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BASIC DATA AND HISTORICAL DEVELOPMENT

On June 15, 2018, the founding assembly was held and at the proposal of the founder, prof. dr. Vladimir M. Cvetković, professors from the Faculty of Security, the Criministics and Police University, the Faculty of Geography and Forestry unanimously adopted the Statute and formed the Scientific-Professional Society for Disaster Risk Management. In order to improve the scientific activity within the Society, 21.12.2020. year, the Statute was adopted and the International Institute for Disaster Research was established. The Scientific-Professional Society for Risk Management in Emergency Situations (NSDR-URVS) is a non-governmental, non-profit association, established for an indefinite period, for the purpose of improving the existing fund of theoretical knowledge in the field of risk management in emergency situations, conducting quantitative and qualitative research, organizing national and international conferences, launching and managing journals, conducting trainings and risk assessments, as well as other academic activities in the aforementioned field.

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It has more than 1,000 members made up of professors from state and private Universities and Colleges in Serbia, scientific researchers, practitioners (members of the police, fire and rescue units, emergency medical services, the army, NGO organizations, in the field of security, etc.), students and young people who are directly or indirectly engaged in research and specific activities in the field of emergency situations. Within NSDR-URVS, a general-purpose civil protection unit was formed with the aim of providing assistance to vulnerable citizens in emergency situations.

OBJECTIVES

Objectives of NSDR-URVS: a) conducting research in the field of disaster studies; b) establishment and management of an international journal - International Journal of Disaster Risk Management; v) preparation, application and implementation of national and international projects on various aspects of risk management in emergency situations; g) preparing, designing, implementing and improving preventive measures against disasters; d) designing and implementing campaigns, programs, plans to strengthen citizens' awareness of the necessity of improving their preparedness for disasters; f) organizing national and international scientific conferences on risk management in emergency situations; e) implementation of expert risk assessments and preparation of protection and rescue plans in emergency situations; j) organizing and implementing various types of training courses, seminars and other training for citizens, students and employees in interested institutions; z) performing other tasks in accordance with the law and its Statute.

HELD TRAININGS, COURSES AND LECTURES

In the organization of the Scientific-Professional Society for Risk Management in Emergency Situations, a large number of trainings and other activities aimed at education in the field of emergency situations were realized: the first, second, third, fourth and fifth basic safety training in the field of emergency situations.

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Over 15 textbooks, monographs and collections of works were published within the scientific and publishing activities of the Society. Associates of the society have written more than 10 projects in the field of emergency situations and more than 150 scientific papers.

INTERNATIONAL JOURNAL (IJDRM) AND INSTITUTE (IDR)

At the founding assembly, held on 21.12.2020. year, the Statute was adopted and the International Institute for Disaster Research was established as an organizational unit of the Society. In 2019, the first international journal in the field of risk management in emergency situations was founded in Serbia - Journal of Disaster Risk Management.

The journal cover all aspects of disaster risk management from a global and national perspectives



Editor-in-Chief
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International Journal of Disaster Risk Management (IJDRM) is a double-blind peer-reviewed (twice a year), open-access journal that serves all aspects of disaster studies, policy, and management. It provides a platform for academics, policymakers, and practitioners to publish high-quality research and practice concerning natural disasters, anthropogenic disasters, complex political emergencies, and crises around the world. This is an open-access journal which means that all content is freely available without charge to the user or his/her institution.

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Journal will cover all aspects of disaster risk management from a global perspective, including but not limited to:

- Disaster and crisis management theory and practice
- Risk awareness and assessment
- Hazard and vulnerability analysis
- Knowledge development including education, training, research, and information on disasters
- Public commitment and institutional frameworks, including organizational, policy, legislation, and community action
- Disaster prevention, mitigation, response, recovery planning, policies, and implementation
- Promotes the interchange of ideas between practitioners, policy-makers, and academics

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Research article

A Systematic Collaboration of Volunteer and Professional Fire Units in Hungary

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Abstract: Volunteer firefighter units provide fire protection and rescue in many countries, while efforts to ensure safety often fall under the competencies of municipalities and local communities. Hungary, a Central European country centralised a large portion of its public services in the past decade, fire safety and rescue became the competence of a centralised professional governmental agency with national coverage. Although policy builds on a central professional organisation, the volunteer firefighting movement gained importance and has grown significantly recently. This paper investigates the collaboration between private volunteer firefighting brigades (local associations) and the central governmental disaster management agency of Hungary. We apply a case study approach to understand how volunteer units are integrated into the professional system. Our research is based on the analysis of policy documents, key informant interviews and Freedom of Information data requests. Findings show that volunteer units contribute to the safety and resilience of local communities in Hungary, but their engagement is not sustainable due to demographic and societal challenges, as well as the policy contradictions identified. The majority of the research on the role of volunteer firefighters covers decentralized countries with subsidiary systems. This current case study provides an addition to the discourse around the involvement of volunteers in fire safety with the evaluation of a collaboration between a centralized professional authority and localized, individual volunteer fire associations.

Keywords: volunteer firefighters, collaboration, fire safety partnership, Emergency Management Policies, first responders

1. Introduction

Although the formalisation of disaster management increased in the past decades and actors became more professionalised, a large portion of work still remains in the hands of volunteers (Montano, 2020). Volunteer firefighters play a crucial role in fire protection all across the globe. According to the latest worldwide statistics on fire brigades, out of the 15,4 million firefighters, 13,9 million people volunteer to provide life- and value-saving services (Brushlinsky et al., 2020). In recent years, Hungary has developed a centralised and professional public body to guarantee the safety of its citizens. The National Disaster Management Authority integrates fire and rescue services, civil protection and industrial safety in its three operating pillars. According to the national legislation, fire protection and technical rescue are state responsibility (Muhoray, 2012).

Hungarian public administration has seen a profound re-centralisation of power in the past 15 years, which has been accelerated since 2010 (Kovács, 2014). Services formerly provided by local governments to their citizens, including but not limited to housing, education, healthcare and parts of social welfare became the competence of central governmental agencies (Gellén, 2012; Pálné Kovács,

2016). Formerly, firefighting and technical rescue operations were municipal competencies, but in line with the new constitution accepted in 2011, a central governmental agency was established at the beginning of 2012, integrating firefighting, civil protection and industrial safety (Muhoray, 2012). The main objective of the Ministry of Interior's National Directorate General for Disaster Management (NDGDM) is to prevent disasters, to protect the life- and property of the Hungarian population, and ensure the safe operation of critical infrastructures and the overall economy (Teknős, 2019). To fulfil these legislative obligations, the overall territory of the country is covered by the operational territories of professional fire services belonging to NDGDM (Tóth and Tímár, 2016a).

Although national legislation (Act CXXVIII of 2011) defines fire and technical rescue activities as a national responsibility, the past 8 years have shown a significant development in local volunteer firefighter capacities. Their headcount and engagement has grown dramatically since 2012 (Bérczi, 2020). In Hungary, volunteer fire brigades are categorised as self-organising private associations (local NGOs) with dedicated tasks related to fire safety and rescue in their statutes (Urbán, 2019). As will be shown in this current article, the recently established system extended the responsibilities and competencies of the volunteer brigades as local civil society actors. Despite the clear systematic motivation to include additional resources, establishing of further understanding of the efficacy of this system is necessary, especially to deepen the understanding of the practical implementation of cooperation between professional units, as assets tied to authorities, and volunteer associations (Cvetković, 2019; Cvetkovic & Martinovic, 2020; Cvetković et al., 2022; Carla, 2019; Cruz & Ormila, 2022). The article aims to provide empirical evidence on how civil society involvement can be established in a centralized country, meanwhile to identifying policy gaps constraining the full potential of these collaborations (Xuesong et al., 2019; Kumiko & Shaw, 2019). The paper investigates the nature of the collaboration between private volunteers and public professional fire units, focusing on factors stimulating the development of such cooperation as well as systems and functions supporting it.

This paper is structured as follows. After the introduction, we summarise the relevance of public-private partnership in firefighting, then we explain the methodology we applied and present the data sources of our study. We divided our results into subsections detailing the policy of responding to volunteer fire brigades, their engagement and motivation, the administrative aspects and the information and communication technologies involved. At the end of this paper, we discuss the possible way forward regarding policy development and future research and conclude our findings.

2. Public-private collaboration in fire safety and rescue

Safety is a public good (Székely, Somody and Szabó, 2017), and fire safety can be considered as a special form of public services (Jääskeläinen and Lönnqvist, 2011). Collaborations between professionals and volunteers in fire safety are especially important in case of vulnerable communities (Halvorsen, Almklov and Gj, 2017), and hard-to-reach rural areas (Ramsell, Pilemalm and Granberg, 2017). Effective cooperation with non-governmental actors during disasters, and their integration into the respective national response system has been an ongoing theme in the Central-European regional risk management discourse (Dostál, 2015).

Although governments have their main responsibility to provide safety and security to their citizens, there's an increasing recognition that the public sector apparatus is unable to deal alone with wicked policy problems, such as climate change, safety and security issues (Lægreid et al., 2014). Crisis events are typically complex situations involving multi-level and multi-sectoral actors when public organisations need to work across their existing organisational boundaries and collaborate with their stakeholders (Christensen, Lægreid and Rykkja, 2019).

By the definition of Lindblom (1965), coordination is a systematic relationship between decisions in order to reach positive outcomes for the participants and to avoid negative consequences (Lindblom, 1965). Coordination is deliberate intervention if it leads the participants to recognize their mutual dependencies, followed by arrangements to shape their decisions (Tuite, 1972). Interorganizational relationships can be formalized, but a large number of them happen as short-term, ad-hoc efforts to overcome an urgent issue (van de Ven and Walker, 1984).

Organizations involved in the resolution of complex and unexpected situations need to implement strategies for collective action (Weick and Sutcliffe, 2007). Relief organizations and scholars of disaster management often use the phrases cooperation and collaboration interchangeably (Balcik et al., 2010), but major literature on collaboration theory presents the phenomenon more as a contin-

uum. According to Kamensky et al. (2004), the collaboration continuum has two ends, coordination and cooperation represent a more distant connection, and networks and partnerships describe a closer joint approach (Kamensky, Burlin and Abramson, 2004). Collaborative public services (including public safety) have extensive contemporary literature. While collaborations take different forms across time periods and geographical locations, scholars also employ different definitions (Batory and Svensson, 2020).

According to Kamensky et al (2004), “collaboration occurs when people from different organizations produce something together through joint effort, resources, and decision-making, and share ownership of the final product or service” (Kamensky, Burlin and Abramson, 2004, p. 8). Focusing more on public services, Ansell and Gash phrase it as “[a] governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or asset” (Ansell and Gash, 2007, p. 544). Another definition highlights the main driving force for collaboration, the limitations of the standalone organizations, and phrases the concept of collaborative public management as the „process of facilitating and operating in a multi-organizational arrangement to remedy problems that cannot be solved – or solved easily – by single organizations” (Mcguire, 2006, p. 33). In the scope of our current study, we emphasize that the relationship between volunteer and professional units in firefighting is on the collaboration end of the cooperation-collaboration continuum described by Kamensky et al. (2004).

This collaboration has special particularities as firefighting is a skill-based activity, involving largely dedicated and specifically trained personnel. Firefighters have to build knowledge, physical fitness, and mental strength to overcome dangerous situations. While professional firefighters carry out training and services as their day-to-day job with a salary, volunteer firefighters take part in these at the expense of their leisure time (Guidotti et al., 2016). Volunteer firefighters occupy a deep part in the local public life, providing a wide range of societal services that help to strengthen the cohesion of the community (Brunet, DeBoer and McNamara, 2001). Unity and heritage are important for volunteer fire brigades, and they are often important parts of the local history (Simpson, 1996).

In a decentralised, subsidiary-based system, local governments can choose to operate a professional or a volunteer fire brigade. According to Brunet et al. (2001), maintaining a volunteer fire brigade is more beneficial and rational in areas with rural areas covering a lower economic aggregate. The absence of high-rise buildings and dangerous industrial facilities makes the need for specialised training and special equipment lower, and longer alert time acceptable (Brunet, DeBoer and McNamara, 2001). This paper contributes to the current state of knowledge in public policy related to the management of risks and hazards with a case study from a centralised state.

3. Methods

Hungary is a highly centralised state (Ágh, 2013), where fire safety and technical rescue are the responsibility of a dedicated central national agency. This paper investigates how volunteer assets can be utilised in a centralised professional fire and rescue structure. During our work, we emphasize the nature of the collaboration, as well as on the different Information and Communication Technologies assisting it. We also aim to identify obstacles, niches and good practices from this case.

The current research follows the case study methodology (Stake, 2000; Schwandt and Gates, 2018). We chose case study methods as they focus on in-depth factors and can be used to investigate a phenomenon in its real-world context (Su, 2018). The paper utilises information from three main sources. We conducted desk research covering legislative and policy documents, to identify the formal structures and responsibilities within the collaboration. After establishing an understanding on the actors and responsibilities, we organised interviews with competent key informants, which has been supplemented with a connecting public data request under the Hungarian Freedom of Information legislation from the relevant authorities. At the beginning of the interviews, we asked the participants to describe the collaboration and summarize how it has been developed. Further questions covered the different practicalities of the collaboration, including administrative obligations, red tape, Information Communication Technology (ICT), financial background, possible gaps and further developments. The interviews were held as semi-structured discussions giving the opportunity to the participants to introduce topics broader than the list of questions. Researchers conducted the interview and followed up on issues raised with further questions, capturing the different aspects of the collaboration. The current case study was part of a broader research initiative focusing

on the aspects of Red Tape and ICT in public collaboration, therefore aims to identify how Red Tape affects the efficacy of the collaboration, and how ICT solutions support it. Analysis of these is mainly based on the opinions and experiences of the participants and their perception of them as matter experts. Follow-up phone calls were carried out with the respondents in autumn 2022 to see if their opinions had changed since the interviews in 2019. During this, respondents indicated no deviation, except the issue of rising energy prices and more scarcity of financial resources.

Throughout the research, the anonymity of the informants was ensured, except for the high-level informants who represented their office. Interviews were held in Hungarian, except one in English. Discussions were recorded, and the content of interviews was captured in English summaries. This research received approval from the Central European University's Ethical Research Committee under the reference number 2017-2018/9/EX. Requirements of research ethics and data protection were observed and followed throughout this research, including informed consent by the participants.

4. Data

Data collection took place between November 2019 and April 2021. During desk research, collected documents included relevant legislation and public administration orders, as well as existing academic and historical literature about the role of Hungarian volunteer firefighters. During the data collection period, there were no changes in legislation nor in the practical implementation of relevant regulations.

Interviews were organised either at the premises of CEU or the informant's venue. Discussions were semi-structured with open-ended questions to discover the history, the structure and the nature of the collaboration. Interviews were organized between November 2019 and September 2020. COVID-19 pandemic response restrained our access to informants, but the selection of respondents was done to have broader coverage – please note that key decision-making personnel and advocacy representatives with umbrella roles were also included.

Quantitative data are also used to support our research aims. We gained access to statistical information related to volunteer brigades through a Freedom of Information request to the proper authorities. Accessed data include information on the number and territorial location of volunteer brigades, as well as their headcount and level of competences. We received information covering the number of annual turnouts, disaggregated on individual or cooperative responses.

Table 1. List of informants and their background.

Code	Details
WP9-01	A professional firefighter officer with more than 15 years of experience, working closely with volunteer fire brigades. The informant has responsibilities in the professional supervision of their activities, including equipment and readiness inspections, as well as on-site commanding during major incidents and fires.
WP9-02	Professional firefighter general, president of Hungarian Firefighters' Association. Holds degrees in pedagogy and emergency-management. A central actor in the development of the emergency services in the '90s and 2000s. The Hungarian Fire Association is an umbrella NGO of the local Fire Brigade Associations, advocating on behalf of the non-professional fire assets of the country.
WP9-03	A high-level commanding officer of the Disaster Management agency with more than 30 years experience in firefighting. Both professional and volunteer assets are under the coordination of his organisational unit in a county area.
WP9-04	The National Inspector General for Fire Protection. He has 26 years of experience in firefighting with 20 years in leadership roles on different levels. Previously oversaw the national reform of the fire services, including the emerging role of volunteer brigades. As a scholar, he has a strong research interest in the development of fire protection and volunteer assets.
WP9-05	Leader of a responding volunteer fire brigade in the outskirts of Budapest. His fire brigade has a long history in his village, majority of the village burnt down in the 19th century. The Volunteer Fire Brigade of the village was one of the first re-established after the fall of socialism, and one of the first that gained responding status in 2014. The brigade has strong support both from the municipality and the local individuals and business.

WP9-06	Leader of a recently (past 5 years) established cooperating volunteer fire brigade located in a county capital. Experienced in volunteering for disaster management activities.
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5. Results

The chapter follows the structure detailed below. First, we show the extent and relevance of volunteer units in the Hungarian response system based on statistics and literature analysis. We begin with the establishment of the new collaboration and then explain it in detail. After establishing a deep understanding of the system of collaboration, we investigate the importance of motivation and the solid financial background of the brigades, which is followed by the administrative burden and the role of ICT solutions.

5.1. Introducing a new system for on-site collaboration with volunteer first responders

According to all interviewees, volunteer firefighting units are a necessary part of the current fire and rescue system in Hungary. The introduction of the “responding volunteer fire brigades” (RVFB) in 2014 was a major step in extending the responsibilities and competencies of voluntary actors, which was praised both by the representatives of the public bodies and the volunteers themselves. Up until then, volunteer fire brigades had a cooperating and ancillary function, meaning that each incident had to be attended by a professional unit, even if the local voluntary capacities were sufficient to deal with the incident. The policy reform offered a new relationship with the introduction of written cooperation agreements and different support schemes. One of the main consequences was a substantial increase in the number of volunteer fire brigades in Hungary (fig.1), leading in 2014 to the introduction of a new administrative and operational status: the “responding volunteer brigades”.



Figure 1. Number of volunteer fire brigades in Hungary. Source: Bérczi (2020) and Freedom of Information data request

As mentioned, before the reforms volunteer brigades were only allowed as additional assets, and a professional unit had to attend to each incident and take control of the situation. According to informants of this study, this was often inefficient as many volunteer groups had the ability and the resources to extinguish smaller fires and carry out rescue activities on their own. (WP9-04). The introduction of “responding volunteer brigades” acknowledged the autonomous potential of this group. If there is a sufficient headcount, volunteers are trained, there is a fire engine vehicle with certified equipment, and other administrative requirements are fulfilled, then the volunteer brigades can elevate their status from additional cooperating assets to first responders. In practical terms, this means that they must provide a minimum of 3000 hours of on-call service when they can be alerted and dispatched immediately to attend incidents via instructions from the central operation room.

Table 2. Number of Responding Volunteer Fire Brigades (RVFB) and their on-duty service hours.
Source: NDGDM – Freedom of Information data request

	2014	2015	2016	2017	2018	2019	2020
Number of RVFB	12	22	37	44	49	55	58
On duty (hrs)	28,500	69,125	135,125	167,000	179,750	202,000	211,375

The new status brings more than just additional responsibilities. If brigades satisfy the minimum requirement of 3,000 hours on-duty time per annum, they receive monthly support for their operations (~262,5 EUR/month, 447 EUR after 4500 hours per year) covering utility and other costs, and they are also given priority in calls for proposals for training and in-kind support (equipment).

According to the information we received for our public data request, out of the 654 volunteer brigade associations across the country, by November 2020, 58 groups took up this responsibility and opportunity. The remaining 599 volunteer fire brigades continued to provide additional response assets as cooperating volunteer fire brigades, and participate in fire prevention activities and awareness raising, as well as other social activities in support of local youth, sport, and heritage preservation. A head of a recently established cooperating volunteer brigade in a large city in Hungary (WP9-06) described how his responding team aims to fill gaps with special skills and equipment to supplement and extend the local capabilities. On major incident sites, the NDGDM's Disaster Management Operational Service provides supervision for all volunteer assets (Tóth and Tímár, 2016b).

According to one informant (WP9-04), 10% of all alerts in the country are now attended by volunteer brigades, either individually or as cooperating assets; this means 8,000 responses by volunteer brigades each year. (His statement is confirmed by statistical data received from NDGDM, as shown later in this article.) Since 2010, the total number of volunteer brigades increased from 283 to 657 as the result of the additional support and competencies given to voluntary actors. The majority are classified as “cooperating” fire brigades without individual response competencies. Historically, Hungary had long developed its volunteer fire brigade movement, but after the Second World War, firefighting became a task for the national authorities. Communities across the country kept the memories and traditions, which was the base of the renewal of the movement. In contemporary Hungary, expanding the volunteer fire brigade movement is seen as an essential part of the development of national fire safety (WP9-04).

Table 3. Number of incident responses with VFB involvement.
Source: NDGDM – Freedom of Information request

Year	2014	2015	2016	2017	2018	2019
Number of incident response involving VFB assets	3,903	3,923	4,746	7,711	5,582	7,496
Number of individual responses without professional presence	631	1,141	1,518	2,575	1,835	2,815
Number of cooperating responses	3,272	2,782	3,228	5,136	3,747	4,681

5.2. Responses, motivation and financial support

In the new system, “responding volunteer brigades” are alerted individually to incidents in which there is no immediate life-threatening danger. “If there is no indication in the 112 calls to immediate life-threatening conditions, and a responding brigade is on duty in the area, we alert them to attend the site. From this point, we rely on them to mobilise, attend, assess and eliminate the situation. If they are on-site and report back with their assessment indicating a life-threatening danger, we alert additional units” (WP9-04). Responding volunteer brigades can deal with minor incidents like smaller wildfires on the outskirts of settlements or small accidents with no or minor injuries, but they can also provide rapid reconnaissance over larger incidents and start the necessary life-saving tasks before the professional units arrive.

“Volunteering means giving up our time and knowledge to the community for free, but it does not mean that the volunteer needs to put money into his or her service” (WP9-04). Based on this principle, Disaster Management provides in-kind and financial support for volunteer fire brigades described below. According to WP9-01, the central budget support of volunteer brigades rose in the past years, but the contributions of local communities and local donors are still vital.

Central financial support for volunteer fire brigades began in 2010 in the form of regular “call for proposals”. Every volunteer fire brigade association can submit their needs for equipment and specialised training in the annual call. The funding is covered by the central national budget, which in 2010, allocated 150 million HUF (approx. 511,700 EUR on 2010 exchange rates) for the volunteer fire brigades. As the number and competencies of the fire brigades extended, the allocation from the central budget rose. Last year (2020) 700 million HUF (approx. 1,85 million EUR) was dedicated to the central budget. This means that the average support rose from 530,000 HUF in 2010 to 1.044 M HUF (~2,750 EUR) in 2020. According to an interviewee, the equipment provided through these calls is high-quality, often state-of-art, and sometimes professional firefighters envy them because of their novel items. On the other hand, volunteer brigades can only choose from a pre-set equipment list, which limits their development and sometimes leads to mismatches with their real needs (WP9-06).

