrity analyses. They indirectly indicate a positive correlation between the uniform development of data sets (uniform form of data presentation and uniform set of collected data) and the efficiency of data use. Previous research indicates that the more differences in ways of expression in two or more risk assessments, the harder it will be to integrate the information from them. There is currently a lack of research to determine the scale of variation in CMPs being developed in Poland and across the EU. Few works indicate the existence of the CMP discrepancy problem (the form of data presentation and the set of data collected) while not discussing the nature of these discrepancies.

A CMP integrity research study was carried out in the paper, verifying two hypotheses concerning differences in detail and possibilities of data exchange and aggregation. The elements of CMP were determined by the Crisis Management Act and the adopted benchmark for implementing its provisions of the NCMP 2013. The research assessed only the form of the elaboration and uniformity of the data set of particular elements of CMP. The results obtained do not constitute a basis for extending the conclusions of their analysis to the entire population. Nevertheless, in the author's opinion, the survey results constitute a premise for conducting analyses of the CMP at all administrative levels of the country. The research should be conducted on a two-year cycle in order to observe changes in the integrity level of CMP. The period of the cyclicality of the research correlates with the timing of the CMP update. The information about the degree of integrity of CMP with the benchmark may guide the entity to elaborate on CMP. Results of research pointed to the areas requiring change. In addition, the achievement of a high level of integrity of CMP may provide measurable evidence of the implementation of the EU CMP in Poland.

For hypothesis H1 - the form of data elaboration in most cases is different from the benchmark results indicated that more than half of the items in the CMP study (50.42%) conform to the benchmark in terms of the form of elaboration. The result obtained indicates that the hypothesis for the study sample is false. However, an analysis of the individual

Table 2
Summary of the scale of divergence of CMP elements.

	Percentage of CMP elements with different data presentation	Percentage of CMP elements with gaps in a data set	Percentage of missing CMP elements	Percentage of integral CMP elements
	C1	C2	C3	C4
Threats characteristics	17,65%	23,53%	0,00%	76,47%
Risk assessment of threats	5,88%	17,65%	5,88%	82,35%
Risk assessment of threats to Critical Infrastructures	5,88%	52,94%	52,94%	41,18%
Risk map	0,00%	52,94%	47,06%	47,06%
Threat map	5,88%	52,94%	41,18%	47,06%
Tasks and responsibilities of participants in crisis management in the form of a safety net	11,76%	47,06%	17,65%	52,94%
List of resources planned for use in crisis situations	17,65%	41,18%	35,29%	29,41%
Tasks defined in the short-term action plans referred to in Article 92 of the Law of April 27, 2001 - Environmental law	5,88%	70,59%	58,82%	29,41%
List of entities using the environment, obliged to limit or stop introducing gases or dust into the air from the installation	0,00%	94,12%	94,12%	5,88%
Maner of organization and restrictions of movement of vehicles and other devices powered by combustion engines	5,88%	94,12%	88,24%	5,88%
The behavior of authorities, institutions, and bodies using the environment and the behavior of citizens in the event of exceedances	11,76%	88,24%	76,47%	11,76%
Determining the mode and manner of announcement of the occurrence of exceedances	0,00%	82,35%	76,47%	17,65%
Risk monitoring tasks	17,65%	41,18%	11,76%	52,94%
Procedure for mobilization of necessary resources, participating in the execution of planned undertakings in case of a crisis situation	5,88%	35,29%	23,53%	52,94%
Crisis response procedures, defining manners to deal with crisis situations	11,76%	17,65%	11,76%	64,71%
Cooperation between entities participating in the implementation of planned undertakings in case of a crisis situation	5,88%	58,82%	17,65%	41,18%
Procedures for the execution of crisis management tasks, including those related to critical infrastructure protection	17,65%	47,06%	17,65%	47,06%
Organization of communications	0,00%	0,00%	0,00%	0,00%
Organization of the threat monitoring, warning, and alert system	17,65%	58,82%	23,53%	35,29%
Rules for informing the public about threats and measures to deal with them	5,88%	35,29%	17,65%	35,29%
Organization of evacuation from danger zones	23,53%	47,06%	23,53%	47,06%
Organization of emergency, medical care, social and psychological support	5,88%	29,41%	17,65%	64,71%
Organization of protection against threats for considered area	11,76%	29,41%	23,53%	52,94%
List of agreements and contracts concluded in relation to the implementation of tasks contained in the crisis management plan	0,00%	35,29%	23,53%	64,71%
Rules and procedures for assessing and documenting damage	11,76%	35,29%	17,65%	64,71%
Procedures for mobilizing State reserves	0,00%	64,71%	64,71%	35,29%
List of critical infrastructure located in a district covered by a crisis management plan	0,00%	0,00%	0,00%	0,00%
Priorities for the protection and recovery of critical infrastructure	5,88%	58,82%	41,18%	41,18%