Responding volunteer brigades receive monthly financial allocations (~262,5 EUR / 447 EUR), based on their on-call obligations. In category one, the brigade is obliged to serve 4500 hours of on-duty readiness shifts through the year, while category two brigades are on-duty for 3000 hours annually. During their on-duty shifts, they must respond immediately (in a short mobilisation time) after they receive an alert through the radio. They also receive notifications of incidents when they are not on duty and can mobilise to incidents during this period as well. The eligible costs for this support include utilities, fuel, maintenance of equipment, purchase of equipment and other direct costs, with the exception of personal expenses. According to WP9-03, this monthly allowance is still low and only covers the minimum costs.

According to the data received from the national authorities, there were 10,515 individual incident responses managed solely by responding volunteer fire brigades since the introduction of this new method of collaboration. Mobilising volunteer units to these alerts, the new collaboration shortened response times and cut the costs of the possible alert of professional units. Using the average response cost of a professional fire engine (92 970 HUF according to (Bérczi, 2013) and the number of individual responses (10,515 cases, see table 3), 977,579,550 HUF (around 2,57 million EUR) would be born as cost without the new responding volunteer structure. As presented earlier in Table 3, the on-duty hours of responding volunteer brigades have been constantly rising since 2014. During these hours, each RVFB has at least 4 trained volunteer firefighters ready to respond. Volunteer units offered readiness for 992,875 hours since 2014. Multiplied with a minimum 4 members in a unit, this equates to 3,971,500 person-hours. In comparison, professional firefighters work in 24 hours shifts with 2 days of break; with an average of 10 shifts/month. The average gross salary for a professional firefighter is 270,000 HUF (710 EUR). Following this calculation, responding volunteer firefighters substituted salaries of 16,548 per month, equating to 4,467,937,500 HUF (around 11,8 million EUR). However, this calculation is indicative and approximate only, it shows the financial importance of the volunteer contribution of RVFBs to cut public spending.

Besides the clear budgetary benefits of the introduction of responding volunteer brigades, their work indeed contributes to the safety and resilience of communities across the country, the collaboration with volunteer units certainly provides faster deployment of fire assets, however, no detailed data is available on this issue.

All informants expressed the need for a stronger appreciation approach to recognise the contribution of volunteer firefighters and attract more potential volunteers. According to the informants, recruitment is one of the most challenging aspects of the volunteer brigades. While rural areas face depopulation and ageing, social cohesion and bonds in larger cities are less tight. Although their headcount has increased significantly over the last decade, the longer sustainability of the trend is questionable. While WP9-02, 03 and 04 emphasised the need of individual benefits like tax reduction, WP9-05 expressed that the most important factor in motivation is to feel recognised and supported collectively as a volunteer brigade. This could be strengthened through central provision of vehicles and equipment, and other better enabling actions involving host communities and more accommodating attitudes from employers.

5.3. Administrative Procedures and Red Tape

The introduction of the category “responding volunteer brigades” certainly brought some development in bureaucratic requirements with the opening up of hitherto closed governmental systems and formalising collaborations. NDGDM Written Command 2/2014 and 2/2019 detail different procedures and obligatory administrative actions, for example, “responding volunteer brigades” must

organise internal training every quarter of a year, with mandatory attendance for the volunteers involved. According to informants WP9-04 and WP9-05, these obligations could be administrative and bureaucratic burdens with many details to bear in mind, but the Professional Fire Commands provide guidance and support for each volunteer brigade to mitigate these. In the scope of this support, a mentoring scheme has been introduced, involving a professional firefighter who knows the operational area of the mentored brigade and supports them in their different professional, administrative and training tasks.

The most crucial difference between the administrative burden of a regular “cooperating volunteer brigade” and a “responding volunteer brigade” is related to the procedures of alerting and after-action reports. Regular “cooperating” brigades receive notifications through SMS, and they can decide upon the available personnel and resources if they mobilise to the incident. “Responding” brigades got alerts through radio (EDR/TETRA) if they were on-duty with a minimum of 4 volunteers, and they were obliged to respond.

While regular “cooperating” brigades maintain their logs of their actions and report them verbally through radio to the professional units and the dispatch centre, the “responding” brigades have an account to NDGDM’s “Disaster Management Data Provision Programme” (KAP), a real-time data management software used by the central operation control. The RVFB must register their on-duty readiness at the beginning of their shift in KAP and document any changes in their readiness. “Responding” brigades must upload after-action reports for each of their alerts attended. According to WP9-05, the leader of an RVFB, using KAP for after-action reports is a natural part of their work and is not a burden. The reporting system provides an easy-to-use survey-like surface to input all necessary details of deployment, making reports more accurate and prompter than the old paper-based reporting systems. The submitted reports appear instantly on the devices of the operations room and can be accessed by relevant officials. The system also generates statistics for planning and development purposes.

5.4. Information and Communication Systems supporting collaboration

Responding volunteer fire brigades use three obligatory information and communication systems, with additional voluntary solutions. Mandatory systems aim to integrate voluntary units into the overall coordination structure of the Hungarian fire and rescue services. They include (1) a central coordination system to alert and inform units about incidents, (2) a closed and encrypted radio communication, (3) and a standardised system for after-action reports.

1. “PAJZS” is the central operation coordination system used by the NDGDM. It receives all calls in need of firefighting capacities. Calls can be received through the central emergency line (112 or 105), or through other emergency agencies (police, ambulance services), but it has a direct connection with automatised fire alarm systems as well. Whenever a call is received, the system sends out automatised SMS notifications and an email detailing the alert to the Volunteer Fire Brigade leaders in the corresponding area (both for responding and cooperating fire brigades).
2. “EDR” is the nation-wide governmental TETRA radio system. It uses a specialised mobile network to provide secure and encrypted radio communication for law enforcement and other agencies. “EDR” provides a quick and secure way to communicate between the operations room and the units alerted and on-site, but network coverage is low in scattered areas across the country, as reported by WP9-05.
3. “Katasztrófavédelmi Adatszolgáltatási Program – KAP” – the ‘Disaster Management Data Provision Program’, detailed earlier.

In addition to these systems, there are various self-developed ICT tools used by volunteer brigades. Many brigades use for example smartphone apps and data translation services to convert incoming alerts to their volunteers in a more informative way. These systems can be used to alert the volunteers with pre-installed alert apps on their phones.

Many volunteer fire brigades use different free or open-source applications, some of them even have their own IT system developed by local professional in-kind supporters. As these solutions varied across the country, the need for the development of a central alert application was mentioned across the interviews. Mobile applications could assist volunteer brigades in shift-planning, in training and in day-to-day operations as well.

6. Discussion

Previous research shows that national governments have a critical role in building the trust needed for good inter-organisational collaboration to develop local resilience (Jung and Song, 2015). Volunteer brigades provide a chance to contribute to the safety of the community and beyond, therefore we argue that the development of a strong volunteer firefighting movement favours community resilience across the country. This development started in Hungary with the extension of competencies and the growing importance of volunteer brigades in the past decade, but the process is still ongoing, and possible future milestones are yet to be identified.

As seen before and under in Table III, responding volunteer brigades have wider competencies and obligations, but have access to continuous and structured professional and financial support from the professional fire brigades. This shows that the involvement of responding volunteer fire brigades shifted from cooperation towards the collaboration end of the cooperation-collaboration continuum defined by Kamensky et al. (2004). This leads to a higher level of local preparedness in settlements where responding volunteer fire brigades are located.

As the informants expressed, the current upward trend in the number of volunteer brigades and their headcount is not sustainable. Demographic and societal challenges are expected to influence the recruitment and retention of volunteers. Informants shared some ideas to enhance recruitment and recognition of volunteers for better motivation. Ideas included individual and collective incentives that can be further explored in future research. Individual incentives could entail tax reductions, service discounts, wider access to healthcare, and financial compensation for employers contracting volunteer firefighter employees. As there are current discussions to renew legislation around the benefits for volunteer firefighters in Poland, we argue that a regional discussion on current policy challenges would be beneficial. The Polish proposal includes a widened insurance scheme, as well as pension supplements for volunteer firefighters based on the length of their service.

Collective incentives focus on stronger financial and in-kind support for volunteer brigades. According to the informants, volunteer brigades usually procure their vehicles and the vast majority of their equipment through twin-city relations. There is no available data on the average age of fire engines used by volunteer brigades, but we observed that many of their vehicles are over 40 years. Although fire safety and rescue are national competencies and local governments don't have dedicated funding for developing and maintaining volunteer brigades, volunteer firefighters still are reliant on the support of local communities, donations from local businesses as well as the financial support of municipalities. Volunteer brigades are important elements of the local communities; therefore, many municipalities allocate resources to give financial and other support, but the centralisation tendencies in the recent decade have significantly narrowed local governments' budgetary room. As described earlier, the monthly allowance of RVFBs is not sufficient to cover unforeseen costs, not to mention the development and purchase of new equipment.

Table 4. Comparison of responding and cooperating fire brigades

	Responding volunteer brigade	Cooperating volunteer brigade
Capacities	fire engine with standardized equipment ready for alert min. 4 trained firefighters (1 engine driver and 1 on-site commander) during on-call hours	capacities varied on a large spectrum (no minimum requirements)
Duties	3000 hours or 4500 hours on-call obli- gation, with instant response to nearby incidents	Optional cooperation in fire prevention and firefighting activities.
Alerting/notification	Alerting through TETRA radio and SMS/e-mail	Notification through SMS/e-mail
Reporting	Reporting using TETRA radio and stand- ardized report forms	Reporting using TETRA radio, standard- ized reporting forms filled by professional units
Professional support	Structured mentoring Professional oversight Participation in training	Professional oversight Participation in training

Financial support	Monthly cost allowance (262,5 EUR or 447 EUR depending on on-call time)	Financial coverage of equipment through a call for proposals
	Financial coverage of equipment through a call for proposals	Own fundraising activities
ICT	Own fundraising activities	Alerts from the central operation coordination system ("PAJZS")
	Access to TETRA and online reporting system ("KAP")	Notifications from the central operation coordination system ("PAJZS")
	Self-developed systems varied across volunteer associations	Access to TETRA Self-developed systems varied across volunteer associations

Information Communication Technology is an important part of effective collaboration with responding volunteer brigades. Opening the internal governmental systems to private citizens (volunteers) is a major step towards a closer public-private partnership in fire safety and local community resilience. According to the interviews, further development is needed to transfer data crucial in deployments to the volunteers. Smartphone applications can further assist shift management, alerting and training activities as well while providing instant access to information needed for a swift and accurate on-site response. The development of such a system should be based on the needs identified by the volunteer firefighters themselves, built on their experiences and needs, and kept open for further additions.

7. Conclusions

This current case study shows the importance of the involvement of local volunteer actors as first responders in the national fire and rescue services. Even in the case of a nation-wide centralised professional fire brigade under the umbrella of a central governmental organisation, private citizens can contribute to the safety of their communities as volunteers if the government enables and embraces them. To support these initiatives, systematic inclusion of volunteer assets into the overall response system is essential, which should expand the narrow field of public safety to wider policy areas. Providing an enabling societal environment, a longer-term approach is needed to address the phenomena of rural ageing and depopulation, as well as urban alienation as main constraints in the recruitment of volunteer firefighters. The Hungarian example shows that local volunteer fire brigade associations rely on the support of their communities and the local governments, but this can clash with the centralisation tendencies of the country, causing narrowed competencies and budgetary options of municipalities. This policy contradiction should be addressed in the future to establish a better enabling environment for the engagement of volunteer fire brigades. Further analysis is needed to determine policies founding the sustainability of volunteer brigades, including appreciation and recognition to embrace them and support their recruitment activities.

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Research article

Dynamics of Internal Migration in the Southwest Region of Bangladesh

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Abstract: Bangladesh is well-known as a developing nation around the world. Migration is common in Bangladesh, particularly within the country. To raise their living conditions (income, housing, education, health, communication, etc.), many people move to new areas. Dacope Upazila is located in the southwestern region of Bangladesh, and this study seeks to examine the factors that contribute to the dynamics of internal migration by assessing the social and economic changes in the living standard of internal migrants following the migration. Both primary and secondary data were analysed statistically. The use of a questionnaire survey has allowed for the collection of primary data. Priority ranking matrix, Satisfaction Index, Economic Status Index (ESI), and Social Status Index (SSI) were computed to analyse the data. Statistical methods were also used to derive demographic information of the migrants. The study found that the majority of migrants were men who were either unemployed or living in poverty. The lack of economic opportunities, the inability to protect one's financial well-being from natural disasters, and the absence of adequate market infrastructure were the primary driving forces of migration. Migratory choices are heavily influenced by economic factors, and a lack of employment opportunities was ranked as the top factor. The Satisfaction Index highlighted the high levels of contentment experienced by internal migrants. Both the ESI and SSI showed greater improvement in the migrants' social and economic standing after migration. One could say that internal migration has a significant effect on the resulting population.

Keywords: Internal Migration; Priority Ranking Matrix; Satisfaction Index; Economic Status Index; Social Status Index

1. Introduction

Migrating within Bangladesh is becoming an increasingly popular option for the economically disadvantaged as a means of improving their standard of living. They are leaving their current location in search of better economic prospects elsewhere (Alam & Islam, 2014). Several factors, including those of a socioeconomic, demographic, and cultural nature (Ishtiaque & Rahman, 2007), are driving migration within Bangladesh. The loss of land, the need for a new job, the hope for higher wages, and the lessons learned from one's past all play a role in perpetuating income disparity (Ishtiaque & Mahmud, 2011). Most of these people are just passing through; most return within six months. More than two-thirds of coastal Bangladesh's permanent migrants are moving from the countryside to the city, a trend that has accelerated dramatically over the past three decades (BBS, 2011; Braun, 2019).

Afsar (2003) reports that between 1984 and 2010, the permanent rural-urban migration rate increased from 1.2 per thousand to 22.5. This has led to the growth of urban slums, where between 40 and 50 per cent of the population originates from rural areas and fleeing poverty (Ishtiaque & Ullah, 2019).

The “push forces” caused by climate change are already having an influence, even though economic and political causes continue to be the primary drivers of migration in today’s world. Many people may be displaced from their homes, either temporarily or permanently, as a direct result of global warming. Both developed and developing nations may be affected (Stern, 2006).

Kreft and Eckstein (2013) state that between the years 1993 and 2012, Bangladesh ranked high on the global climate risk index. The risk of natural disasters was used as a criterion for this ranking. As the first most vulnerable region to cyclones, it also ranks sixth most vulnerable to flooding due to the danger they pose to local populations. Both lists are ordered by the number of people who are likely to be impacted (Pelling et al., 2004). It is also the third most susceptible to flooding as sea levels rise (Pender, 2008). Bangladesh is divided into 64 districts, 19 of which are on the water. Further, Mallick (2011) found that 28% of Bangladesh’s entire population resides in coastal regions. Because of this, Bangladesh is among the top ten nations in the entire globe in terms of the percentage of its population that lives in coastal areas (Pender, 2008). Climate change is not a new phenomenon, and nor is the disruption and displacement of human populations that it causes. That human actions are the primary cause of both ecological vulnerabilities and global warming has been proven beyond a reasonable doubt (IPCC, 2007).

The purpose of this study is to investigate the factors that contribute to the dynamics of internal migration in one of the coastal areas located in the Southwest region of Bangladesh. The identification of the demographic and social characteristics of the migrants, the assessment of the drivers of internal migration, and the evaluation of the social and economic changes in the living standard of internal migrants after the migration are the primary focuses of the study.

2. Significance of the Study

The process of migration can be viewed as socio-demographic in nature. People have been moving around from one location to another, either on purpose or by chance, ever since ancient times. According to Ma et al. (2011), sometimes they migrate due to natural causes and other times they migrate due to different causes triggered by humans. It’s possible for people to migrate either within the same sociopolitical area or to move away from the area altogether. Migration within a country has picked up steam in recent years. As a result, it is essential to have an understanding of the factors that motivate people to move from one location to another as well as the processes involved in migration. In addition to this, it is essential to have an understanding of the socio-economic and impoverishment status of migrants, which can be understood as an indicator of the migrants’ level of contentment after departing from their country of origin. Any kind of economic development initiative can be carried out in an effective manner if done so through this.

People who live in coastal rural areas often leave their homes and move away from their communities in order to improve their socioeconomic circumstances. It is essential to determine the push factors that are causing people to migrate, as well as the problems that are serving as the primary drivers of internal migration. After migrating, they involve themselves in a variety of activities in the destination place that generate income for them. Given the motivation behind their move here, is it possible for them to accomplish what they set out to do? They want to improve their socioeconomic condition; will this allow them to improve their socioeconomic status? Is it possible for them to lessen their level of poverty overall? As a result, carrying out research on the socioeconomic situation of migrants and anything else that pertains to them is not only necessary but also the most logical course of action to take.

Impoverishment is a societal curse in Bangladesh because it is a developing nation. It’s a crucial part of progress in the context of migration. In order to better their economic situation and escape poverty, many people move from rural areas to urban centres or from one region to another (Siddique, 2003). As a result, poverty reduction is a primary motivation for migration. Therefore, research into how migration affects people’s ability to make ends meet is essential. Again, migration has become a way to make ends meet, and it has long been recognised as crucial to the economic and social advancement of the poor. Therefore, the government can take appropriate policy towards internal migration in order to alleviate poverty if its effects on poverty can be investigated. This research is thus extremely important.

3. Literature Review

3.1. Migration and Internal Migration

All forms of human movement are included under the umbrella term “migration” (Haider, 2010). When people migrate, they leave their home country and settle in a new one, either permanently or temporarily. It includes any kind of human migration, whether permanent or temporary. Internal migration takes place within a country, while international migration takes place between countries. People migrate from one area to another in search of better economic opportunities or to start a new life. Mahmood (1996) defines migration as the temporary and intentional movement of a population to a foreign country. Meyer along with Clyed (1970) defined mobility separately from migration. They distinguish between mobility (travelling within established boundaries) and migration (travelling to new areas). These limits may be physical, organisational, cultural, or racial (Haider, 2010). A permanent change in one’s place of residence constitutes migration, as defined by Beijer (1969). According to Saint and William, migration is a societal phenomenon influenced by shifts in the economic and social order. According to Haider’s (2010) research, migration is the intentional movement of people to areas of the country with a high concentration of industries and job opportunities. Various forms of migration are visible in any given society. This includes: 1) domestic (rural-urban, rural-rural, urban-rural, and urban-urban). 2) Cross-border (involving travel between different countries). Both can be arbitrary and coercive in nature.

3.2. Factors of Migration

Humans migrate for a variety of reasons, including those that affect their economy, population, culture, politics, and the environment. The causes of migration can be broken down into two categories: push factors and pull factors. To move from one’s home country to another, one must first consider the push factors (Kainth, 2009). For instance, the dearth of job openings, the prevalence of unemployment and underdevelopment, the state of the economy, the exhaustion of natural resources, and the prevalence of natural disasters. However, pull factors are those that entice migrants to a particular region (area of destination), such as the availability of jobs and better educational opportunities (Haider, 2010, Kainth, 2009, Farhana et al., 2012, Afsar 2003, Rokib, 2009). Bangladeshi internal migration seems to be caused by a combination of economic and environmental factors (Haider, 2010) as well as social and cultural ones (marriage, familial disputes, societal prejudice, social issues, chaos in politics, overpowering village elders, greater job prospects, higher standards of living, more educational opportunities, etc.). Better living conditions are a result of better job opportunities, better educational and health care facilities, and other social amenities, as mentioned by Haider.

3.3. Migration and Change in Socio- Economic Condition

Migration is a multifaceted process that can have material or immaterial motivations and take place across a wide range of temporal and spatial contexts. In the eyes of economic theorists, migrants are free agents seeking better economic opportunities elsewhere. In their working paper, H. Waddington and R. Sabates-Wheeler investigate the ties between economic hardship and relocation. In particular, they look into how poverty and precarity influence people’s decisions to leave their homes. In response to economic development, De Haan (2002) investigated how migration often represents a last resort for the poor. According to De Haan along with Rogaly (2002), migration is a viable option for maintaining one’s standard of living over time. It happens when people are confronted with a crisis on multiple fronts, including the physical, economic, social, and political. The poor are especially vulnerable to food insecurity, according to research by Ellis (1998). The poor are more likely to be forced to migrate as a result of their vulnerability. An overview of migration and poverty reduction in Moldova was provided by Pantiru, Black, and Sabates-Wheeler (2007) in their working paper. They drew on a survey of relevant literature and interviews with officials in Chisinau. According to their research, the number of people leaving Moldova for other countries is still rising significantly. It caused large amounts of money to be sent back home, which helped boost domestic demand and had a beneficial effect on fighting poverty and starting new businesses (Islam, 2007).

In numerous regions of the developing world, migration is the primary means by which the rural poor diversify their income and ensure their survival. Because females can send greater amounts of money than sons can, women make up the majority of migrants in countries like the Philippines and

Latin America (Lauby & Stark, 1988). Outmigration is the primary driver of economic growth and improvement in many low-income regions of Bangladesh, according to research by Haider (2010). De Haan et al. (2000) looked at two different areas of Bangladesh and found that migrant households were less likely to be landless and owned more land on average than those without migrants. In their study, Farhana et al. (2012) investigate what causes internal migration. Economic and social factors, such as poverty, joblessness, political and ethnic conflict, religion, etc., were found to be the primary drivers of migration through a combination of survey, observation, and case study methods.

They also discovered that when migration occurs, poverty and unemployment are the driving forces behind the poor villagers leaving their homes for the cities. Most people who moved to the city were able to significantly better their standard of living as a result. That is, they discovered that migration helped the poor of Bangladesh by reducing their level of poverty. Although migration is a key component of many low-income people's strategies for survival in the developing world, it may not be an option for the most impoverished of the poor. Migration is a last resort for low-income and vulnerable households, as its benefits depend on the household's initial level of destitution rather than on whether it represents an attractive alternative livelihood. According to Zug (2006), it is common for grocery store staple prices to rise during Monga. People in rural areas have to move to the cities of Rajshahi, Chittagong, Dhaka, Barisal, Sylhet, etc. in order to survive.

Based on the reviewed literature, it is clear that migration can be understood in a variety of ways, that many different factors contribute to migration, and that migration itself helps to improve the lives of the poor. However, the vast majority of published works have only focused on the migrant's financial situation or family-related factors. As a result, the economic and social standing of migrants is affected by internal migration, particularly from rural to urban areas. As a result, there is a lack of information regarding the relationship between internal movement and contentment with one's means of subsistence as well as one's socioeconomic and poverty levels. Once again, most studies used a variety of statistical methods to examine the factors influencing the internal migration of respondents. This research, however, uses an economic and social index as well as a satisfaction index to measure the well-being of internal migrants and their families.

4. Materials and Method

4.1. Research Area Selection

Khulna is the administrative centre of Khulna district as well as Khulna division, and the third-largest city in Bangladesh. The 991.57 sq. km. that make up Dacope Upazila (Khulna District) can be found between the coordinates of 22°24' and 22°40' north latitude and 89°24' and 89°35' east longitude. The area of Dacope Upazila along the southwestern coast of the country has been chosen as the research site. Dacope upazila is home to 15 2,316 people as of 2011 (according to the BBS). The upazila is divided into nine different unions. Due to its coastal location, the upazila has been severely impacted by cyclones in recent years (Kumar et al., 2010). A total of 250,000 people were impacted by the 2009 super cyclone Aila, and 9,000 were forced to relocate from their homes in Dacope upazila alone (USS, 2009).

Study Area Map of Dacope Upazila, Khulna, Bangladesh

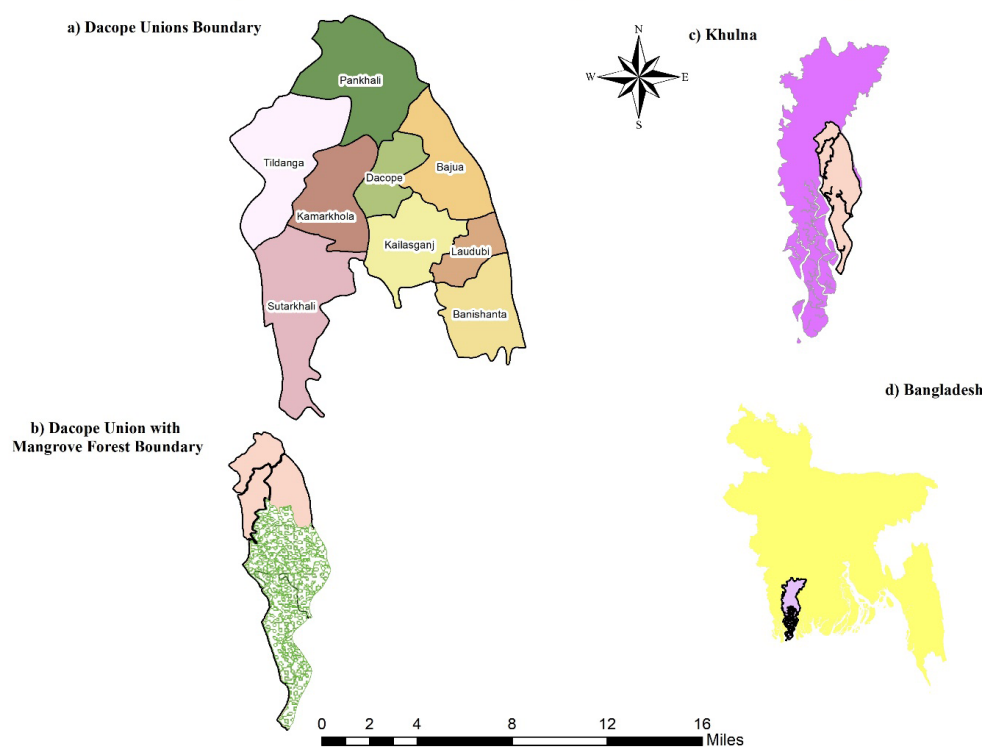


Figure 1: Map of Dacope Upazila.

Prepared by: Author, 2022

4.2. Population and Sample of Research

The population of the research is the total population of the nine unions of Dacope upazila. The sample size for the research has been fixed as 378 using the “Yamane formula” with a 95% confidence level, 10% precision, and 50% prevalence. The sample of the research has been equally distributed among the nine unions of the upazila. 42 samples have been chosen from each union.

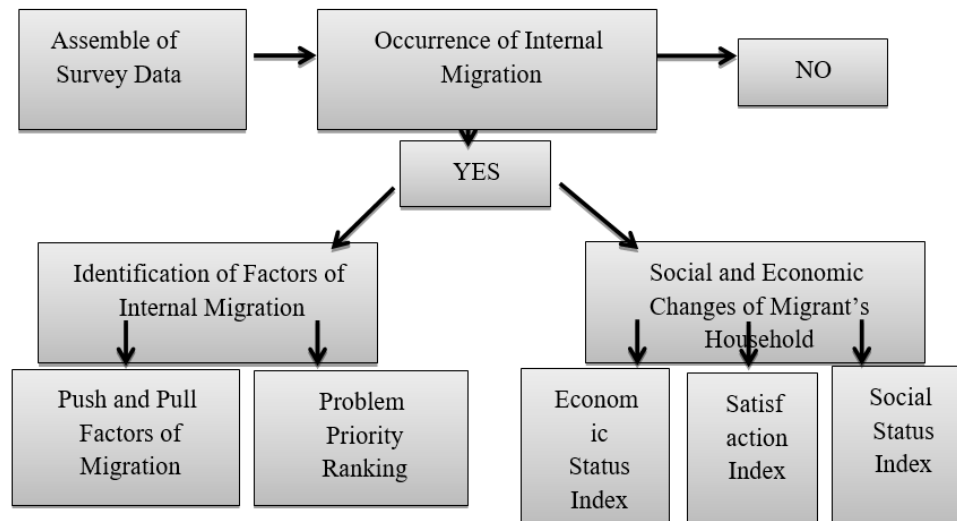
4.3. Research Design and Data Collection Technique

The research has followed a mixed approach. Both primary data and secondary data have been used for the analysis. A semi structured questionnaire survey has been used for the research. To identify the migrants from the sample size, household survey has been used and to identify socio-economic changes in migrant’s livelihood both household survey and telephone survey have been used. So, in the research there are two groups of respondents. The household members are in one group and the migrants from the households are in another. The households in which single migrants have been found that means household

head migrated from his origin and the other members of the households remained in origin place are considered as migrant households.

4.4. Data Analysis Techniques

To collect quantitative data, semi-structured questionnaires have been designed for household and telephone survey. So, the research instruments of this study are questionnaires. SPSS and several statistical tools have been used to analyze the data. The basic framework for data collection is show in figure 02. Statistical techniques such as priority ranking, satisfaction index, economic status index and social status index have been used according to the following formula to analyze the collected data in the research.



Prepared by: Author, 2022

Figure 02: Framework for data analysis

4.3.1. Problem Priority Ranking

Priority Ranking Technique has been used to identify and rank the different problems in Dacope upazila. Mini scores have been calculated for each issue, with the lower the ranking value, the higher the priority score. (Miah and Weber, 1990).

$$\text{Total Priority Score} = \sum_{i=1}^n X_i \dots\dots\dots (1)$$

Where, X_i = Score given to each problem by the individual respondent.

N = Total number of Respondent.

4.3.2. Satisfaction Index

An individual's level of contentment with various facets of life is measured using a satisfaction index. When the satisfaction index is measured from 0 to 1, 1 indicates extreme satisfaction, -1 extreme dissatisfaction, and 0 indicates neither extreme satisfaction nor extreme dissatisfaction. One definition of a satisfaction index can be found in Yea and Lee (1975) and Weber (1990), and it reads as follows:

$$I_s = (f_s - f_d) / N \dots\dots\dots (2)$$

Where,

I_s = Satisfaction Index

f_s = Number of satisfied respondents

f_d = Number of dissatisfied respondents

N = Total Number of respondents

4.3.3. Economic Status Index

The economic status index of respondents is a cutting-edge method of quantifying qualitative shifts (Islam et al., 2008). The sum of the shifts in specific economic indicators is used to produce this index. The formula for determining the Economic Status Index is:

$$ESI = \sum w_i \times f_i \dots\dots\dots (3)$$

Where,

w_i = Weight of the change in economic indicators

f_i = Number of respondents detecting the change

m = Magnitude that means the multiplication of the highest weight of change and total number of respondents

4.3.3. Social Status Index

To quantify qualitative shifts, the social status index of respondents is one method (Islam et al., 2008). The rate of change of particular social indicators is used to determine this index's value. The formula for determining social status is as follows:

$$SSI = \sum \frac{w_i \times f_i}{m} \dots\dots\dots (4)$$

Where

w_i= Weight of the change in social indicators

f_i= Number of respondents detecting the change

m= Magnitude which means the multiplication of the highest weight of change and total number of respondents.

5. Results and Discussion

5.1. Demographic, Social, and Economic Characteristics of the Migrants

The residents of Dacope Upazila, Khulna, and their demographic and social characteristics are displayed in Table 01 below. There were more men than women who emigrated (80.90 percent versus 19.0 percent). That's indicative of the gender gap in migration, with males being more willing to leave their homes than females. Male and female migrants aged 15 and under made up 4.54 percent, while those aged 15-25 made up 32.73 percent. The 25-35 year old age group had the highest percentage of the population (48.02%). The percentages of those between the ages of 35 and 45, 45 to 55, and 55 and older were 9.09%, 3.63%, and 1.81%, respectively. It was discovered that the middle-aged were the most likely to have moved.

The marital status of the migrants is also displayed in Table 01. The percentage of single migrants is significantly higher than the percentage of married migrants, which stands at 30%. According to the data, 51.9% of migrants have completed both SSC and HSC, while 8.18 % have not completed elementary school and 11.81% have completed only through eighth grade. Table 01 displays the percentage of migrants with Bachelor's, Honours, and Master's degrees.

Table 1. Demographic and Social Characteristics of Migrants in Dacope Upazila

Demographic and Social Characteristics	Migrants	
	Frequency	Percentage
Sex of Migrants		
Male	89	80.90
Female	21	19.09
Age of Migrants		
<15	5	4.54
15-25	36	32.73
25-35	53	48.2
35-45	10	9.09
45-55	4	3.63
>55	2	1.81
Marital Status of Migrants		
Married	33	30
Unmarried	77	70
Education Level of Migrants		
No education	9	8.18
Up to Class Eight	13	11.81
SSC & HSC	57	51.9
Degree	19	17.27
Honors	7	6.36
Masters	5	4.54

Source: Field Survey, 2022

In Table 2, we see the migrants' pre-migration economic characteristics. The average income per month was 9,220 tk. The majority of the migrants (31.82%) were jobless. The remaining percentages of migrants worked in agriculture (20.9%) or private sector jobs (3.63%). According to Table 02, before leaving their home countries, about 23.64 percent of migrants worked in transportation, 6.36 percent ran their own businesses, 9.09 percent were day labourers and 4.54 percent did not have formal employment.

Seventy percent of migrants left Dacope Upazila because they were unhappy with their jobs and/or income. As can be seen in Table 02, roughly 30% of migrants were content with their job and income situations prior to migration. It was discovered that 53.64 percent of migrants did not have a place of their own to live prior to leaving Dacope Upazila, while 46.36 percent of migrants did have a place of their own to live prior to leaving, but it was in poor condition.

Table 2. Economic Characteristics of Household Head (HH) of Migrants (Before Migration)

Economic Characteristics of HH	Migrants HH	
	Frequency	Percentage
Monthly Average Income (Taka)	9220	
Occupation of HH		
Unemployed	35	31.82
Agricultural Activities	23	20.9
Private Job	4	3.63
Business	7	6.36
Day Labour	10	9.09
Transport Work	26	23.64
Others	5	4.54
Job and Income Satisfaction of HH		
Not Satisfied	77	70
Satisfied	33	30
Types of House Ownership of HH		
Own	51	46.36
Rent	59	53.64

Source: Field Survey, 2022

5.2. Internal Migration: Push and Pull Factors

Among the six main push factors identified in this study, the lack of employment opportunities was a significant factor, with 36.36 percent of migrant households citing this as the primary reason for leaving the Dacope upazila. The inability to make ends meet as a result of natural disasters was the second leading cause of people leaving Dacope Upazila (23.64 percent). About 16.36% of migrants moved due to a lack of market facilities for business, making this the third push factor. 11.82 percent of migrants cited a lack of access to healthcare as a driving force behind their decision to leave Dacope Upazila. Finally, Table 03 reveals that 1.81 percent of respondents cited Inadequate educational facilities as a driving factor.

Table 3. Main Push Factors for Leaving Dacope

Push Factors	Frequency	Percentage
Lack of Income Opportunities	40	36.36
Insufficient Education Facilities	2	1.81
Lack of health services	13	11.82
Poor Transport Facilities	10	9.1
Income barriers from natural hazard	26	23.64
Lack of Market Facilities for business	18	16.36
Others	1	0.9

Source: Field Survey, 2022

There were also six primary Push factors that influenced migrants' final destination choices. The primary motivating factor was the prospect of higher earnings in the new location (cited by 72.7% of migrants). The second allure was the promise of financial security in the new community, with 11.8 percent of migrants reporting that they were more secure there than in their home of Dacope Upazila. As for the third reason, 6.36 percent of migrants said the destination had better shopping or market facilities for business. Table 04 displays that 4.54 percent of the pull was attributable to improved health services, while the percentages attributable to improved education and other facilities were both 0.9 percent.

Table 4. Main Pull Factors of Migrants for Selecting Destination

Pull Factors	Frequency	Percentage
Better Income Opportunities	80	72.7
Better Education Facilities	1	0.9
Better Health Facilities	5	4.54
Better Transport Facilities	3	2.72
Protection for Income from Natural Hazards	13	11.8
Better shopping or market facilities for business	7	6.36
Others	1	0.9

Source: Field Survey, 2022

5.3. Priority Ranking of Different Problems in Dacope

Preliminary data analysis revealed seven categories of issues plaguing Dacope Upazila, Khulna: inadequate income opportunities, inadequate educational facilities, inadequate health services, inadequate transport facilities, income barriers resulting from natural hazards, and inadequate market facilities for business. The questionnaire has been set up to rank these issues. According to Table 05, the primary motivation for people to leave Dacope Upazila was the lack of economic opportunities. Dacope Upazila is a disaster-prone area that causes income barriers, ranking second on the list. The third issue was the dearth of commercial infrastructure; business owners in Dacope face fewer prospects as a result. Inadequate communication infrastructure was cited as the fourth issue facing the residents of Dacope Upazila. The lack of health services, inadequate educational facilities, and other factors all made the list. The result is shown in table 05 has been formed by using problem priority ranking method.

Table 5. Rank of Problems in Dacope Upazila Influencing Migration Decision

Problems in Dacope	Problem Score	Problem Rank
Lack of Income Opportunities	153	1
Insufficient Education Facilities	668	6
Lack of Health Services	454	4
Poor Transport Facilities	541	5
Income barriers from natural hazard	228	2
Lack of Market Facilities for business	334	3
Others	702	7

Source: Field Survey, 2022

5.4. Comparison between Migrant's Present Location and Place of Origin

In order to make a comparison between the present and the place where they originated from, the satisfaction index method was utilised. The overall satisfaction index came in at 0.32, which, according to the scale, indicates a level of satisfaction that is positive. The satisfaction index can range from -1, which indicates that a person is extremely dissatisfied, to +1, which indicates that they are extremely satisfied. A value of 0 indicates that the individual is neither satisfied nor dissatisfied. The satisfaction index was determined based on a total of thirteen criteria, which were as follows: the nature of the job, the level of income, the housing facilities, the education facilities, the health service facilities, the transport facilities, the marketing facilities, the relationship with the community, the safety and security facilities, the cultural activities, the recreation facilities, communication with the

family members in Dacope, and the utility facilities. The satisfaction index value that was measured was the highest for the Level of Income criterion, coming in at 0.836. Positive satisfaction index values were found for Job Nature, Housing Facilities, Education, Health Service, Transport Facilities, Marketing Facilities, Cultural Activities, and Recreation Facilities respectively. These values were 0.518, 0.236, 0.390, 0.872, 0.581, 0.4, 0.3, and 0.5. The criteria like Job Nature and Level of income are represented by the positive value of the satisfaction index. The destination location has superior housing facilities, educational facilities, health service facilities, transport facilities, marketing facilities, cultural activity facilities, and recreational activity facilities compared to the Dacope Upazila location. The dissatisfaction index scores for Relationship with Community, Safety and Security, Communication with the Family Members in Dacope, and Utility Facilities were -0.181, -0.109, -0.036, and -0.109 respectively. The overall value of 0.32 indicates that migrants are satisfied, which indicates that migrants are more satisfied with their lives in the destination place, both socially and economically, than they were in Dacope Upazila.

Table 6. Satisfaction Index of the Migrants Compared to Place of their Origin

Criteria in Place of Destination	Migrants N=110						Satisfaction Index I _s =(fs-fd)/N
	Better (f _s)		Same		Worse (f _d)		
	Number	%	Number	%	Number	%	
Job Nature	68	61.818	31	28.181	11	10	0.518
Level of Income	97	88.181	8	7.272	5	4.545	0.836
Housing Facilities	45	40.909	46	41.818	19	17.272	0.236
Education	45	40.909	63	57.272	2	1.818	0.390
Health Service	98	89.090	10	9.090	2	1.818	0.872
Transport Facilities	65	59.090	44	40	1	0.909	0.581
Marketing Facilities	60	54.545	34	30.909	16	14.545	0.4
Relationship with Community	26	23.636	38	34.545	46	41.818	-0.181
Safety and Security	24	21.818	50	45.454	36	32.727	-0.109
Cultural Activities	50	45.454	43	39.090	17	15.454	0.3
Recreation Facilities	71	64.545	23	20.909	16	14.545	0.5
Communication with the family members in Dacope	19	17.272	68	61.818	23	20.909	-0.036
Utility Facilities	24	21.818	50	45.454	36	32.727	-0.109
Total	53.230	48.391	39.076	35.524	17.692	16.083	0.32

Source: Field Survey, 2022

5.5. Economic Status Index of Migrant's Household

Respondents' economic status index is a cutting-edge technique for quantifying qualitative shifts (Islam et al., 2008). This index is based on the sum of five different economic indicators' movements. Migrants' resources include their income, expenses, savings, land holdings, and non-productive assets. The level of economic success can be traced directly by income. The level of poverty can be gauged, in part, by looking at a family's spending habits. Savings give strength to the households and increase their capacity of coping with crisis (Islam, 2007). Ownership of land is also an important indicators of livelihood.

The extent of changes is rated using a like system, where the score for no change is 0, the score for a little change is 1, the score for a medium change is 2, the score for a high change is 3, and the score for a very high change is 4. Only the change in one of the respondents' indicators is counted as being non-existent, while the change in both indicators is counted as being only slightly significant. Considered to be a high change if there is a shift in at least three of the respondents' indicators; considered to be a very high change if there is a shift in all of the respondents' indicators. Table 7 presents the degree to which these indicators have changed as a percentage of their previous values.

Table 7. Economic Status of the migrants

Economic Status	Weight	Number of Migrants	Percentage
No Change	0	5	4.54
Small Change	1	19	17.27
Moderate Change	2	65	59.09
High Change	3	16	14.54
Very High Change	4	5	4.54
Total		110	100

Source: Field Survey, 2022

$$\text{Economic Status Index (ESI)} = \sum \frac{w_i f_i}{m} \times 100$$

$$\text{ESI} = \frac{(0 \times 5) + (1 \times 19) + (2 \times 65) + (3 \times 16) + (4 \times 5)}{110 \times 4} \times 100 = \frac{0 + 19 + 130 + 48 + 20}{440} \times 100 = \frac{217 \times 100}{440} = 49.32\%$$

According to the table that was just presented, 4.54 percent and 14.54 percent of respondents' economic status rise "very highly" and "high" respectively. A sizeable proportion, approximately 59.09 percent, have experienced "medium change" in their economic standing. To reiterate, approximately 17.27 percent of respondents have "little change" in their economic status, while only 4.54 percent of respondents have "no change" in their economic status. There is a value of 49.32 percent for the economic status index.

5.6. Social Status Index of Migrant's Household:

The social status index of migrants was determined by taking into account five different variables, including their healthcare aptitudes, patterns of occupation, the status of their housing, and the availability of water and sanitation facilities (Islam, 2007). Table 8 displays the different types of housing and the respondents' length of membership.

Table 8. Changes on Housing status of Migrants

Types of House of the Migrants	Before Migration		After Migration		Percentage Change
	Number	Percentage	Number	Percentage	
Katcha	53	48.18	2	1.81	-46.37
Semi Pucca	12	10.9	41	37.27	26.37
Tin Shed	40	36.36	42	38.18	1.82
Pucca	5	4.54	25	22.72	18.18

Source: Field Survey, 2022

According to Table 8, there were four distinct styles of home. These included katchas, semi-puccas, tin sheds, and paccas. The results of the field survey show that the housing situation has improved significantly. After migrating, the percentage of semi-pacca who own their own homes rose from 10.9 to 37.27 percent. Tin-shed dwellings as a whole rose again, this time to 38.18 percent from 36.36 percent. However, the percentage of people living in katchas and mud houses has dropped dramatically, from 48.18 percent to 1.81 percent, suggesting a decrease of 46.37 percent due to internal migration.

In order to sustain life, water must be present. This is especially related to the general health of the respondents' families and neighbourhoods (Islam, 2008, p.78). After moving, nearly all respondents (96.3%) used water from tube wells for cooking and other household uses. Before the migration, however, that number was only 18.18 percent. While 81.82 percent relied on water from a pond, river, or other source for cooking as well as other purposes prior to migration, only 3.63% do so now (Table-9).

Table 9. Change in Source of water of the migrants

Sources of water	Before migration		After migration	
	Number of respondents	Percentage	Number of respondents	Percentage
Pond, river or others	90	81.82	4	3.63
Tube well	20	18.18	106	96.36

Source: Field Survey, 2022

The quality of a family's sanitary facilities is a major factor in determining their social status. It demonstrates that after migration, approximately ninety percent use sanitary and pit latrines, whereas before migration, only 23.63 percent did so. Prior to migration, approximately 43% and 42% of people relied on either an open latrine or a katcha, which is a type of latrine that is constructed from local materials but is not a sanitary type. Having said that, it has been modified after the migration. Only 11 percent of residents in Dacope use katcha latrines, and there was not a single respondent whose family still uses open toilets after migration (Table-10).

Table 10. Change in Sanitation of the migrants

Types of toilet	Before migration		After Migration	
	Number of household	Percentage	Number of household	Percentage
Sanitary	7	6.36	46	41.82
Pit	19	17.27	53	48.18
Katcha	43	39.09	11	10
Open	41	37.27	0	0

Source: Field Survey, 2022

After the migration of income-generating member, the other members of the households of migrants in Dacope Upazila use better health facilities, and the migrants' occupational efficiency of migrants has increased significantly. The alterations in social status are broken down into five categories, and each category carries a different weight value, which ranges from 0 to 4 according to its category. Table 11 provides insight into the respondents' social status, as shown in:

Table 11. Social Status of Migrants

Social Status	Weight	Number of Migrants	Percentage
No Change	0	2	1.81
Small Change	1	22	20
Moderate Change	2	53	48.18
High Change	3	21	19.09
Very High Change	4	12	10.91
Total		110	100

Source: Field Survey, 2022

$$\text{Social Status Index (SSI)} = \sum \frac{w_i f_i}{m} \times 100$$

$$\text{SSI} = \frac{(0 \times 2) + (1 \times 22) + (2 \times 53) + (3 \times 21) + (4 \times 12)}{110 \times 4} \times 100 = \frac{0 + 22 + 106 + 63 + 48}{440} \times 100 = \frac{239 \times 100}{440} = 54.32\%$$

The table mentioned above reveals that the value of the average of the weighted index is 54.32 percent. According to Table 10, the social status of migrants improves to "very high" levels by approximately 12 percent. Twenty-one percent of respondents are considered to have "high change" in their social status, forty-three percent of respondents are considered to have "medium change," and approximately twenty-two percent have minor change.