Source: Own elaboration

performance of each CMP reveals that only seven CMP achieved a compliance rate above 70%. Among the remaining CMP, the results below 50% dominate. It means that each district CMPs assessed has discrepancies regarding the form of data presentation in at least one CMP element assessed. In one case, discrepancies in data presentation form occurring in every CMP element were noted.

The results of the research confirmed hypothesis H2 - the district Crisis Management Plans are less detailed than the adopted benchmark. In this case, data set deficiencies were present in every CMP studied. The level of deficiencies ranged from 10.71% to 100% within a single CMP. The results obtained mean that there is at least one CMP element with less data than the benchmark in each CMP assessed. In one case, a situation was observed where each CMP element contained less data than the benchmark. The largest number of deficiencies in the data set occurs for the element: list of entities using the environment, obliged to limit or stop introducing gases or dust into the air from the installation and manner of organization and restrictions of movement of vehicles and other devices powered by combustion engines (94,1% cases).

Previous research indicated many differences in the development of CMP. The conducted research fills a gap in the body of knowledge regarding the degree of discrepancies of CMP, elaborating the various elements of CMP and discrepancies in the data set. The disturbing observation is that the observed differences in the data set are primarily due to the lack of inclusion in the CMP. It indicates that the CMP is inconsistent with the requirements of the Emergency Management Act. Moreover, results obtained indicate an insufficient degree of CMP integration which may cause difficulties in exchanging information and aggregation by emergency services, public administration entities, and the public.

The conducted research revealed a problem with the availability of CMP to the public. In the study sample of 40 CMP, only 11 were available on the local government website. In addition, 6 CMP were accessed as a result of a request for public information. Considering that CMP should be open documents available to all, the result should be