6. Conclusion

In countries where a large proportion of the population lives below the poverty line, migration has become an important strategy. For better economic opportunities, many people move within their own country, particularly from rural to urban areas. The standard of living of people generally improves as a result of migration. The respondent did not have a particularly impressive socioeconomic background. Most of them were young people who had recently lost their jobs and were looking for ways to make money despite the threat of natural disasters. They left Dacope Upazila because of these factors. With an index value of 0.32, migrant satisfaction is high. After leaving Dacope, people were content. More than a third of respondents report a significant improvement in their economic status, and this is reflected in the Economic Index (ESI) value of 49.32%. The average index value of the respondents' social status increased by 5.43 percent as a result of the improvement in the economic situation of the households. The social index took into account a person's healthcare knowledge, occupational preferences, housing conditions, and access to clean water and sanitary facilities as its variables. Extreme poverty is a major driving factor in human migration. It would be instructive to investigate people's motivations for emigrating and the factors that influence those decisions. Besides aiding in migration forecasting, the findings could also form the basis for social and economic planning in cities hosting large numbers of temporary dwellers.

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Research article

Psychological Preparedness of the Rescuers and Volunteers: A Case Study of 2023 Türkiye Earthquake

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Abstract: When disaster strikes, first responders must be not only operationally and logistically but also psychologically prepared. Psychological preparation for a potential adverse event can have a critical impact on the success of responses, and recovery efforts. This paper aims to analyze the psychological preparedness of rescuers and volunteers from Bosnia and Herzegovina who were assigned to the mission of minimizing the consequences of the earthquake in the Republic of Türkiye in February 2023. As a module in the training of the organizations that engaged them, the existence of psychosocial assistance provided to rescuers and volunteers (psychological first aid) in the circumstances of natural disasters was analyzed. The psychological readiness of the rescuers sent from Bosnia and Herzegovina to perform the assigned tasks and their status and condition during the mission were analyzed. The research was conducted in the period March – June 2023 using an anonymous questionnaire with combined questions. The results of this research determined that the majority of respondents believe that training aimed at protecting mental health and preventing the harmful effects of stressful situations in their work organization does not meet the challenges they encountered during the rescue mission in the Republic of Türkiye in February 2023. The results of this research highlight the need to find practical solutions - the inclusion of psychosocial assistance activities. It is therefore vital that psychological preparedness be included in emergency response plans.

Keywords: rescuers, volunteers, psychological preparedness, earthquake, Türkiye

1. Introduction

In the last decade, there has been an increase in natural disasters caused by climate change, accompanied by floods, landslides, extreme temperatures, storms, droughts and fires. Natural phenomena aided by human activities cause disasters. Most often, without warning, in a very short time, causing great losses in human lives and destroying the material infrastructure. Disaster resilience encompasses a broad array of strategies crucial for communities, organizations, and individuals to effectively prepare for, respond to, and recover from adverse events. Adaptive methods are employed to reinforce infrastructure, reduce risks, and give first responders and impacted communities' well-being top priority (Rico et al., 2019; Öcal, 2019). Education plays a pivotal role in fostering disaster resilience by equipping communities and responding organizations with essential knowledge and skills. School-community collaboration enhances situational awareness and adaptive responses tailored to local contexts (Rico et al., 2019; Öcal, 2019). Technological integration, particularly through social media, revolutionizes disaster preparedness and response by enhancing information dissemination and public awareness (Mano et al., 2019). Psychological resilience is equally critical, addressing the

profound impacts disasters have on mental health. Robust support systems, including psychological first aid and stress management training, are essential for supporting the well-being of responders (Cvetković, 2023). Natural disasters can cause a significant amount of distress, as well as potential damage to people's mental health. According to author Shoygu (Шойгу, 2010), this was a major factor in the development of emergency psychological aid as a separate area of psychological treatment. During and after natural disasters, psychological effects such as emotional instability, reactions to stress, anxiety, trauma, and other psychological symptoms of the victims have been recorded. Mental disorders in disaster victims are most often not psychosis but reflect symptoms of affective disorders accumulated by stress. Victims of disasters who are psycho-traumatized should often be viewed as normal persons whose clinical symptoms are only a reaction to an abnormal situation (Ненадовић, 2013). A person who has experienced a stressful situation should not be treated as a patient but as a normal person. It is necessary to maintain the belief that normality will soon return (Малкина-Пых, 2005). Alleviating the suffering of disaster victims is carried out by providing psychological care. Psychological support is a composite term that is defined as any type of internal and external support that aims to protect or improve psychosocial well-being, prevent mental disorders, and facilitate treatment if necessary (IASC, 2007). The development of the stress response is largely determined by the nature of the stressor (Shoygu, 2009), that is, by its qualitative and quantitative characteristics. Author Shoygu (2009) adds that the presence of a stressor alone does not determine the development of a stress reaction. She also believes that many researchers tend to consider stress resistance as a result of training, but it should not be denied that each person has a certain set of personality traits and physiological characteristics that define their stress resistance. Undoubtedly, future research is needed to better understand the predictors of resilience.

This paper aims to analyze the psychological preparedness of rescuers and volunteers assigned to the mission of minimizing the consequences of the February 2023 earthquake in the Republic of Türkiye. The existence of psychosocial assistance provided to rescuers and volunteers (first psychological aid) in the circumstances of natural disasters is a module in the training of the organizations that engaged them. The psychological readiness of the rescuers sent from Bosnia and Herzegovina to perform the assigned tasks, their status, and condition during the mission was also analyzed. The results of the survey can be used when creating a strategy for training programs of mental health protection for rescuers and volunteers and contribute to the organized improvement of their psychological benefits in order to provide assistance in overcoming the traumatic event. Following, the procedure and appropriate commitment can be utilized in arrange to lessening the possibility of mental results within the frame of post-traumatic stretch clutter. In order to achieve the goal of this work, research was conducted with members of the protection and rescue forces of the Republican Administration of Civil Protection of the Republic of Srpska, volunteers of the Mountain Rescue Service of the Federation of Bosnia and Herzegovina, and members of the Armed Forces of Bosnia and Herzegovina, all of whom were engaged in February 2023 an earthquake rescue mission in Republic Türkiye. This paper is structured and consists of five parts. Part one is an introduction. In the second part, materials and methods are presented. The third part contains the findings of research conducted in the period March – June 2023. The fourth part refers to the discussion of the research results, while the conclusion is given at the end.

1.1. Literary review

The fact is that at the global level, there is consistent scientific literature that treats the consequences of a natural disaster on rescuers and volunteers (Dyregrov et al., 1996; Малкина-Пых, 2005; Шойгу, 2010; Forbes et al., 2011; Kleim & Westphal, 2011; Рыбников и Ашанина, 2011; Fox et al., 2012; Lewis-Schroeder et al., 2018; Helfman, 2018; SAMHSA, 2018; Jones et al., 2020; Alden et al., 2021; Polemikou, 2021; Lowery & Cassidy, 2022). When disaster strikes, first responders must be not only logistically prepared, but also psychologically prepared. Psychological preparation for a potential event can have a critical impact on the success of responses as well as recovery efforts. It is therefore vital that psychological preparedness be included in the emergency plans of emergency response organizations. It is believed that organizations should consider introducing training for rescue and humanitarian workers to provide psychological first aid, and that it is important for emergency planners to prioritize the mental health of their members in the planning process (Coleman, 2021 cited in Guterman, 2005).

Training can help individuals cope with the stresses of everyday life or minor acts of violence. Some research has been conducted to identify recommendations for interventions to reduce risk and to promote resilience after an incident. The assumption is that occupations performing their roles during natural disaster response are likely to have more training and thus be more psychologically and psychologically prepared. It is suggested to take care of the training and preparation of employees (Brooks et al., 2016). Greater preparedness and ability to mitigate the impact of negative factors, taking into account the frequency, nature, and intensity of traumatic exposure and the cumulative impact on mental health, concern for personal safety, etc., is achieved with appropriate training (Brooks et al., 2016; Jones, 2017). That is, all employees should undergo appropriate and specialized training that will equip them with the skills, knowledge, and confidence to work in challenging and stressful conditions, with psychological first aid being the most important (Brooks et al., 2016). Training employees in psychological first aid can improve the sense of camaraderie (belonging to a team/college) and, at the same time, train employees in peer support (Brooks et al., 2016). Psychological first aid training has been found to provide a framework for supporting others following traumatic events and to lead to greater confidence in providing support, as well as helping to overcome others' psychological distress. The results of research conducted with police officers (Kouvatsou et al., 2022) revealed that police officers, who received training in providing psychological first aid according to the adapted version of the World Health Organization (World Health Organization, War Trauma Foundation, & World Vision International, 2011, 2013) significantly increased their self-confidence, knowledge, attitudes, and skills about psychological first aid and showed an increased sense of confidence in their capacity to provide it. Research evidence shows that training in psychological first aid significantly improves knowledge of appropriate psychosocial responses and skills to support people in acute distress, thereby increasing self-efficacy and promoting resilience (Wang et al., 2021). Authors (2021) stated in their work that the knowledge and systemic impact of psychological first aid training on participants is promising. Psychological first aid can be considered a specific crisis-focused intervention used during and after natural disasters (Everly & Lating, 2021). It is designed for use in the assessment and mitigation of acute stress and serves as a platform for psychological triage to complement more traditional psychological and psychiatric interventions. The authors Everly and Lating (2021) believe that psychological first aid can be applied among first responders as peer support.

A systematic review of factors influencing the psychological well-being of engaged disaster health workers (Brooks et al., 2015). These factors can be grouped by, one predeployment (preparation/training); two during-mission factors (length of deployment/time; traumatic exposure; emotional involvement; leadership; interagency cooperation; support; role; demands and workload; safety/equipment; trust/guilt; coping strategies); and three post-mission factors (support, media, personal and professional development). The authors (2015) found that factors not specific to the humanitarian mission often pose a significant risk to the health of humanitarian workers. Poor leadership and poor support have been noted as work stressors that affect employees' psychological well-being. Aid organizations should prioritize strengthening relationships between team members and supervisors to improve the psychological resilience of their workforce. Examining the level of post-traumatic stress disorder and burnout in volunteers who provided first aid, a high level of anxiety and depression was determined, as well as the need for greater psychosocial support was emphasized (Rowe et al. 2022). The authors (2022) found that resilience training and peer support would be useful interventions. Organizations should have a clear policy framework on the protection of staff within the management of traumatic events, and managers should be aware of key risk factors and use them when identifying particularly vulnerable groups of employees who may need additional support (Brooks et al., 2016). This includes education and training programs for psychological first aid providers in an organizational context (supervisors, managers, work colleagues, and health professionals, where relevant) as well as recipients (who are themselves members), with the aim of peer support, while supervision groups should be led by professionally trained moderators (Малкина-Пых, 2005).

Preliminary evidence suggests changes in knowledge, awareness, and confidence in the use of psychological first-aid interventions by managers and colleagues following such training (Allen et al., 2010; Lewis et al., 2013). Suggestions for pre-deployment training content ranged from safety orientation (Benedek et al., 2007; Brooks et al., 2017; Coleman, 2021), organizational values, job briefings, to accommodation provision courses, nutrition, situational awareness (Coleman, 2021), psychological first aid (Benedek et al., 2007; IFRC, 2009; Brooks et al., 2016), medical first aid training, and cultural safety training courses (Benedek et al., 2007; Brooks et al., 2016).

Support before and during disaster relief activities can be key to preventing and minimizing the negative impact of stressors. Promoting self-care consistent with stress monitoring can play a central role in psychosocial support (Umeda et al., 2020). Responsible helping also means that rescuers and volunteers should take care of their health and well-being. Members of the first response forces must take care of their health and mental state. In this way, they are psychologically and emotionally capable of helping others. Taking care of yourself is a condition for helping others in the best possible way, and working in a team also means taking care of your colleagues (World Health Organization, War Trauma Foundation, & World Vision International, 2011, 2013; Sphere Association; 2018).

In 2009, the European Union established the European Network for Traumatic Stress (ESTSS, 2023). The European Network for Traumatic Stress (TENTS) is recognized as one of the leading projects in the harmonization of psychosocial support standards across Europe. Although it is not a binding document, guidelines have been developed for all European Union countries, and they include a set of interventions ranging from first aid (provision of first psychological aid) to long-term care (remediation of the consequences of disasters). These guidelines aim to develop a network of European experts for psychosocial assistance and treatment of post-traumatic stress in accident victims, and to establish a more effective mental health service (ESTSS, 2011a, 2011b). The aforementioned guidelines were developed 2008 at Cardiff University, Wales, United Kingdom by authors Bisson and Tavakoly with contributions from partners of the TENTS (Bisson and Tavakoly, 2008). These guidelines were also published in the Serbian language (TENTS, 2009, 2011a, 2011b). In accordance with TENTS guidelines, which are not binding in nature, psychosocial assistance to emergency services personnel / rescuers, and volunteers in the general assistance model foresees the planning of procedures that will help prevent burnout and traumatization. These procedures include: 1) regular shifts (so that people do not work longer than necessary); 2) technical debriefing after the end of the shift; and 3) support systems. Support systems include regular supervision, consultation with colleagues and external advisors, and techniques for building a collective spirit aimed at unity and support in the team (Marčeta and Vručinić, 2022, cited in Bisson & Tavakoly, 2008).

The Psychological First Aid and Psychosocial Support in Complex Emergencies project (PFA-CE) was financed by the European Union in the period from 2017 to 2019. The partners in the project were: the Austrian Red Cross (project coordinator), the University of Innsbruck (Austria), and the national Red Cross organizations of Croatia, Italy, North Macedonia, Serbia, and Slovenia (PFA-CE, 2017). The project sought to improve the capacity to respond to disasters by strengthening the competencies of employees in national Red Cross organizations and volunteers in the field of psychological first aid and psychosocial support. In order to improve the inclusion and active participation of crisis-affected communities, families, and population groups in disaster response, community activation tools have been developed.

2. Methods



Part of the results of a larger research project with the objective of ascertaining the influence of stressful elements on the psychological stability of volunteers and rescuers, in addition to the presence, necessity, and significance of psychosocial support – also known as psychological first aid – offered to volunteers and rescuers during natural disasters conducted between March and June of 2023, are presented in this paper.

2.1. Questionnaire Design

The survey instrument was a survey questionnaire with combined questions. The survey questionnaire for this research was created based on questionnaires that have been used in previous research (Marčeta, 2021). Survey questions were formed based on the guidelines of the European Network for Traumatic Stress – TENTS (ESTSS, 2011a, 2011b), which were confirmed through the PFA-CE 2017-2019 project (PFA-CE, 2017).

2.2 Research Limitations

The limitation of the research refers to the fact that it was based only on the persons engaged in the rescue mission to minimize the consequences of the earthquake in the Republic of Türkiye in

February 2023 who were willing to participate in the research. In the rescue mission in the Republic of Türkiye, 22 members of the rescue team of the Republican Administration of Civil Protection of the Republic of Srpska (RACP RS), 42 members of the rescue team of the Federal Administration of Civil Protection of the Federation of Bosnia and Herzegovina (FACP FBiH), 10 members of the rescue team of the Department of Public Security of Brčko District of Bosnia and Herzegovina (DPS DB) and 167 members of the Mountain Rescue Services (MRS) from the entire BiH (МБ БиХ, 2023) participated in the rescue mission in the Republic of Türkiye. 10 members of the Armed Forces of Bosnia and Herzegovina (AF BiH) are also involved in humanitarian missions to minimize the consequences of the earthquake in the Republic of Türkiye (МО БиХ, 2023). The research was conducted with members of the protection and rescue forces of the RACP RS, volunteers from the MRS FBiH, and members of the AF BiH. Members of the MRS FBiH were surveyed from MRS stations: Visoko, Tuzla, Zenica, Novi Grad - Sarajevo, Kakanj, Mostar and Travnik. In the humanitarian mission to minimize the consequences of the earthquake in the Republic of Türkiye, 10 members of the AF BiH were engaged, consisting of 6 officers, 3 non-commissioned officers, and 1 soldier (МО БиХ, 2023). The final survey was conducted on a sample of 34 respondents.

2.3 Implications and Future Directions

Members of the rescue teams from the following organisations: the FACP FBiH, the DPS DB, and the Association for Assistance in Extraordinary Circumstances "WOLF" Foča did not want to participate in the research after seeing the survey questions. This points to the need for new research on the existence and measure of sincere and supportive relationships within work organizations, and the subject of the research would be the level of organizational culture of work organizations. In doing so, it would be examined at what level rescuers and volunteers can openly talk and share problems without fear of consequences, i.e., whether they feel safe to talk about stress and seek help. We encourage future researchers to expand upon this work.

3. Results

The research was conducted on a deliberate sample of respondents who were engaged in a rescue mission to minimize the consequences of the earthquake in the cities of Kahramanmaraş and Antakya in the Republic of Türkiye in February 2023. The survey instrument was a survey questionnaire with combined questions. In this part, the results of the research and the final purpose and goal of this empirical research are presented.

Structuring time by defining the main areas of work and ranking priorities significantly reduces stress. By reviewing what has been done, the schedule for today and the priorities for tomorrow, activities are determined depending on the assistant's own oscillations in daily functioning. They depend on the ability of the helper and the difficulty of the tasks, as well as the energy to carry them out. Helpers must be aware of their capabilities, so it is necessary to review their expectations. The helper must first meet the basic needs of life. He must have free time to relax. Relaxation techniques can be passive (walking, reading, music) and active, which are systemic and targeted relaxation techniques, and are carried out to achieve a state of calm (Ajduković et al., 2016; World Health Organization, War Trauma Foundation, & World Vision International, 2011, 2013; Crveni krst Srbije, 2017; Црвени крст Србије, 2018).

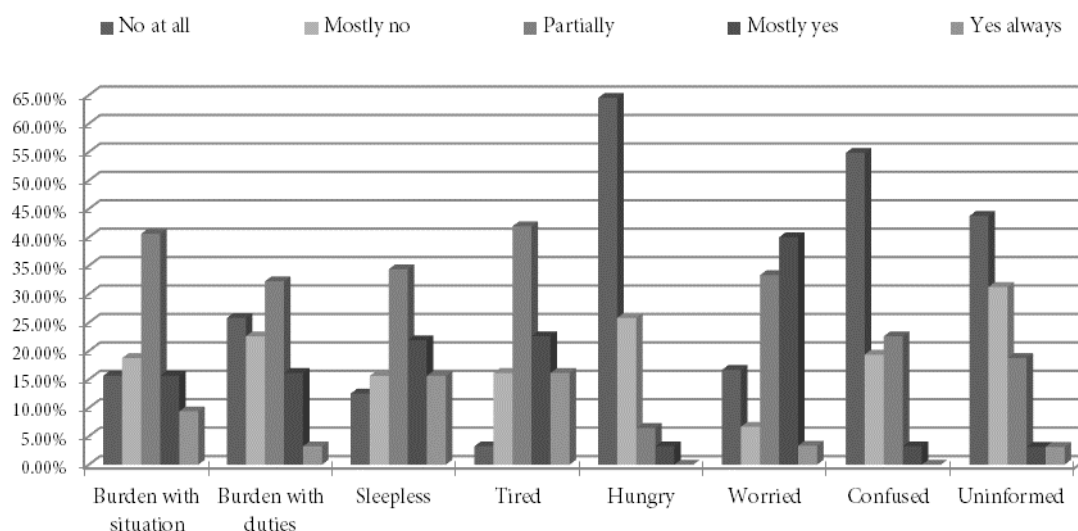
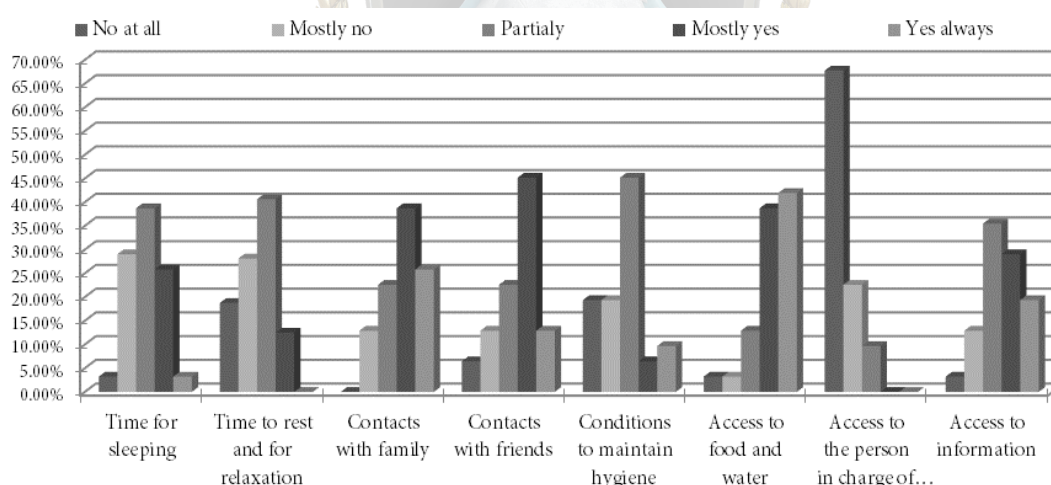


Figure 1. Question Q1 – Status of crew members during 2023 Türkiye earthquake rescue mission

To determine the status of rescue team members during the earthquake rescue mission in Turkey, a five-point Likert scale was used (1 [not at all] to 5 [yes always]) for responses to the first question: “During the rescue mission I was:?”. Concerning the situation during the rescue mission, four (11.76%) respondents chose not to respond. Three respondents (8.82%) did not react when questioned about their condition during the rescue mission, including their load, level of exhaustion, and whether or not they were hungry or confused. When asked if the circumstances were weighing on them, if they were sleep deprived or misinformed throughout the rescue operation, two members (5.88% of the total) chose not to respond.



*MHP/PSA – Mental Health Protection/Psychosocial assistance

Figure 2. Question Q2 – Conditions of crew members during 2023 Turkey earthquake rescue mission

To determine the conditions of the rescue team members during the earthquake rescue mission in Turkey, a five-point Likert scale (1 [not at all] to 5 [yes always]) was used to answer the second question: “During the rescue missions I had:?”. Questionnaires about bedtime, contact with family and friends, conditions for hygiene maintenance, and information access (i.e., who is responsible for mental health protection and psychosocial aid) were not responded by three (8.82%) respondents. Regarding the question of whether they had enough time to rest during the rescue mission, two respondents (5.88%) chose not to comment.

Table 1. Question Q3 – Relationship between training and challenge

Q3 Training aimed at protecting mental health and preventing the harmful effects of stressful situations in my work organization corresponds to the challenges I encountered during the rescue mission in the Republic of Türkiye in February 2023.								
	n	%	n	%	n	%	N	%
Completely yes	0	0,00	0	0,00	0	0,00	0	0,00
Mostly yes	1	12,50	2	12,50	0	0,00	3	8,82
Partially	1	12,50	3	18,75	4	40,00	8	23,53
Mostly no	1	12,50	1	6,25	2	20,00	4	11,76
Not at all	1	12,50	3	18,75	3	30,00	7	20,59
I do not know	4	50,00	7	43,75	1	10,00	12	35,29
	RACP RS		MRS FBiH		AF BiH		TOTAL	

A five-point Likert scale was used (1 [completely yes] to 5 [not at all]) for responses to the third question to determine the training aimed at protecting mental health and preventing the harmful effects of stressful situations on the status of rescue team members during the earthquake rescue mission in Turkey. When asked: “Do training aimed at protecting mental health and preventing the harmful effects of stressful situations in my work organization correspond to the challenges I encountered during the rescue mission in the Republic of Türkiye in February 2023?” (Table 1), the majority of respondents think that the training does not meet the challenges they encountered during the mission. Few respondents (8.82%) think that the training primarily addresses the challenges they faced during the rescue mission in the Republic of Turkey in February 2023. For unexplained reasons, up to 12 (35.29%) respondents are unclear about the answer to this question.

According to the findings, work organizations should modify their training programs in the near future. Training plans must address psychological readiness since a member’s psychological preparedness for a potential event can significantly affect the effectiveness of psychological reaction and psychological recovery efforts. The mental health of participants should be taken into account when designing training, and the training planners should incorporate targeted training that protects mental health and minimizes the negative impacts of stressful situations. That is, according to Brooks et al. (2016), all staff members should receive suitable and specialized training that will provide them the abilities, know-how, and self-assurance to perform under demanding and stressful circumstances. In such situations, psychological first aid is crucial.

Table 2. Question Q4 – The need for conducting training in the provision of psychological first aid

Q4 In my opinion, in my work organization there is a need to train rescuers/volunteers in providing psychological first aid to the injured population.								
	n	%	n	%	n	%	N	%
Completely yes	7	87,50	6	37,50	7	70,00	20	58,82
Mostly yes	0	0,00	5	31,25	2	20,00	7	20,59
Partially	0	0,00	2	12,50	1	10,00	3	8,82
Mostly no	0	0,00	2	12,50	0	0,00	2	5,88
Not at all	0	0,00	0	0,00	0	0,00	0	0,00
I do not know	1	12,50	1	6,25	0	0,00	2	5,88
	RACP RS		MRS FBiH		AF BiH		TOTAL	

On a Likert scale from 1 to 5 (1 [completely yes] to 5 [not at all]), respondents rated the extent to which they agreed with the statement “In my opinion, there is a need for training of rescuers/volunteers

in my work organization in providing psychological first aid to the injured population". Training in psychological first aid was deemed necessary by the majority of respondents (Table 2).

Providing psychological first aid training to staff members can enhance their sense of camaraderie and belonging to a team or collective while also teaching them peer support techniques. According to Brooks et al. (2016), receiving training in psychological first aid can boost one's confidence in offering assistance and assisting in easing the psychological suffering of others. It can also give one a framework for helping others after experiencing traumatic situations.

4. Discussion

It is evident that the minimal conditions were not fulfilled when inquired about their status during the rescue operation. The volunteers and rescuers who were interviewed felt that the organization and timing were improper. Responses indicated that there was regular communication with family, as well as with friends. Low standards of organization and provision of hygienic necessities were present. There was ample food and water supplied. It was discovered in the sample of volunteers and rescuers who were questioned it is not feasible to get in contact with the person in charge of psychosocial support or mental health protection. Information was satisfactorily accessible. When asked about their conditions during the rescue mission, responses were recorded that rescuers and volunteers were quite burdened by the situation, while the burden of duties was less pronounced. Two notable phenomena among the respondents were fatigue and insomnia. Most respondents expressed concern, but it's also important to emphasize that they were not really confused. The majority of respondents were informed.

The findings imply that in the upcoming term, work organizations should modify their training programs. Psychological readiness needs to be included of training plans since a member's psychological preparedness for a prospective event can have a significant impact on the effectiveness of the psychological response as well as psychological recovery efforts. Training designers should think about training that protects mental health and minimizes the negative impacts of stressful conditions.

Regarding the need for conducting training in the provision of psychological first aid, the majority of respondents stated that psychological first aid training was necessary. Providing psychological first aid training to staff members can enhance their sense of camaraderie and belonging to a team or collective while also teaching them peer support techniques (Brooks et al., 2016). Psychological first aid is a non-medical, non-professionalized activity performed by non-medical staff and volunteers in the affected community (Bisson & Lewis, 2009; Кордић, 2018), while emergency psychological help is the professional activity of psychologists and unique independent field of psychological practice (Shoygu, 2014; Шапанов et al., 2023). The fact that the initial psychological aid is frequently provided is due to the fact that Russian Federation psychologists prefer emergency psychological assistance. In the course of the 2014 floods, the European Network for Traumatic Stress - TENTS (ESTSS, 2011a, 2011b) guidelines were consulted and confirmed by the PFA-CE 2017–2019 project (PFA-CE, 2017) for the Team for the Coordination of Psychosocial Assistance and Support in the Republic of Srpska (Марчета, 2021). The World Health Organization, Foundation for War Trauma, & World Vision International (2011, 2013) have all cited the availability of psychological first aid as the basis for their 2017 and 2018 field worker guides (Crveni krst Srbije, 2017; Црвени крст Србије, 2018) and their 2020 presence in Bosnia and Herzegovina (World Vision Bosna i Hercegovina, 2020) are examples of these developments. The diverse approaches taken by European countries to integrate psychosocial support into their emergency response plans, underscoring the importance of addressing the emotional and psychological needs of responders and communities during crises. Drawing lessons from examples in the United Kingdom, Norway, Sweden, Germany, and the Netherlands, Bosnia and Herzegovina can glean practical insights for enhancing its own emergency response practices. Implementing peer support programs similar to those in the UK (Police Federation of England and Wales, 2024) and establishing psychosocial support teams modeled after Norway's initiative (Norwegian Red Cross, 2024) could bolster support for responders experiencing stress or trauma. Adopting training programs akin to Sweden's for psychological first aid and stress management (MSB, 2024), along with establishing psychological support units inspired by Germany's model (BBK, 2024), could further strengthen Bosnia and Herzegovina's response capabilities. Moreover, developing a comprehensive framework for psychosocial support, such as the Crisis Care Continuum in the Netherlands (Government of the Netherlands, 2024), could enhance coordination

and effectiveness in disaster response efforts. By prioritizing comprehensive training, clear protocols, and proactive community engagement, Bosnia and Herzegovina can enhance its capacity to address the emotional and psychological needs of responders. Undoubtedly, the decision-makers, in conjunction with the recommendations of research and educational facilities, will determine which model of psychological assistance will be selected and implemented into practice.

5. Conclusions

A portion of the findings of a larger research project, which was implemented from March to June 2023, are presented to a sample of respondents: members of the protection and rescue forces of the Republican Administration of Civil Protection of the Republic of Srpska, volunteers from the Mountain Rescue Service of the Federation of Bosnia and Herzegovina, and members of the Armed Forces of Bosnia and Herzegovina who were engaged in a rescue mission to minimize consequences of the February 2023 Türkiye earthquake. The truth is that the study is limited and only includes persons who were involved in the rescue mission to minimize the effects of the earthquake and were willing to participate. Despite the foregoing, the findings of this study should be used to identify practical solutions. These solutions include incorporating psychosocial assistance activities, such as psychological first aid as a training module, into the planning and implementation of preparedness measures, immediate response measures, and quick response and recovery measures.

The main goal of this study was to assess the psychological readiness of rescuers and volunteers from Bosnia and Herzegovina who were assigned to the mission of minimizing the consequences of the earthquake in the Republic of Türkiye in February 2023. An analysis of the psychological readiness of the rescuers to execute the tasks they were given, as well as their status and condition during the mission, was done.

Based on the study's findings, the majority of those surveyed feel that the difficulties they faced during the February 2023 rescue mission in the Republic of Türkiye were not adequately addressed by the training designed in their work organization in order to protect the rescuers' and volunteers' mental health and minimize the negative effects of stressful situations.

The findings of this study should serve as indicators for the identification of feasible solutions, such as the incorporation of psychosocial support activities. Various European countries have implemented robust psychosocial support mechanisms within their emergency response systems to address the needs of responders and affected individuals during crises. These mechanisms include counseling services, peer support programs, psychosocial support teams, and training programs on psychological first aid and stress management. Additionally, some countries deploy psychological support units during emergencies. Thus, it is essential to include psychological readiness into emergency response plans. Implementing peer support programs, establishing psychosocial support teams, and adopting training initiatives aligned with successful European models can significantly strengthen Bosnia and Herzegovina's resilience framework. Ultimately, investing in these strategies not only mitigates risks but also enhances societal cohesion and sustainability in the face of future challenges.

Author Contributions: The following actions were undertaken by the research team members: project conceptualization and execution, questionnaire dissemination and data collection Ž.M.; data analyze and interpretation and theory development, Ž.M. and D.J.; writing – original draft preparation, Ž.M.; writing – review and editing, Ž.M. and D.J.; while D.J. critically reviewed the data analysis and contributed to the content for revising and finalizing the manuscript. All authors have read and agreed to the published version of the manuscript.

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Appendix A

Responses to the first question: "During the rescue mission I was:?" among different crews are:

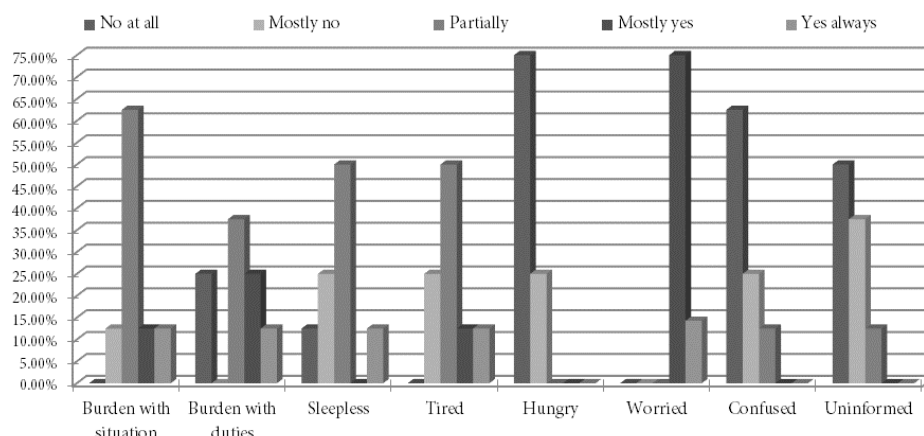


Figure 3. Status of the RACP RS members

A single respondent (12.50%) chose not to comment when asked if he was worried during the rescue operation.

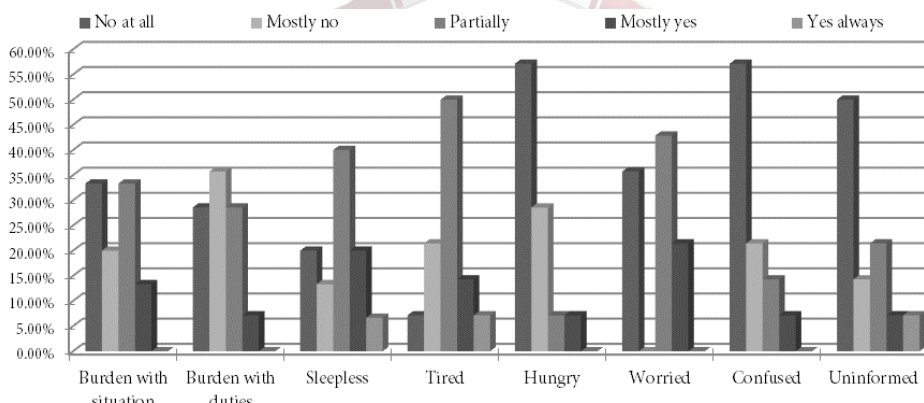


Figure 4. Status of the MRS FBiH members

When questioned about their condition during the rescue operation, two respondents (12.50%) decided not to respond to the question about the workload, exhaustion, concern and confusion, as well as whether or not they were hungry or uninformed. Regarding the burden of the situation, i.e., the lack of sleep - one respondent (6.25%) chose not to react.

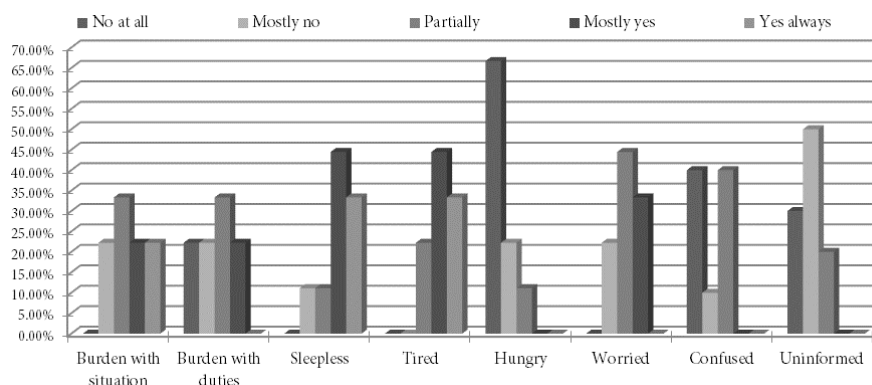


Figure 5. Status of the AF BiH members

Just the question about lacking information was answered by one (10.00%) respondent; the other questions went unanswered.

Appendix B

Responses to the second question: "During the rescue missions I had:?" among different crews are:

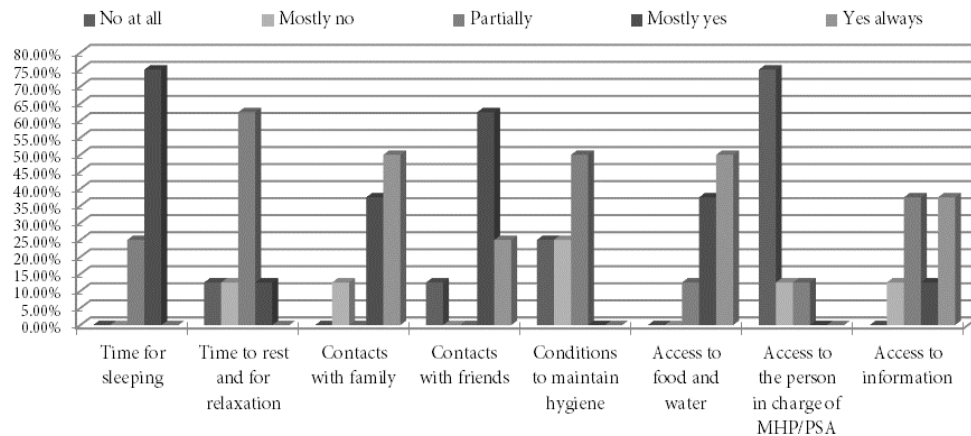
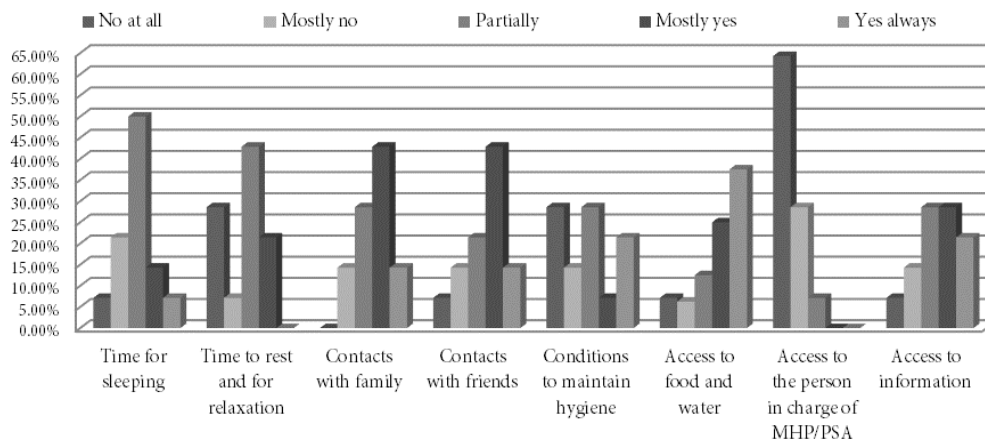


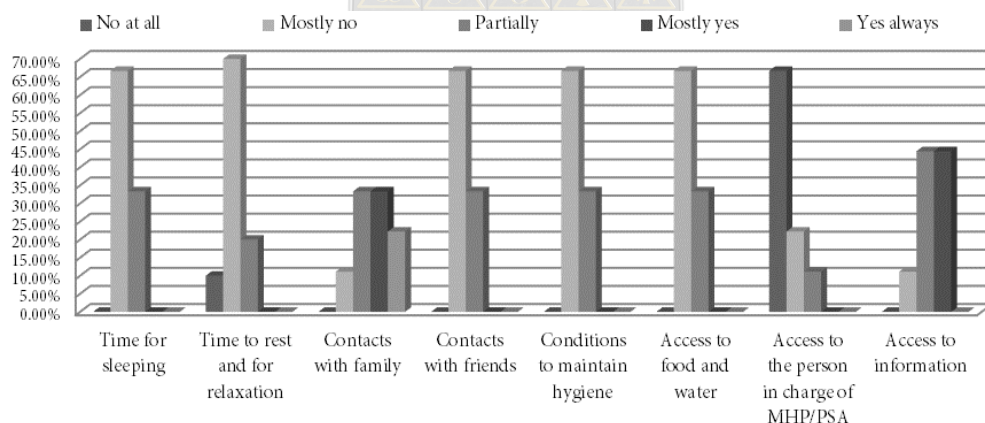
Figure 6. Conditions of the RACP RS members



*MHP/PSA – Mental Health Protection/Psychosocial assistance

Figure 7. Conditions of the MRS FBiH members

Regarding the conditions during the rescue mission - two (12.50%) respondents did not answer any question.



*MHP/PSA – Mental Health Protection/Psychosocial assistance

Figure 8. Conditions of the AF BiH members

One (10.00%) respondent answered only the question related to time for rest and relaxation, while he did not answer the other questions.

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Research article

Harmonization of Soft Power and Institutional Skills: Montenegro's Path to Accession to the European Union in the Environmental Sector

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Abstract: This research investigates the alignment of soft power and institutional skills in Montenegro's journey towards accession to the European Union (EU), with a particular focus on the environmental sector. An online survey targeting individuals employed in state institutions directly engaged in negotiation processes, notably the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection, was conducted. The research conducted an online survey, distributed before and after the summer recess to accommodate the transition of power following parliamentary elections, aimed at assessing the effectiveness of current personnel and identifying areas for improvement in staffing and negotiation strategies within Montenegro's environmental sector. Employing diverse methodologies, the survey's analysis delved into the demographic, social, and professional backgrounds of respondents. It explored their roles within institutions, involvement in environmental negotiations, and possession of relevant skills and expertise. Furthermore, respondents' knowledge of environmental issues, legislation, and challenges facing the country was assessed to gauge institutional capacity for environmental governance. Demographic data, including gender, age, education and regional origin, were collected to understand gender-specific attitudes and regional disparities in environmental perspectives. The sample of 84 individuals, comprising executives and employees from both institutions, provided insights into the age structure and regional diversity of personnel involved in negotiation tasks for Chapter 27. The selection of the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection reflects their pivotal roles in shaping Montenegro's environmental policies and addressing climate change challenges. This study aims to illuminate the dynamics of environmental governance within Montenegro's state administration, contributing to the country's path towards EU accession. The research findings highlight the critical need for Montenegro to prioritize strategic initiatives in personnel management, skill development, and institutional capacity-building within its environmental sector. The implications of this research extend beyond academia to inform policymaking and societal action, emphasizing the urgency for Montenegro to bolster its environmental sector capabilities, fostering both

EU alignment and sustainable governance practices for the benefit of present and future generations.

Keywords: environment; soft power; accession; alignment; harmonization; institutional skills; governance; Montenegro; European Union.

1. Introduction

Within the realm of academic discourse, the endeavor to delineate Montenegro's trajectory towards European Union accession within the environmental sector demands a nuanced examination of the interplay between soft power strategies and institutional competencies, highlighting the imperative for synchronized efforts to ensure a seamless integration process (Skjærseth, Stokke, & Wettstad, 2006; Zeitoun, Mirumachi, & Warner, 2011). Such a scholarly exploration not only delves into the intricacies of Montenegro's accession journey but also underscores the multifaceted nature of contemporary geopolitics and environmental governance. At its core, the harmonization of soft power and institutional skills encapsulates the complex interplay of political, economic, and socio-environmental factors shaping Montenegro's path towards EU membership (Albro, 2018; Oberthür, 2009; Sine & David, 2003).

Montenegro's pursuit of EU accession in the environmental sector is emblematic of its broader aspirations for socio-economic development and regional integration. In this context, soft power emerges as a crucial instrument for fostering positive perceptions, building trust, and enhancing cooperation among stakeholders, both domestically and within the EU framework. Whether through cultural diplomacy, public diplomacy initiatives, or strategic communication efforts, Montenegro seeks to leverage its cultural heritage, natural beauty, and commitment to environmental sustainability to strengthen its candidacy and cultivate alliances. Nye (Nye, 1990) coined the term "soft power" in 1990, defining it as the capacity to achieve desired outcomes through attraction rather than coercion or payment. This concept is rooted in the appeal of a nation's culture, political ideals, and policies. When our policies are seen as legitimate by others, our soft power grows stronger. This influence was especially evident during the Cold War era, with American dominance in global music and film industries, promoting worldwide consumerism, intellectual freedom, and modern liberal democracy, alongside freedom of expression and creativity (Lee, 2011). Conversely, Craig Hayden views soft power as a significant shift in traditional international power dynamics, where persuasion and culture become integral components of a nation-state's instrumental powers, envisioning soft power as both a creation and utilization tool (Hayden, 2012).

To fully integrate soft power into academic and practical realms, it's essential to consider the concept of neoliberalism (Patalakh, 2018). Soft power emerges from the influence of values, education, media, and other non-military instruments, aligning with the core principles of neoliberalism, which emphasize freedoms such as movement, labor, and trade, crucial not only in European politics and integrations but also a global scale (Martynov, 2020).

The European Union represents a unique form of integration and operation, characterized by an autonomous legal framework (Raunio, 2002). Within this framework, citizens of the Union hold rights and obligations derived from both national and community sources. Consequently, this arrangement diverges from both national and international legal norms, functioning instead on agreements ratified by member states and possessing its legal foundations and institutions. The intricacy of this governance model also stems from its adherence to the Treaty on the Functioning of the European Union (2016) and the Charter of Fundamental Rights of the European Union (2007), as well as international law about common foreign and security policy. Furthermore, the EU engages in specific agreements with candidate countries seeking EU membership, broadening its scope and conferring legitimacy upon its expansion and institutional development. To qualify for EU membership, candidate countries must satisfy accession criteria, undergo reform processes, and demonstrate compliance with EU standards and regulations (Memoli & Vassallo, 2009). These criteria, commonly referred to as the "Copenhagen criteria," encompass stable institutions ensuring democracy, the rule of law, human rights protection, and minority rights, alongside a functioning market economy capable of withstanding EU competition and market dynamics (Memoli & Vassallo, 2009). These conditions were formalized during the European Council meeting in Copenhagen in 1993 (Raunio, 2002; Sudar, 2021).