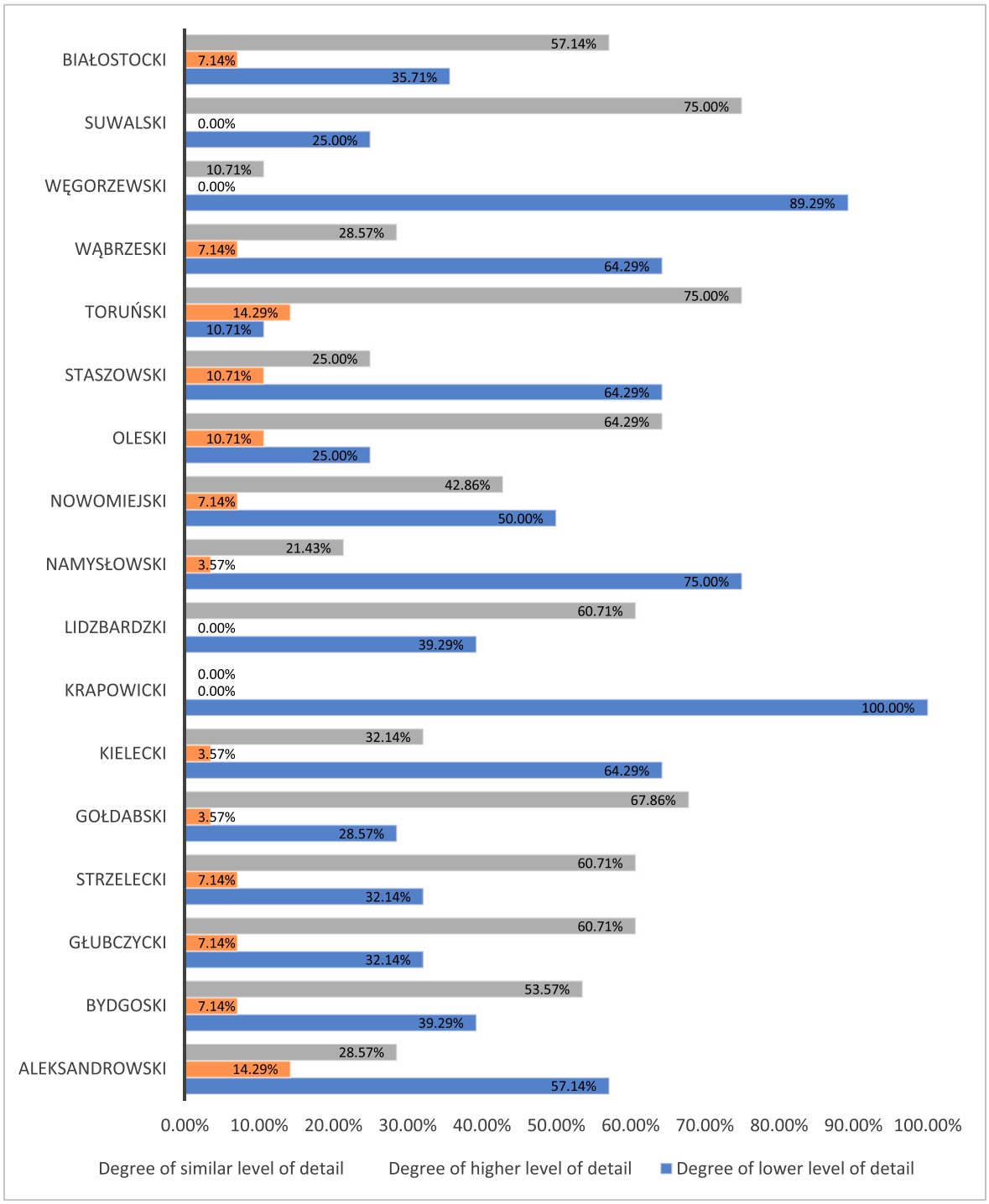

Fig. 3. The degree of detail of CMP in relation to NCMP.
Source: Own elaboration.

considered insufficient.

Furthermore, the analysis of CMP areas to be assessed showed that the formal requirements for CMP do not include elements related to prevention focusing on aspects related to emergency preparedness and response, which confirms previous research [[15]; p. 247 [7]; p. 62].

The information about the integrity degree of CMP with the benchmark may guide the entity to elaborate on the CMP. Results of research pointed areas requiring change. In addition, the achievement of a high level of integrity of CMP may provide measurable evidence of the implementation of the EU CMP in Poland.

Research performs important insights into the problems of communicating risk information in the process of civil planning and crisis management. However, it did not investigate how risk ought to be described to enhance the possibility of aggregating information from multiple stakeholders. Neither did they investigate whether the situation could be improved by greater harmonization of how risk is described.

The research should also be extended to additional analyses, including the extent to which data exchange between public security stakeholders is difficult. Future research should also address why there

are discrepancies in the form and data set of the various CMP elements. In addition, elements of CMP should be analyzed in terms of their relevance to the risk assessment process, assigning the relevance index of the elements of the CMP under consideration. The results obtained so far merely indicate the existence of the problem in this domain.

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