Montenegro commenced negotiations for Chapter 27, focusing on Climate Change and Environment, during the Intergovernmental Conference in Brussels on December 10, 2018. This chapter encompasses over 200 EU legislative acts spanning across ten key areas, aiming to solidify sustainable development as a guiding principle and ensuring environmental preservation. The policy framework emphasizes proactive measures and a sectoral approach to environmental safeguarding, integrating both horizontal and sector-specific policies. Central to this approach is the recognition of shared responsibility and the imperative to address environmental degradation. The ten areas covered in Chapter 27 include horizontal legislation, water and air quality, waste management, nature protection, industrial pollution control and risk management, chemical management, noise pollution, civil protection, and climate change adaptation. The negotiation process and oversight of the Working Group for Chapter 27 are led by representatives from the Ministry of Ecology, Spatial Planning, and (following recent political developments in Montenegro, specifically the parliamentary elections on August 30, 2020, which resulted in a change in government structure. The former Ministry responsible for environmental protection, previously known as the Ministry of Sustainable Development and Tourism, has been reorganized into the Ministry of Ecology, Spatial Planning, and Urbanism under the new administration. The Office for European Integration, situated within the Government of Montenegro, appoints the contact person for Working Group 27.

Montenegro fulfilled its initial obligations under Chapter 27 by adopting the National Strategy for Transposition, Implementation, and Application of EU Legislation concerning Environment and Climate Change, along with the Action Plan covering the period from 2016 to 2020 (NEAS), on July 28, 2016 (Strategy with AP)(Sudar, 2021). This strategic move, aligned with negotiation stipulations, aims to systematically integrate the entirety of EU laws related to Chapter 27 – Environment and Climate Change into Montenegro's legal framework. Following the Analytical Review Report (screening report) by the European Commission in November 2013, the European Council mandated Montenegro to fulfill these preliminary requirements to initiate negotiations with the EU concerning Chapter 27 – Environment and Climate Change (Government of Montenegro, 2016). The comprehensive national strategy, along with its action plan, will be presented to the European Commission, laying the groundwork for the transposition, implementation, and enforcement of EU regulations concerning environmental protection and climate change. Furthermore, it includes plans for enhancing administrative capabilities and assessing necessary financial resources (Sudar, 2021).

The Strategy with Action Plan delineates its objectives based on explicit recommendations from the screening report for Chapter 27 and conclusions drawn during the initial meeting in May 2014. It places particular emphasis on the water and waste sectors, incorporating strategies for waste reduction and the management of non-recyclable waste, including landfill disposal. Additionally, it addresses policy formulation and administrative capacity challenges associated with climate-related actions. Moreover, the Strategy with AP functions as a cornerstone for the integration, execution, and enforcement of EU environmental and climate change legislation. It encompasses strategies for bolstering relevant administrative capacities and evaluating financial requirements. Furthermore, it facilitates the monitoring of scheduled obligations and measures within defined timeframes, along with the timely planning and procurement of essential financial and technical aid from domestic and international sources, including EU funds, to support Montenegro's competent authorities.

1.1. Regulatory Foundations and Institutional Framework for Environmental Protection

Montenegro embarked on the adoption of the National Strategy for Transposition, Implementation, and Application of EU Legislation concerning Environmental and Climate Change issues, coupled with the Action Plan spanning from 2016 to 2020, with the intent of progressively and comprehensively integrating EU legislation for Chapter 27 – Environment and Climate Change into Montenegro's legal framework (Grozđanić & Cvetković, 2024; G. Grozđanić, V. Cvetković, T. Lukić, & A. Ivanov, 2024; Sudar, 2021). Given that the journey towards EU accession is a multifaceted process that commences with transposition efforts, this analysis will primarily examine this aspect of the Strategy. Since the inception of the Strategy with AP in July 2016 until December 2019, significant strides have been made in bolstering the strategic and programmatic landscape of Chapter 27. This has been achieved through the formulation of six key strategies: the National Strategy for Air Quality Management accompanied by the Action Plan for 2017-2020, the Water Management Strategy, the National Biodiversity Strategy alongside the Action Plan for 2016-2020, the Chemicals Management Strategy spanning 2015-2018, followed by the National Chemicals Management Strategy for 2019-2022, and the Disaster Risk Reduction Strategy featuring the Dynamic Activities Plan for 2018-

2023. Alongside these strategies, several other initiatives have been embraced, including the Action Plan for mitigating adverse environmental impacts, the Municipal Wastewater Management Plan for Montenegro for 2020-2035, and the General Plan for water hazard protection for water bodies of significance to Montenegro for 2017-2022, among others (Sudar, 2021).

By enacting a total of 123 regulations (24 laws and 99 bylaws) from July 2016 to December 2019 to transpose EU legislation into the national legal system, Montenegro has significantly enhanced its domestic regulatory framework concerning environmental and climate change matters. A detailed overview of the regulations enacted during this period is provided in Annex 3. Recognizing the dynamic nature of the European legal framework and the continuous introduction of new regulations, the Accession Programme of Montenegro to the European Union for 2020-2022, endorsed by the Government in February 2020, outlines strategies, programs, laws, and bylaws aimed at fulfilling the remaining targets outlined in the Action Plan of the Strategy, in addition to aligning with new EU *acquis* requirements and setting forth a timeline for their implementation. By the end of 2022, the Accession Programme aims to adopt ten strategic documents across six areas. These include plans to introduce horizontal legislation, enhance waste management practices, improve water quality management, strengthen nature protection measures, bolster civil protection mechanisms, and address climate change challenges (Sudar, 2021).

Additionally, the Programme entails the enactment of four laws related to waste management, forest conservation, nature protection, and fire protection, accompanied by 36 bylaws addressing various aspects of environmental and climate change issues. Annex 3 provides a comprehensive list of regulatory acts enacted in Montenegro from 2016 to the beginning of 2020, juxtaposed against the backdrop of the COVID-19 pandemic and the political transformations in Montenegro following the parliamentary elections on August 30, 2020. In Montenegro, the institutional framework for environmental protection underwent significant changes until December 5, 2020, following the parliamentary elections held on August 30, 2020, resulting in the formation of a new government. The new Montenegrin government comprises 12 ministries, each with specific areas of responsibility. These ministries include the Ministry of Justice, Human and Minority Rights; Ministry of Internal Affairs; Ministry of Defence; Ministry of Finance and Social Welfare; Ministry of Foreign Affairs; Ministry of Public Administration, Digital Society, and Media; Ministry of Education, Science, Culture, and Sports; Ministry of Health; Ministry of Economic Development; Ministry of Agriculture, Forestry, and Water Management; Ministry of Ecology, Spatial Planning, and Urbanism; and Ministry of Capital Investments.

Additionally, various government bodies contribute to the administration, including the Administration for the Enforcement of Criminal Sanctions, the Police Administration, the Directorate for Protection of Classified Information, and the Nature Administration, among others. In fulfilling obligations related to Chapter 27, thirty institutions, including eight ministries, played vital roles in the previous government. These ministries included the Ministry of Sustainable Development and Tourism, Ministry of Agriculture and Rural Development, Ministry of Health, Ministry of Transport and Maritime Affairs, Ministry of Economy, Ministry of Internal Affairs, Ministry of Finance, and the Ministry of Justice, along with other relevant institutions. Furthermore, three institutions, although not part of the public administration system but majority-owned by the state, were responsible for specific segments of environmental protection.

These institutions included the Public Enterprise for National Parks, the Public Enterprise for Management of Marine Assets, and the Center for Ecotoxicological Testing. Regarding the primary institutions responsible for the transposition and implementation of environmental regulations, notable changes occurred. Initially, the Environmental Agency, established when the Strategy with AP came into force in July 2016, was primarily responsible for implementing regulations across various environmental sectors. However, the agency was abolished as an independent body in March 2017. Its original status as an independent body of state administration was reinstated in December 2018, which it maintained until the end of 2019.

The research conducted an online survey, distributed before and after the summer recess to accommodate the transition of power following parliamentary elections, aimed at assessing the effectiveness of current personnel and identifying areas for improvement in staffing and negotiation strategies within Montenegro's environmental sector. Employing diverse methodologies, the survey's analysis delved into the demographic, social, and professional backgrounds of respondents. It explored their roles within institutions, involvement in environmental negotiations, and possession of relevant skills and expertise.

2. Methods

In line with the objectives of this research, an online survey has been crafted for individuals currently employed in state institutions directly involved in negotiation processes. Notably, these institutions encompass the Ministry of Sustainable Development and Tourism, as well as the Agency for Nature and Environmental Protection. The survey was initially distributed to both entities, with subsequent follow-up dissemination after the summer recess. This strategic timing was selected to account for the seasonal break and the evolving political landscape following the recent parliamentary elections, which resulted in a significant transition of power after nearly three decades.

The analysis of the survey employed a diverse range of methodologies and techniques. Through this analytical process, the objective was to explore various dimensions of the state administration's soft power and personnel structure. The overarching goal was to assess whether the current cadre effectively meets both quantitative and qualitative standards. Additionally, the survey aimed to identify potential areas for improvement and inform decision-making processes related to staffing and negotiation strategies within these state institutions.

The questionnaire's structure follows a systematic progression, facilitating a comprehensive understanding of the respondents' backgrounds and perspectives. It begins with demographic and social inquiries, probing into factors such as age, gender, educational background, and professional experience. This initial section aims to establish a profile of the participants, providing context for their responses to subsequent questions. Moving forward, the questionnaire delves into institutional engagements and professional competencies. Participants are asked about their roles within state institutions and their involvement in negotiation processes related to environmental matters. Additionally, they are queried about their possession of specific skills and expertise relevant to their positions. This segment seeks to uncover insights into the institutional capacity and expertise available for addressing environmental challenges.

Finally, the questionnaire explores respondents' knowledge of environmental protection and nature conservation issues. Through targeted inquiries, participants are prompted to reflect on their understanding of key environmental concepts, legislation, and current environmental challenges facing the country. By gauging respondents' awareness and comprehension of these issues, the survey aims to assess the depth of knowledge within the state institutions tasked with environmental governance.

2.1. Study Area

Montenegro is politically and strategically committed to Euro-Atlantic integrations, entailing the adoption of international and European standards and norms (Djurović, 2009). Democratic currents in the developed European society and state extend to all spheres of life, with candidate countries committing to accept EU recommendations through reform processes aimed at aligning all segments of development and life with standards geared towards improving living standards and respecting principles and norms for a healthy environment and sustainable development to preserve resources for future generations. Membership in the European Union and the level of development and harmony of society are observed and monitored through chapters in the EU accession process, in which candidate countries like Montenegro participate in negotiations with the EU and undertake the following activities: a) harmonising national legislation with EU legislation; b) implementing reforms in public administration to fulfill obligations towards the EU; and c) preparing the workforce structure for implementing obligations towards the EU.

Negotiations with the EU focus on meeting specified conditions (initial positions), which create conditions for opening certain chapters. It is a political process facilitated through the above-mentioned activities, but ultimately, the state must be staffed and equipped to implement the undertaken obligations, representing the most challenging and costly part of the EU accession process. Becoming part of the democratic values of the European Union is an aspiration that promises Montenegro a path toward quality regulations, high standards of governance, economic and societal development, and improved, more successful, and sustainable protection and utilization of natural resources (Orlandić, 2016). Ultimately, this endeavor aims to provide citizens with a healthy environment and a high quality of life. In December 2011, Montenegro demonstrated its readiness to commit to intensive reform processes by applying for EU membership. This commitment signifies a dedication to joining a community where democratic decisions are made collectively, addressing challenges to

achieve a high quality and safe life for citizens and future generations. The EU legislation is divided into 35 negotiating chapters (with the last two undefined for Montenegro in the accession process). Montenegro has opened all 33 chapters, but three chapters are temporarily closed: Chapter 25 – Science and Research, Chapter 26 – Education and Culture, and Chapter 30 – External Relations (Corpădean, 2018).

The penultimate chapter is precisely Chapter 27 – Environment and Climate Change, considered the most complex in terms of human, technical, technological, and financial requirements. One of the biggest challenges in implementing the requirements of Chapter 27 is taking a sectoral approach to environmental protection and achieving sustainable development. This involves integrating environmental protection into all sectoral policies to prevent, mitigate damage, share responsibility, and maintain biological balance, along with providing necessary financial resources and administrative capacities to guide and follow the process effectively. The Ministry of Sustainable Development and Tourism, as the highest authority for Chapter 27, continually monitors the implementation of obligations from the initial stance and informs both the Government of Montenegro and the European Commission. The Ministry recognizes the importance of intersectoral cooperation and the necessary collaboration of state administration with expert and scientific institutions, civil society, the private sector, and international organizations as links to specific available funds, aiming to achieve the goals and obligations of Chapter 27 in the simplest way possible (Djurović, 2009).

The closure of Chapter 27 will largely depend on the mobilization of available EU funds and other funds in the field of environment and climate change. It also relies on the country's capacity to establish sustainable mechanisms for financing and implementing environmental protection activities, which, with clear operational frameworks, fund inflows, and project selection, will enable the resolution of certain environmental issues on one hand and efficient protection and improvement of conditions in the field of environment and climate change on the other hand.

Montenegro embarked on its reform path towards full and lasting stabilization as early as June 2005, following the Parliamentary Declaration for EU Accession. By signing the Stabilization and Association Agreement (SAA) between the European Communities and their member states, on one side, and the Republic of Montenegro, on the other, in 2007, which came into effect on May 1, 2010, Montenegro reaffirmed its commitment to democracy. In line with the achievements and goals on which the European Union was founded, Montenegro also demonstrated a strategic interest in achieving economic stability and prosperity, and complete freedom of movement for persons, capital, goods, and services, while respecting the principles of sustainable development and environmental protection.

Montenegro's accession process to the European Union, from the moment of acquiring candidate status (December 2010), through the official start of the negotiation process (June 2012), until today, has been significantly conditioned by the establishment of a governance system based on democratic principles. The EU's views are fully embraced, and the country is economically adapting to the Union's system and standards. To adopt EU principles, Montenegro must implement comprehensive reforms in 33 negotiation chapters (from the free movement of goods and capital, fisheries, transport policy, economic and monetary union, to financial and budgetary provisions – Chapters 1-33), including Chapter 27 – Environment and Climate Change, one of the toughest, most complex, expensive, and complex negotiation chapters. Environmental protection and climate change directly impact people's quality of life, and challenges arising from incorrect technological development result in instability and changes in economic systems worldwide, hence the interdependence, importance, and complexity of the given topics. Today, full respect for Chapter 27 is considered indisputable. It is recognized that the chapter itself requires a sectoral approach to environmental protection and achieving sustainable development, implying the integration of environmental protection into all other sectoral policies (Vujović & Nenezić, 2023).

2.2. Socio-Economic and Demographic Characteristics

The study aims to provide a comprehensive analysis of the socio-economic and demographic characteristics of respondents, shedding light on key factors that may influence their attitudes and behaviors towards environmental protection and policy implementation. To begin with, the survey asks participants to disclose their gender, offering the options of female or male. This data has been previously collected in similar studies to gauge the level of interest and engagement in environmental conservation efforts across different gender identities. Understanding gender-specific attitudes

towards environmental issues is crucial for designing targeted interventions and policies that resonate with diverse demographic groups.

Moving on, respondents are prompted to specify their age, with choices ranging from 21 to 60 years old. This question is designed to uncover potential variations in environmental awareness and engagement among different age cohorts. By examining age-related trends, the study seeks to identify which segments of the population are most motivated to acquire the necessary skills and knowledge for promoting environmental sustainability, particularly in the context of Chapter 27 implementation. Furthermore, participants are asked to indicate their geographical region of residence, with options including the northern, central, or southern regions. This inquiry is informed by previous research highlighting regional disparities in environmental attitudes and behaviors. By capturing regional perspectives, the study aims to assess the geographical distribution of environmental concerns and priorities, thereby informing targeted policy interventions and resource allocation strategies tailored to specific geographical contexts.

Overall, by examining the interplay between gender, age, and regional dynamics, the study seeks to offer valuable insights into the socio-economic factors shaping individuals' engagement with environmental issues. Such insights are essential for crafting effective policies and initiatives that address the diverse needs and preferences of the population, ultimately contributing to more sustainable and inclusive environmental governance practices.

In addition to understanding respondents' demographic characteristics, it's crucial to delve into their educational backgrounds. Education plays a significant role in shaping individuals' perspectives and abilities to engage with environmental issues effectively. By exploring respondents' educational attainment, the study aims to uncover any correlations between the level of education and interest or involvement in environmental protection efforts. The survey provides respondents with options to indicate their level of education, which includes secondary vocational education, higher education, or ongoing education. This segmentation allows for a comprehensive analysis of the educational landscape among respondents, shedding light on the distribution of educational qualifications within the surveyed population.

Furthermore, participants are encouraged to provide detailed information about their educational journey. They are asked to specify the type of secondary school they completed, such as technical, vocational, or general education. Additionally, respondents are prompted to share details about their undergraduate studies, including the institution, degree obtained, and field of study. This granularity enables researchers to gain insights into the diversity of educational backgrounds among respondents. Moreover, the survey seeks to capture respondents' ongoing educational pursuits. Participants are allowed to disclose any additional professional development activities they have undertaken, such as courses, certified training programs, or other forms of supplementary education. This section of the survey aims to assess individuals' commitment to continuous learning and skill enhancement, which are valuable traits in the context of environmental stewardship and sustainability efforts.

By comprehensively examining respondents' educational profiles, the study aims to identify patterns and trends that may influence their attitudes and behaviors towards environmental protection. Education catalyzes raising awareness, fostering environmental literacy, and empowering individuals to become active participants in environmental conservation initiatives. Therefore, understanding the educational landscape of respondents is crucial for designing targeted interventions and educational campaigns aimed at promoting sustainable practices and behaviors. The inclusion of educational variables in the survey enriches the analysis by providing valuable insights into the relationship between education and environmental engagement. By exploring respondents' educational backgrounds, the study gains a more nuanced understanding of the factors that shape individuals' environmental attitudes and behaviors, ultimately contributing to the development of more effective strategies for promoting environmental sustainability.

2.3. Sample

The sample comprises 84 individuals, encompassing all proficient and capable executives or employees. Among them, 25 (29.77%) originate from the Ministry of Sustainable Development and Tourism (MoSDT), while 59 (70.23%) hail from the Agency for Nature and Environmental Protection (ANEP). These questions aim to capture the representation concerning gender, age, and the region of the participant's origin. Considering the diverse range of completed secondary schools, this ap-

proach proves to be highly relevant. Moreover, the parameter of the participant's region of origin provides crucial insights into the varying approaches to environmental issues and the distinct needs for addressing them within different regions. Given the comprehensive analysis of the state administration's conditions in this study, it becomes imperative to assess the age structure of the personnel responsible for executing all professional tasks in the negotiations for Chapter 27, irrespective of the political context of these negotiations.

The inclusion of individuals from both the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP) underscores the comprehensive representation of key stakeholders in environmental governance. By examining the demographic composition of these institutions, this study seeks to uncover patterns that may influence decision-making processes related to environmental policy formulation and implementation. Understanding the age distribution of personnel engaged in negotiations for Chapter 27 is particularly crucial as it provides insights into the generational perspectives and experiences shaping Montenegro's approach to environmental challenges. Additionally, by analyzing the regional origins of respondents, this research aims to identify potential disparities in environmental awareness, resource allocation, and policy priorities across different geographic areas within Montenegro. This holistic examination of socio-demographic characteristics within the state administration offers valuable insights for policymakers, environmental practitioners, and researchers striving to enhance environmental governance and sustainability efforts in Montenegro.

This dataset comprises responses from 84 individuals, with 55% identifying as female and 45% as male. This breakdown reveals a slightly higher representation of women in the state administration engaged in environmental protection and conservation efforts, a trend not unexpected in this field. Notably, only three respondents (3%) originate from the northern and southern regions combined, while the overwhelming majority, 83 respondents (97%), hail from the central region. Such a stark disparity suggests either a lack of regional employment tracking by governmental bodies or a limited interest among individuals in these regions to work for entities like the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP). The researcher posits that both factors likely contribute to this phenomenon, potentially stemming from inadequate employment policies in this sector.

Furthermore, there appears to be a notable imbalance in the movement of personnel within the institutions under investigation, particularly evident in the comparison between different age groups. This discrepancy suggests a direct consequence of ineffective personnel management policies. Additionally, the uneven distribution of male personnel across various age brackets exacerbates this issue. When there is a lack of incentives for employment within environmental protection institutions, it can lead to an unfavourable staff structure, resulting in diminished work quality. With insufficient staff members facing heightened pressure and workload, fatigue becomes a significant concern, especially when considering the retirement age limit.

The data clearly indicates that 60% of individuals undergoing further education are female, while 40% are male. While such a gender distribution may not inherently pose an issue, it becomes significant when considering that, according to respondents, all have completed their education. When coupled with the already unfavorable age structure among male respondents, this information paints an unfavorable picture of human resource management practices. Furthermore, the remaining employees not pursuing further education differ only in whether they followed the traditional system or the Bologna Process. The number of respondents undergoing additional training suggests that such endeavors, including courses, certified training, and other educational activities, represent added pressure and burden on employees. It's worth noting that out of the 84 respondents, 16 (19%) have no additional training, comprising two from MoSDT and 14 from ANEP. This suggests that MoSDT's extensive scope and organization require more staff involvement in further education. Conversely, ANEP's focus on implementing and enforcing legal regulations necessitates more detailed additional training. Of the remaining 68 respondents (81%), many are existing staff members participating in various forms of additional training necessary for normal functioning and completing tasks and obligations.

2.4. Analyses of Environmental Governance Dynamics: A Focus on Montenegro's Key Institutions

In the context of this study, the selection of these two pivotal institutions, the Ministry of Sustainable Development and Tourism, and the Agency for Nature and Environmental Protection holds sig-

nificant relevance. These institutions play instrumental roles in shaping Montenegro's environmental policies and spearheading initiatives aimed at addressing climate change challenges. By focusing on these entities, this research aims to shed light on the dynamics of environmental governance within Montenegro's state administration.

The Ministry of Sustainable Development and Tourism serves as a central coordinating body, responsible for overseeing the implementation of policies and measures outlined in Chapter 27 of Montenegro's accession negotiations with the European Union. This chapter encompasses a wide array of environmental issues, ranging from biodiversity conservation to waste management and climate change mitigation. By analyzing the Ministry's organizational structure, staffing patterns, and policy initiatives, researchers can gain valuable insights into the state's capacity to effectively address these complex challenges. Similarly, the Agency for Nature and Environmental Protection plays a crucial role in monitoring environmental quality, enforcing regulations, and promoting sustainable practices across various sectors. As Montenegro strives to align its environmental standards with EU norms, the agency's efforts are pivotal in ensuring compliance and fostering a culture of environmental stewardship. By examining the agency's functions, resources, and areas of focus, researchers can assess its effectiveness in safeguarding Montenegro's natural heritage and promoting sustainable development.

One of the key strengths of this research lies in its adaptability and scalability. The chosen research model, which focuses on analyzing the socio-economic and demographic characteristics of personnel within key environmental institutions, can be easily tailored to accommodate changes in the political or administrative landscape. This flexibility ensures that the research remains relevant and applicable, regardless of shifts in government or policy priorities. Moreover, the inclusivity of the research design allows for a comprehensive understanding of the workforce within these institutions. By collecting data on gender, age, education, and regional distribution, researchers can identify potential disparities or areas for improvement in workforce diversity and representation. This information is essential for fostering inclusive decision-making processes and promoting equal opportunities within the environmental sector.

Furthermore, the findings of this research are expected to have broader implications for environmental governance and policy-making in Montenegro and beyond. By documenting best practices, identifying challenges, and proposing recommendations for improvement, this study can inform future policy initiatives and strategic interventions aimed at enhancing environmental sustainability and resilience. The selection of the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection as focal points of this research reflects their critical roles in shaping Montenegro's environmental agenda. Through a comprehensive analysis of these institutions and their personnel profiles, this study aims to contribute to the ongoing discourse on environmental governance and sustainable development in Montenegro and the wider European context.



3. Results

The Ministry of Sustainable Development and Tourism covers various aspects concerning the protection of the environment. After gaining independence in 2006, the state, defined as an ecological state by the Constitution, and engaging in accession negotiations, developed its legislative, negotiating, and organizational capabilities for EU negotiations, which were then considered optimal and cost-effective. Organizational structures have since been variable to achieve the current form. Today, the Ministry includes directorates involved in environmental protection, either directly or indirectly. Directly involved directorates, falling under Chapter 27, encompass the Directorate for Environmental Protection, the Directorate for Waste Management and Municipal Development, and the Directorate for Climate Change and Mediterranean Affairs.

Indirectly involved directorates, not covered by Chapter 27, address areas indirectly impacting the environment. These include the Directorate for Spatial Planning, the Directorate of the Chief State Architect, the Directorate for Construction, the Directorate for Inspection Affairs and Licensing, the Directorate for Competitiveness Development and Tourism Investments, the Directorate for Tourist Destination Development and Tourism Infrastructure, the Directorate for Monitoring Tourist Flows and Tourism Traffic, the Directorate for Accommodation Development, and the Directorate for Valorization of Tourist Sites. This enumeration of Directorates illustrates the Ministry's organizational structure, assessing whether the existing organization, which may be institutionally cumbersome, has personnel sufficiently capable and qualified. Such analysis is divided into two phases: first, eval-

uating aspects such as institution, sector, job position, and years of work in the institution, and second, assessing general professional skills, types thereof, and professional areas of the examinee.

The analyzed example specifically concerns Directorates falling under Chapter 27, with a total of 25 examinees from the Ministry. According to the Law on Civil Servants (Government of Montenegro, 2018, 2019, 2021), job positions within the Ministry include the General Director of the Directorate, the Director of the Department, the Head of the Division, and Advisors from I – III ranks. It is important to note that the systematization of job positions is influenced by the organizational needs of the Ministry and the requirements for complying with legal regulations and harmonizing with EU legislation. In essence, the analyzed Directorates include the personnel mentioned above.

This presentation highlights the significant emphasis placed by Montenegro, through its Ministry responsible for Chapter 27, on specific aspects of environmental protection. The Directorate for Environmental Protection and the Directorate for Climate Change and Mediterranean Affairs receive considerably more attention than the Directorate for Waste Management and Municipal Development, as reflected in their respective staffing levels. Notably, the head of the Directorate for Waste Management and Municipal Development lacks a relevant environmental science education, instead possessing qualifications in social sciences, a noteworthy observation in itself.

It is crucial to stress the imperative of bolstering personnel within the Department for International Cooperation and European Integration, given the substantial workload demanding a larger workforce. This need is apparent in the regulations adopted during the period from 2016 to early 2020, where continuous engagement with the European Commission aimed to secure positive feedback on proposed legislation. Furthermore, the provided tables indicate a satisfactory distribution of job positions concerning additional qualifications. Regarding the age composition of Ministry examinees, there is a concerning bias toward older male candidates, averaging 45 years. While not alarming on the surface, considering the limited intake of new staff, it raises concerns. Conversely, the age profile of female candidates is slightly lower, with an influx of younger personnel, aligning with the Ministry's goals. An additional crucial aspect for analysis is the requisite work experience for many pivotal roles within the Ministry. Drawing on questionnaire data, the years of experience within the Ministry and overall work experience of the examinees are presented in Table 1, categorized by gender.

Table 1. The structure of categorized personnel at the sample from the Ministry of Sustainable Development and Tourism.

Job position of the respondent	Institution							
	Ministry of Sustainable Development and Tourism (MoSDT)							
	Directorate for Environment		Directorate for Waste Management and Municipal Development		Directorate for Climate Change and Mediterranean Affairs		Department for International Cooperation and European Integration	
	Female	Male	Female	Male	Female	Male	Female	Male
Head of Directorate	1	0	0	0	0	0	1	0
Senior Advisor	1	0	1	0	1	0	0	0
Independent Advisor	2	1	0	0	0	2	0	0
Independent Advisor I	1	0	2	2	1	0	2	0
Independent Advisor II	2	0	0	0	0	0	1	0
Independent Advisor III	1	1	1	0	0	0	0	1
Towards the director	8	2	4	2	2	2	4	1
Towards the director	10		6		4		5	

This presentation sheds light on the considerable emphasis that Montenegro places on specific aspects of environmental protection through its Ministry tasked with Chapter 27. The Directorate for Environmental Protection and the Directorate for Climate Change and Mediterranean Affairs hold considerably higher importance than the Directorate for Waste Management and Municipal Development, as evidenced by their respective staffing levels. Notably, the Directorate for Waste Management and Municipal Development lacks a head with pertinent environmental science education, relying instead on personnel with backgrounds in social sciences. This observation carries significant weight on its own.

It is imperative to underscore the necessity for bolstering personnel within the Department for International Cooperation and European Integration, given the substantial workload in this domain demanding a larger workforce. Moreover, the continuous engagement with the European Commission, as evidenced by adopted regulations (Annex 3) spanning from 2016 to early 2020, illustrates a commitment to obtaining positive feedback on proposed measures. Furthermore, the distribution of job positions vis-à-vis additional qualifications data (Tables No. 33 and 34) appears to be adequate based on this analysis.

Regarding the age composition of examinees from the Ministry of Sustainable Development and Tourism (MoSDT), it's crucial to note the unfavorable conditions for male candidates, whose average age stands at 45 years. While this might not set off immediate alarms, the absence of fresh talent entering the workforce poses a genuine concern. On the other hand, the age structure of female candidates shows a slight decrease, suggesting an influx of younger professionals—a trend that MoSDT should actively encourage.

Another crucial aspect to consider in this analysis is the level of work experience necessary for various key roles within the Ministry of Sustainable Development and Tourism (MoSDT). Using data obtained from questionnaires, the work experience of individuals within MoSDT has been evaluated in terms of years, encompassing their overall professional background. This information is presented in Table 2, which categorizes both types of work experience based on gender.

Table 2. Years of Work Experience of Personnel from the Sample of Ministry of Sustainable Development and Tourism (MoSDT)

Gender	Work experience	
	Ministry of Sustainable Development and Tourism	Total
Female	147, 6	289
Male	31	86
Total	178, 6	375

The data presented here were gathered by simply aggregating the work experience of the examinees. The table delineates several key points: Female personnel contribute 51% of the total work experience in MoSDT, whereas male personnel contribute 36%. Combined, both genders contribute 47% of the total work experience. The average work experience in MoSDT for both genders is 7.14 years.

A comparable analysis was conducted for the Environmental Protection Agency, involving a sample of 59 examinees. It's worth noting that the job classification within the Agency differs from that of MoSDT. Instead of directorates, the Agency is organized into sectors and departments, with a reduced number of standardized job positions for chiefs and managers. The Agency encompasses various sectors and departments, including Monitoring, Analysis, and Reporting; Nature Protection; Permitting and Consent Issuance; Aarhus Convention Implementation and Pollution Inventory Management; Nuclear and Radiological Safety, and Environmental Projects.

Table 3. The organizational and comprehensive structure, as well as the distribution of job positions across sectors and departments in the Environmental Protection Agency (EPA) sample.

The job position of the respondent within the institution	Name of the institution											
	Agency for Nature and Environmental Protection (ANEP)											
	Monitoring, Analysis, and Reporting Sector		Nature Protection Sector		Environmental Projects Department		Sector for Sectoral Issuance and Consents		Implementation and Polluter Registry Management Sector		Department for Nuclear and Radiological Safety and Protection	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Senior Advisors	0	0	1	0	1	0	0	0	0	0	1	2
Indep. Advisors	2	0	1	2	1	1	0	0	0	1	0	2
Advisor I	2	1	2	1	3	5	2	1	0	2	0	2
Advisor II	0	2	1	1	2	0	2	0	1	2	0	2
Advisor III	0	3	0	2	1	2	2	0	0	0	0	0
Total by Gender	4	6	5	6	8	8	6	1	1	5	1	8
Total by Sector	10		11		16		7		6		9	

This table presents the primary focus of activities within the Environmental Protection Agency. Examining the Agency's initiatives, the table distinctly indicates a significant emphasis on the Monitoring Sector, Nature Protection Sector, and Permitting Sector. Particularly noteworthy is the active involvement of the Permitting Sector, which is tasked with handling the myriad decisions, permits, consents, and opinions required for private activities. Additionally, the Monitoring, Analysis, and Reporting Sector is poised to see increased involvement, as its outcomes will gauge the alignment of planned economic activities with Montenegro's signed and internationally binding agreements, declarations, directives, and conventions. Furthermore, there's a conspicuous indication of the necessity for personnel engagement in sectors like the Implementation of the Aarhus Convention, Nuclear and Radiological Safety, Protection from Ionizing and Non-Ionizing Radiation, and Environmental Projects. The operational dynamics of the Agency are contingent upon the evolving dynamics, needs, and negotiations related to Chapter 27, as well as the forthcoming demands of Montenegro's society and the financial capacities of the state.

In the Environmental Protection Agency, the majority of job positions are filled with profiles delineated by the job classification. Presently, the age composition within the Agency is marginally more favorable compared to that of MoSDT, although this scenario is expected to undergo significant changes upon the imminent relaxation of the restrictive employment policy. Echoing the scenario at the Ministry of Sustainable Development and Tourism, the aspect of work experience assumes paramount importance here, given the substantial responsibilities associated with the Agency's endeavors. Table 4 provides a breakdown of the examinees' work experience in terms of years within the Agency, along with their cumulative work experience.

Table 4. Work Experience of Personnel Sample from the Agency for Nature and Environmental Protection (ANEP).

Gender	Work Experience: Agency for Nature and Environmental Protection (ANEP)	Total
Female	226	321
Male	272	384,5
Total	498	705,5

The data presented in this report was collected by compiling the work experience of the respondents. This data offers insights into several key aspects: among female personnel, the work experience within the Agency for Environmental Protection accounts for 70% of their total work experience. For male personnel, this figure is slightly higher at 71%. Overall, the Agency for Environmental Protection contributes 70% to the total work experience for both genders. Additionally, the average work experience in the Agency for Nature and Environmental Protection is approximately 12 years.

In the course of analyzing this dataset, it became essential to determine the respondents' possession of general professional skills. These skills encompass proficiency in areas such as computer literacy, foreign language usage, communication, and case/data analysis. Regarding the possession of general professional skills, the responses were as follows: 75 respondents (89%) affirmed possessing these skills, while 6 respondents (8%) indicated they did not. Additionally, 3 respondents (3%) did not respond.

Those respondents who indicated a lack of general professional skills are typically individuals nearing the end of their careers, where interest in further professional development tends to wane. For those who did not respond, their absence from the analysis does not significantly affect the overall findings, given their small representation in the sample.

An area of concern arises when examining the level of computer literacy within the context of this analysis. Given the pivotal role of the two main institutions in negotiating Chapter 27, responsible for aligning legislation with EU regulations and implementing environmental changes, one would expect a high level of computer literacy. Considering the respondents' extensive work experience, prompts the question of whether these institutions have adequately invested in enhancing the computer literacy of their staff. Table 5 illustrates the situation in both the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection.

Table 5. Computer literacy according to the gender of the personnel from the sample of the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP).

Level of computer literacy	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
None	0	1	11	19
Basic	0	0	3	2
Intermediate	3	2	0	3
Advanced	11	1	11	4
Expert	6	1	3	3
Total by gender	20	5	28	31
Total by institution	25		59	
Total for the sample	84			

Foreign language proficiency, alongside a deep understanding of information technology, is crucial for all state institutions. As Montenegro progresses towards EU accession and engages in international cooperation, the demand for such skills intensifies. While this analysis primarily focuses on European languages, it acknowledges the importance of proficiency in languages from other regions as well. The proficiency levels considered are basic, intermediate, advanced, and expert. Within the Ministry of Sustainable Development and Tourism (MoSDT), English proficiency is notably high. Although efforts to learn other foreign languages exist, they are primarily driven by individual initiatives rather than continuous organizational endeavors. However, due to the aging workforce, there's a concern that proficiency levels may decline, highlighting the need for a fresh influx of young personnel proficient in foreign languages.

In contrast, the Agency for Nature and Environmental Protection exhibits pronounced English language proficiency among its staff. As negotiations for Chapter 27 progress, a heightened demand for professional-level English proficiency is anticipated. The logical progression from this analysis is an exploration of communication skills, a crucial aspect of personal development for respondents. Communication skills are influenced not only by professional abilities but also by general education, cultural awareness, and technological acumen. Table 6 illustrates the level of communication skills within both the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection, categorized by level and gender structure.

Table 6. Communication Skills Level by Gender in the Sample of the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP).

Level of communication skills	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
None	0	0	4	5
Basic	0	0	2	2
Intermediate	4	3	5	14
Advanced	11	1	12	9
Expert	5	1	2	4
Total by gender	20	5	25	34
Total by institution	25		59	
Total for the sample	84			

Concerning proficiency in communication skills, it is noteworthy that both institutions commonly demonstrate an advanced level of competence. Additionally, within the Agency for Nature and Environmental Protection, there is a significant representation of intermediate proficiency, indicating the potential for further enhancement in this aspect. However, this distribution is expected to

undergo a change and decline in the Ministry of Sustainable Development and Tourism due to its unfavorable age structure. Therefore, it becomes evident that there is a necessity to foster personnel with even higher levels of communication skills, or to implement a rigorous process of enhancement within these institutions to equip the staff adequately for effectively managing the demanding tasks inherent in the negotiation proceedings for Chapter 27.

The negotiation process concerning this chapter entails an adaptation endeavor aimed at optimally aligning all EU legal regulations, international conventions, agreements, declarations, directives, and positive environmental experiences within the EU legislative framework. To execute these endeavors most efficiently, a multitude of comparative analyses involving cases, data, and various information sources is imperative. Particularly noteworthy is the analytical acumen of individuals, which emerges as a crucial skill for these undertakings. This analytical overview should ascertain whether other state institutions should be incorporated within their respective domains. Table 7 delineates the level of analytical prowess within institutions, a category not quantified conventionally but rather emerging from factors such as expertise quality, structural continuity, experience, observational acuity, and inclination towards further research. Consequently, data of the level of analysis inherently bear a subjective nature, and their extent of articulation will be elucidated in the ensuing table (Table 7).

Table 7. Level of Analytical Proficiency According to Gender in the Sample from the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP)

Analysis level	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
None	0	0	6	7
Basic	0	0	0	2
Intermediate	3	2	2	11
Advanced	13	3	14	11
Expert	4	0	3	3
Total by gender	20	5	25	34
Total by institution	25		59	
Total for the sample	84			

The data presented in the table underscores a notable presence of advanced proficiency levels within both institutions, suggesting promising potential for advancement, especially in specialized areas. The analytical depth within these specialized domains holds particular significance for disciplines within the environmental sector. Notably, a concerning proportion of personnel within the Agency for Nature and Environmental Protection—specifically, 13 respondents (38%)—demonstrate a lack of analytical proficiency. All of these individuals are affiliated with the sector responsible for permit issuance and approvals. This deficiency may stem from the sector's administrative nature and the inherent complexities of the tasks involved. However, it's imperative to recognize that such roles demand a level of analytical acumen, regardless of administrative functions.

In the context of negotiations for Chapter 27, Montenegro must enlist personnel who possess both quality and quantity to effectively execute all planned tasks and activities. These negotiations necessitate the collective contribution of advanced professional skills to ensure seamless organization, coordination, and synergy among all stakeholders, all aimed at achieving timely negotiation success. Outlined among the requisite advanced professional skills essential for leadership roles within these institutions/organizations are proficiency in leadership, expertise in management, consultancy/management skills, aptitude in scientific proficiency, and other pertinent capabilities.

Table 8 illustrates the extent to which respondents possess advanced professional skills. In both institutions, consultancy emerges as the predominant skill, as indicated by most respondents. Furthermore, a slight bias towards male personnel is observed in terms of leadership roles, while female staff exhibit a notable advantage in scientific professional skills. Notably, leadership positions display gender parity.

It is essential to underscore that respondents' answers might be influenced by their current roles, heightening subjectivity. Advanced professional skills, including scientific expertise, are influenced by personal motivation for development, transcending one's current administrative role. This principle extends to all skill sets. It's noteworthy that our administration lacks a distinct "manager" category, explaining the absence of responses in that regard. The responsibility for such gaps primarily lies with personnel policies and the financial backing of institutions, which rely solely on state funding. Additionally, it's imperative to analyze the distribution of personnel by their professional domains, aligning with Chapter 27's mandates. This strategic approach aims to identify areas of advancement and potential shortcomings within negotiation parameters (Table 8).

Table 8. Ownership of professional skills among the sample from the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP).

Type of Competence	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Leadership	1	0	1	3
Management	2	0	0	2
Counselling	13	5	2	28
Scientific professional skills	4	0	4	1
Other	0	0	0	0
Total by gender	20		5	
Total by institution			84	

Table 9 offers a comprehensive insight into Montenegro's active participation in negotiating Chapter 27. It's evident that both the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection played pivotal roles in shaping horizontal legislation, leveraging their existing capacities to the fullest. As the development of horizontal legislation progressed, activities in the realm of nature protection saw a significant boost, leading to a notable surge in personnel dedicated to this area. It's imperative to highlight that the current workforce addressing climate change falls short of Montenegro's needs, considering the urgent global nature of this issue. Similarly, while personnel responsible for air quality, water quality, and waste management are reasonably distributed across institutions, there's a consensus among researchers that the overall allocation remains insufficient.

Table 9. Representation of personnel by field with total work experience by field in the sample from the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection.

Area	Institutions					
	Ministry of Sustainable Development			Tourism Agency for Nature and Environmental Protection		
	Female	Male	Experience	Female	Male	Experience
Horizontal Legislation	3	1	30	4	7	56
Water Quality	2	1	21,5	1	3	19
Air Quality	2	0	25	3	2	28
Waste Management	1	2	23	2	1	15
Nature Protection	5	0	46	6	5	92
Industrial Pollution	1	0	2	3	5	63
Chemicals	1	0	4	2	2	34
Noise	2	0	26	2	3	51
Civil Protection	0	0	0	1	0	18
Climate Change	1	0	4	1	2	15
Other	2	1	13	0	4	28
Total by Gender	20	5	194,5	25	34	419
Total by Institution	194,5			419		
Total for the Sample	Experience 613,5					

The issue of industrial pollution unveils a discrepancy between the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection. With the Agency boasting personnel with a combined work experience of 63 years, doubts arise regarding the adequacy of a single industrial pollution advisor in the Ministry. This concern extends to personnel specializing in chemicals.

Civil protection, however, falls under the jurisdiction of another ministry—the Ministry of Internal Affairs of Montenegro—and wasn't included in this investigation. In the miscellaneous category, the majority of personnel are affiliated with the Agency for Nature and Environmental Protection, particularly in nuclear and radiological safety, ionizing and non-ionizing radiation protection, and environmental projects. On average, employees at the Ministry of Sustainable Development and Tourism boast 7.78 years of work experience, slightly higher than the 7.03 years seen at the Agency. This culminates in an overall sample average of 7.30 years, underscoring the depth of expertise within Montenegro's environmental institutions.

The competencies of the staff mainly revolve around crafting legislative regulations, irrespective of their assigned tasks within their respective institutions. This trend is reflected in Table 10, which illustrates the connection between professional fields and the competencies of the respondents.

Table 10. Display of Competencies by Field for the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection.

Type of Competence	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Strategic devel. documents	3	0	1	1
Conducting studies	2	0	0	6
Planning documentation	6	0	5	9
Formulation of legal	3	3	7	9
Development of policies	3	1	7	3
International cooperation	3	1	5	6
Total by gender	20	5	25	34
Total for the institution	25		39	
Total	84			

As indicated by table 10, the earlier observation remains valid, with 22 respondents or 26% actively participating in this aspect. Following the establishment of legal regulations, the primary focus of personnel shifted towards crafting planning documentation, involving 20 respondents or 24%. Noteworthy is the significant role played by policy development in this framework, ranking third in involvement with 17 respondents or 20%. There is a noticeable activity in promoting international cooperation within specific areas of Chapter 27, with 15 respondents or 18% actively engaged. Conversely, minimal participation of personnel is evident in conducting studies, formulating strategic development documents, and various specialized studies. The negotiation process for Chapter 27 will inevitably require heightened personnel involvement, both broadly and especially in this domain. In summary, Montenegro faces the formidable challenge of appointing adequate personnel.

Moving on to address another set of inquiries, we aim to gather the following insights: which competencies are most conducive to the transposition and implementation of Chapter 27?; do current educational programs effectively nurture the essential competencies needed for Chapter 27's transposition and implementation?; what are the two competency areas that should be incorporated into higher education? This segment of the analysis pertains to the entire sample, ensuring a comprehensive understanding of the matter. In Table 11, the attitude of personnel towards which competencies contribute most to the transposition and implementation of Chapter 27 is depicted, with a breakdown of tasks.

Table 11. Competencies that contribute most to the transposition and implementation of Chapter 27 – the perspective of respondents from the Ministry of Sustainable Development and the Tourism Agency for Nature and Environmental Protection by gender.

Type of competence	Gender	
	Female	Male
Development of strategic development documents	19	10
Preparation of studies	4	4
Development/familiarity with spatial planning documents	0	0
Development/familiarity with legal regulations	1	2
Development/familiarity with policies	19	14
Knowledge of global and/or EU development policies, etc.	3	8
Other	0	0
Total by gender	46	38
Total for the sample	84	

The data from the table indicates that 29 individuals, comprising 34% of the sample, hold the view that expertise in crafting strategic development documents stands as the most impactful in facilitating the transposition and execution of Chapter 27. This prompts a logical inquiry: if such a viewpoint prevails, why is there such limited involvement of personnel in this aspect of strategic development? Conversely, the predominant perspective among respondents is that policies, as recognized by 33 individuals or 39%, hold the greatest potential for facilitating Chapter 27's transposition and execution. Meanwhile, 11 respondents, or 13%, assert that familiarity with global or European development policies holds the greatest promise. Only a minor proportion, 8 respondents, or 9%, regard proficiency in conducting studies as significant, whereas merely 3 respondents, or 5%, recognize the importance of crafting planning regulations.

Moving forward in the analysis, we delve into respondents' perceptions regarding whether existing higher education or study programs effectively cultivate the requisite competencies for executing Chapter 27. Of the total respondent pool, 52 individuals, constituting 62%, expressed a negative sentiment, whereas 32 respondents, or 38%, affirmed the notion. Among those with negative sentiments, female respondents predominate with 62%, in contrast to male respondents at 38%, with 61% of females and 39% of males expressing scepticism. Conversely, in the affirmative responses, female participation stands at 44%, whereas male participation reaches 56%.

Of the total 32 respondents who provided affirmative responses, 16 individuals (50%) elaborated on their viewpoint. According to their perspective, the Faculty of Natural Sciences and Mathematics (44%) at the University of Podgorica emerges as the most influential, followed by the Faculty of Mechanical Engineering (19%) at the same institution, then the Faculty of Civil Engineering (12%), and lastly, Social Sciences (25%). These findings suggest a natural distribution, with respondents primarily valuing specialized personnel in environmental protection and the institutional fortification of the state. Respondents highlight the significance of economics, legal studies, and European studies in fostering competency development, both in the negotiation phase and in building skills for implementing Chapter 27.

Upon concluding the analysis of this questionnaire section, it becomes imperative to identify the two competency areas that should be integrated into higher education. This inquiry closely correlates with the previous one and serves as a validation of the responses from the preceding question. Respondents emphasize that the current educational system falls short in nurturing the competencies necessary for transposing and implementing Chapter 27. Hence, the suggestion made by respondents, advocating for the incorporation of knowledge about global or European development policies (38%) and the creation of strategic development documents (31%) into higher education, appears highly rational.

This instance underscores the more rapid progress of negotiations for Chapter 27 compared to the alignment of organizational and personnel structures with the demands of this intricate and financially demanding process. Consequently, the relevant institutions within the country must bolster their personnel, and legal regulations should closely adhere to European standards, necessitating a greater number of personnel. Such efforts will ensure the harmonization of all components outlined in the negotiation criteria for Chapter 27.

3.1. Familiarity with environmental protection and biodiversity issues

In the initial set of questions, respondents were tasked with selecting, based on their own opinions and experiences, the most significant area from the perspective of their initial positions. Montenegro, amidst its European integration efforts and negotiation processes about chapters, adopts documents aimed at facilitating the successful implementation of European legislation. This is achieved through the development of its organizational and personnel structure and the synchronization of necessary elements for negotiations regarding Chapter 27. To analyze this set of questions effectively, it is imperative to refer to documents that delineate the state's stance on issues related to environmental protection and biodiversity. Specifically, these documents include the Strategy for the Development of Higher Education in Montenegro (2016 - 2020) and the Action Plan for Fulfilling the Final Positions of Chapter 27 - Environment and Climate Change. Table 12 presents a breakdown of respondents' answers based on their respective institutions.

Table 12. The most notable aspect of Chapter 27 regarding initial positions - perspectives of the sample from the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection categorized by gender.

Area	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Horizontal legislation	1	0	6	4
Water quality	2	0	1	2
Air quality	1	0	4	3
Waste management	8	4	4	13
Nature protection	6	0	9	4
Industrial pollution	0	0	2	1
Chemicals	0	1	0	1
Noise	0	0	0	1
Civil protection	0	0	0	/
Climate change	2	0	0	4
Total by gender	20	5	26	33
Total for the institution	25		59	

From the viewpoint of the most significant areas concerning initial stances, waste management takes the lead (37%), followed by environmental protection (23%), horizontal legislation (13%), air quality (10%), climate change (7%), water quality (5%), industrial pollution (3%), and chemicals (2%). When reviewing the previous table, three notable indicators come to light: a substantial gap exists in the perceived importance of horizontal legislation among respondents' initial stances. This discrepancy is particularly striking since more respondents from the Agency for Nature and Environmental Protection prioritize horizontal legislation. The Action Plan for fulfilling the closing positions of Chapter 27 - Environment and Climate Change underscores Montenegro's continued alignment with horizontal directives, signalling readiness to ensure their effective implementation upon accession. It's intriguing why such dominance of opinion is not evident in the Ministry of Sustainable Development and Tourism. Respondents from the Agency for Nature and Environmental Protection conclude their work on regulation application and monitoring, asserting that the development of horizontal legislation thus far contributes to smoother and more effective implementation (Table 12).

The nearly identical stance of respondents from both institutions concerning waste management (34%) is noteworthy, indicating careful deliberation on this matter. This uniformity suggests a consistent approach to the initial stances outlined in the aforementioned documents, notably through: formulating and presenting waste management plans encompassing all waste streams (including hazardous, construction and demolition, and industrial waste) and corresponding management strategies; establishing regulations for accumulated "historic" hazardous waste, advancing in the characterization and categorization of hazardous waste in industry sectors; ensuring and labeling storage sites for hazardous waste; compiling a registry of polluters; undertaking initiatives to promote prevention of industrial waste and ensure environmentally responsible disposal; offering increased guidance on constructing recycling facilities for construction and demolition waste (Table

12). In this context, it is crucial to enact all forms of planning documentation, enhance personnel capacity-building processes, execute planning initiatives, oversee implementation, and provide more comprehensive public information. Table 13 displays the areas of Chapter 27 with the most complex closing positions.

Table 13. The domains within Chapter 27 present the most intricate final positions - viewpoints provided by respondents from the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection categorized by gender.

Area	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Horizontal legislation	0	0	2	4
Water quality	0	0	2	3
Air quality	1	0	1	2
Waste management	14	0	8	11
Nature protection	3	1	7	3
Industrial pollution	2	0	4	4
Chemicals	0	1	1	1
Noise	0	0	0	0
Civil protection	0	0	0	0
Climate change	0	2	1	5
Total by gender	20	5	26	33
Total for the institution	25		59	

Respondents from both institutions indicate that waste management is the most intricate area, accounting for 40% of responses. Subsequently, the environmental sector follows in complexity, with 18%, while climate change and industrial pollution each garnered 10%. Horizontal legislation, water quality, air quality, and chemicals make up the remaining percentages, at 7%, 6%, 5%, and 4%, respectively. In December 2018, the International Conference on Environment and Climate Change convened in Brussels, culminating in the EU's Common Position, which outlines the final criteria for closing Chapter 27. This stance likely influenced respondents in shaping their answers to this query.

Upon scrutinizing the two tables, it's evident that respondents converge on waste management and environmental protection as the most significant and intricate domains. Furthermore, respondents express near consensus on noise and civil protection as equally significant and complex areas. Notably, respondents from the Ministry of Sustainable Development and Tourism don't regard horizontal legislation as significant or complex, signaling a distinctive viewpoint. Concerning the question of the most financially complex area for closing Chapter 27, respondents' answers closely mirror their assessments of certain areas' significance and complexity. The responses regarding financial complexity by areas and institutions for Chapter 27, according to gender, are outlined in Table 14.

Table 14. Financial complexity by areas and institutions for Chapter 27, according to gender provided by respondents from the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection.

Area	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Horizontal legislation	0	1	2	2
Water quality	2	0	1	0
Air quality	0	0	0	3
Waste management	16	3	14	12
Nature protection	0	1	4	2
Industrial pollution	2	0	4	9
Chemicals	0	0	1	1
Noise	0	0	0	1

Civil protection	0	0	0	1
Climate change	0	0	0	2
Total by gender	20	5	26	33
Total for the institution	25		59	

According to the consensus of respondents (54%), waste management emerges as the sector requiring the greatest financial allocation. A segment of the Action Plan aimed at achieving the prescribed milestones within Chapter 27 - Environment and Climate Change delineates explicit procedures concerning the actions necessary to meet the commitments outlined in the plan. It includes delineating the methodologies for executing the designated areas by the pertinent institutions overseeing their implementation, specifying deadlines for the completion of these actions, and identifying funding sources along with an assessment of the necessary financial resources for executing the defined initiatives.

Table 15 presents the distribution of respondents' answers to the question: for which area of Chapter 27 in Montenegro are competencies lacking? A total of 78 responses, constituting 93% of the sample, were deemed valid, while 2 respondents, representing 3%, abstained from responding. Additionally, 4 responses, making up 4% of the total, were considered invalid. Remarkably, none of the participants offered justifications for their selection of the competency-deficient domain. Nevertheless, preliminary data suggests that deficiencies in competencies are evident in the realms of civil protection and climate change, particularly noteworthy given the minimal interest shown by respondents in civil protection during the earlier stages of analysis.

Table 15. Chapter 27 areas where competencies are deficient - viewpoint of respondents from the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection categorized by gender.

Area	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Horizontal legislation	1	0	5	5
Water quality	2	0	1	0
Air quality	/	0	0	3
Waste management	6	0	4	5
Nature protection	0	1	1	0
Industrial pollution	0	0	6	2
Chemicals	1	0	1	4
Noise	0	1	1	1
Civil protection	0	1	4	8
Climate change	6	2	3	3
Total by gender	16	5	26	31
Total for the institution	21		57	

The domain garnering the highest consensus regarding competency deficiencies is waste management, with 15 respondents expressing such concerns, followed by climate change (14), civil protection (13), and horizontal legislation (11). Worth noting is that out of the 11 responses of horizontal legislation, 10 originated from respondents affiliated with the Agency for Nature and Environmental Protection. It is imperative to underscore the significance of the findings regarding water quality, where a mere 3% of respondents perceive competency deficiencies. Similarly, the data concerning air quality is notable, with only 3% of respondents indicating such deficiencies.

Table 16 illustrates the distribution of responses to the following question: In which area is the need for capacity strengthening in terms of transposition the most significant? From the entire respondent pool, 86% contributed answers, with the Ministry of Sustainable Development and Tourism predominating over the Agency for Nature and Environmental Protection. Notably, 14% of respondents abstained from answering this particular question. Upon scrutinizing the responses from both Table 15 and Table 16, given the similarity of inquiries, several insights emerge. In the realm of horizontal legislation, no substantial disparities are evident, indicating a unified standpoint among

respondents in this regard. Concerning water quality, a minor fraction of respondents highlighted capacity deficiencies, while a significantly larger segment identified the imperative for capacity enhancement. Although deficiencies in air quality capacities were acknowledged, the urgency for fortification was not as pronounced. Conversely, a favourable trend towards bolstering capacities is discernible in waste management, despite previous observations of inadequacies. While there's a slight shortfall in capacities for nature protection, the demand for enhancement remains substantial. A parallel scenario is observed in industrial pollution.

Table 16. Enhancing Capacity Needs in Chapter 27: Perspectives of Respondents from the Ministry of Sustainable Development and Tourism and the Agency for Nature and Environmental Protection by Gender.

Area	Institution			
	Ministry of Sustainable Development		Tourism Agency for Nature and Environmental Protection	
	Female	Male	Female	Male
Horizontal legislation	/	/	4	4
Water quality	2	/	1	3
Air quality	/	/	/	/
Waste management	8	3	5	10
Nature protection	2	/	6	1
Industrial pollution	/	/	1	1
Chemicals	/	/	1	1
Noise	/	/	1	1
Civil protection	/	/	/	3
Climate change	6	1	5	2
Total by gender	18	4	24	26
Total by institution	22		50	

Although deficits in chemical capacities were noted, the current requirements for reinforcement are deemed realistic, given the notable decline in industrial and metallurgical activities. The issue of noise demonstrates a harmonized equilibrium between capacity insufficiency and necessity. However, civil protection presents a complex scenario: while a minority of respondents recognized capacity shortages, a significant majority underscored the necessity for them. Notably, this area wasn't thoroughly examined before these queries, but its subsequent emergence underscores its significance. This underscores an overarching issue of inadequacy in this domain, spanning from legislative frameworks to problem-solving strategies, interlinked with other areas such as noise, chemicals, and industrial pollution. Likewise, climate change, akin to noise, exhibits a balanced equilibrium between capacity insufficiency and necessity.

Concluding this analysis, there arises a requisite to categorize areas based on their imperative for capacity reinforcement in implementation. This necessitates a succinct synthesis grounded in accurately collected data. However, owing to the diverse range of responses, this analysis mandates reliance on average values. Essentially, scores will be aggregated for each area, as per the questionnaire, and then normalized by the number of respondents in the sample. The grading outcomes are detailed in Table 17.

Table 17. Enhancing Capacity Importance Across Chapter 27: Insights from Ministry of Sustainable Development and Tourism and Agency for Nature and Environmental Protection Sample.

Area	Graduated value
Horizontal legislation	Fifth (5)
Water quality	Sixth (6)
Air quality	Fifth (5)
Waste management	Seventh (7)
Nature protection	Seventh (7)
Industrial pollution	Sixth (6)
Chemicals	Sixth (6)

Noise	Fifth (5)
Civil protection	Sixth (6)
Climate change	Sixth (6)

This table indicates that the most significant requirements for enhancing capacity lie within waste management and environmental protection, whereas the least are evident in horizontal legislation, air quality, and noise. Across all sub-areas, there is a general need for capacity strengthening concerning implementation within this chapter. Addressing the personnel shortage can be achieved through effective employment planning strategies, necessitating sufficient financial backing from both domestic channels and EU funds.

4. Discussion

In the discussion of the research findings, we thoroughly examined key insights and implications to better understand the challenges and potential pathways forward regarding Montenegro's accession to the European Union in the environmental sector. We meticulously analyzed data on personnel capacities, expertise, and institutional capabilities, highlighting shortcomings and opportunities for enhancement in Montenegro. This discussion provided deeper insights into important aspects such as personnel management, skill development, and institutional capacity-building, underscored key research findings, and identified guidelines for future actions and policies in the environmental sector.

The comprehensive analysis of the research findings underscores several crucial insights into Montenegro's environmental sector and its journey towards EU accession, particularly focusing on the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP). One of the key takeaways from the study is the pressing need to reinforce personnel (V. Cvetković, A. Dragašević, et al., 2021; V. Cvetković, Nikolić, & Lukić, 2024; V. Cvetković, Nikolić, Nenadić, Ocal, & Zečević, 2020; V. M. Cvetković et al., 2021; G. Grozdanić, V. M. Cvetković, T. Lukić, & A. Ivanov, 2024; Raj, Nelson, & Rao, 2006; Shubsachs, Rounds Jr, Dawis, & Lofquist, 1978; Stajkovic & Luthans, 2003; Wei & Yazdanifard, 2014). Within the Department for International Cooperation and European Integration, considering the substantial workload associated with negotiation processes (Gomes, Oliveira, Carneiro, Novais, & Neves, 2014; Stuhlmacher, Gillespie, & Champagne, 1998). The analysis of regulations adopted between 2016 and early 2020 highlights the continuous engagement with the European Commission to secure positive feedback on proposed legislation.

The distribution of job positions concerning additional qualifications (Binici, 2021; Dafou, 2009; Decorte, Van Haute, Demeester, & Develder, 2021) appears satisfactory, indicating a balanced approach to personnel allocation (Grawitch, Barber, & Justice, 2010; Karsu & Erkan, 2020; Shi & Li, 2021). However, there are notable concerns regarding the age composition of MoSDT examinees, with an evident bias towards older male candidates, potentially hindering the infusion of fresh talent into the workforce (Batinovic, Howe, Sinclair, & Carlsson, 2023; N. Ruggs, R. Hebl, Singletary Walker, & Fa-Kaji, 2014). The study also sheds light on the requisite work experience for pivotal roles within MoSDT, revealing insights into the Ministry's emphasis on specific aspects of environmental protection, notably through its directorates. Notably, the lack of a head with pertinent environmental science education within the Directorate for Waste Management and Municipal Development raises concerns about expertise alignment (Abd Manaf, Samah, & Zukki, 2009; Corburn, 2007; V. Cvetković, Öcal, & Ivanov, 2019; V. Cvetković, Roder, Öcal, Tarolli, & Dragičević, 2018; de Oliveira, 2019; Ivanov, Nikodinovska-Stefanovska, & Sudar; Sharholy, Ahmad, Mahmood, & Trivedi, 2008; Sudar, 2021).

Similarly, the analysis extends to the ANEP, showcasing a slightly more favorable age composition compared to MoSDT. However, concerns persist regarding the level of work experience and the need for a balanced distribution of skills (Bublitz & Noseleit, 2014; de Oliveira, 2019; Kasper-Brauer & Leischnig, 2016; Oberschachtsiek, 2012), particularly in sectors crucial for environmental governance (V. Cvetković & Jovanović, 2020; V. Cvetković, Nikolić, & Ivanov, 2023; V. M. Cvetković & Šišović, 2024; Nikolić, Cvetković, & Zecevic, 2020; Thomas, Lane, Ribon-Tobon, & May, 2007; Vona, Marin, Consoli, & Popp, 2018; Zhang, 2019). The research delves into the possession of general professional skills among personnel (Avery, Wallace, Groom, & Thomson, 1996; Rasmussen & Sieck, 2015; Yun & Lee, 2017), highlighting the importance of computer literacy (Bahromova, 2021; Brown,

Morgan, Mason, Pope, & Bosco, 2020; Ktoridou & Eteokleous-Grigoriou, 2011) and foreign language proficiency (Chen et al., 2021; De Wit & Altbach, 2021; Diachkova, Sazhko, Shevchenko, & Syzenko, 2021) in the context of EU accession and international cooperation. While proficiency levels vary, there's a clear need for continuous skill development to meet evolving demands.

Furthermore, the study explores communication skills and analytical prowess (V. Cvetković, Radovanović, & Milašinović, 2021; Cvetkovic & Martinović, 2021; Ramli, Nawawi, & Chun, 2010; Svrđlin & Cvetković, 2019) within both institutions, emphasizing their significance in negotiation proceedings for Chapter 27. The data indicates a generally advanced level of competence, albeit with room for improvement, especially in specialized areas (Falk & Lindström, 2022).

In terms of advanced professional skills, consultancy (Avery et al., 1996) emerges as predominant, with slight variations in leadership roles (Cox, Madison, & Eva, 2022; Eagly & Johannesen-Schmidt, 2001) and scientific proficiency between genders (Vladimir Cvetković et al., 2018; V. Cvetković et al., 2018; V. Cvetković et al., 2017; V. M. Cvetković et al., 2015; V. M. Cvetković, Nikolić, Ocal, Martinović, & Dragašević, 2022; Eagly & Johannesen-Schmidt, 2001; Janković & Cvetković Vladimir, 2020). However, the absence of a distinct "manager" category underscores gaps in personnel policies and institutional support for skill development (Stergiopoulos et al., 2010). Overall, the research offers valuable insights into Montenegro's efforts towards EU accession in the environmental sector, highlighting areas of strength and opportunities for enhancement in personnel management, skill development, and institutional capacity-building. These findings are instrumental in guiding future policy decisions (Newig, Pahl-Wostl, & Sigel, 2005) and organizational strategies (Cline, 2000; Stergiopoulos et al., 2010) aimed at facilitating Montenegro's alignment with EU environmental standards.

The analysis of the data reveals significant insights into respondents' perspectives on the factors influencing the transposition (McPherson Frantz & Janoff-Bulman, 2000) and execution of Chapter 27. For instance, while a considerable portion of respondents highlighted the importance of expertise in crafting strategic development documents (Collier, Fishwick, & Floyd, 2004; Faraj & Sproull, 2000; Hussaini, 2020; Kabir, Hossain, & Haque, 2022; Kaur, 2020; Planić & Cvetković, 2021; Thennavan, Ganapathy, Chandrasekaran, & Rajawat, 2020; Zack, 1999), there appeared to be limited involvement of personnel in this aspect (Collier et al., 2004). On the other hand, the majority opinion favoured policies as the most impactful facilitator (Guimón, 2011; Jacoby & Meunier, 2013), followed by familiarity with global or European development policies (Bharti, 2022). Interestingly, only a minority recognized the significance of conducting studies or crafting planning regulations.

Further exploration delved into respondents' perceptions regarding the effectiveness of existing higher education programs (Al-ramlawi, El-Mougher, & Al-Agha, 2020; Domingo Dela Cruz & Ormilla, 2022; Ocal, 2021; Olawuni, Olowoporoku, & Daramola, 2020; Pereira, Flores, Simão, & Barros, 2016; Shah et al., 2020; Xuesong & Kapucu, 2019) in nurturing competencies for Chapter 27 execution. A majority expressed scepticism, particularly among female respondents. However, those affirming the effectiveness mostly highlighted faculties specializing in natural sciences and mathematics as influential, emphasizing the importance of economics, legal studies, and European studies. Following this, attention turned to identifying competency areas that should be integrated into higher education, revealing a consensus on the need for knowledge about global or European development policies (Tolochko, 2018) and the creation of strategic development documents (Satu, Leena, Mikko, Riitta, & Helena, 2013).

In light of these findings, it became apparent that while negotiations for Chapter 27 progress rapidly, the alignment of organizational and personnel structures lags (Alagaraja & Shuck, 2015). Hence, there is a pressing need for institutions to bolster their personnel and ensure legal regulations adhere closely to European standards (Semler, 1997). The analysis also highlighted discrepancies in respondents' perceptions of the significance of certain areas, particularly regarding waste management, environmental protection, and horizontal legislation. Despite these differences, waste management emerged as a focal point, reflecting a shared understanding of its importance. Ultimately, the discussion underscored the need for comprehensive capacity strengthening, particularly in waste management and environmental protection (Alagaraja & Shuck, 2015; Elshaboury & Marzouk, 2021), to effectively implement Chapter 27. This requires not only enhancing personnel capacity but also ensuring sufficient financial backing and aligning with EU directives.

5. Recommendations

Based on the discussion of the research findings, several recommendations can be made to address the identified challenges and capitalize on the opportunities for Montenegro's accession to the European Union in the environmental sector: a) given the substantial workload associated with negotiation processes, there is an urgent need to reinforce personnel within the Department for International Cooperation and European Integration. This reinforcement should be targeted towards areas where expertise is lacking, particularly in crafting strategic development documents and understanding global or European development policies; b) while the distribution of job positions concerning additional qualifications appears satisfactory, attention should be paid to the age composition of personnel, particularly within the Ministry of Sustainable Development and Tourism (MoSDT). Efforts should be made to diversify the workforce by recruiting younger talent to infuse fresh perspectives and ideas; c) continuous skill development programs should be implemented to ensure that personnel possess the necessary competencies for executing Chapter 27 effectively. This includes enhancing computer literacy, foreign language proficiency, communication skills, and analytical prowess, which are crucial for successful negotiation proceedings and alignment with EU standards; d) specialized training programs should be developed to address specific competency areas identified in the research, such as crafting strategic development documents and understanding global or European development policies. These programs should be integrated into higher education curricula to nurture competencies from an early stage; d) institutions must ensure that legal regulations closely adhere to European standards to facilitate the harmonization of all components outlined in the negotiation criteria for Chapter 27. This requires close collaboration with the European Commission and proactive efforts to address any discrepancies in regulations; e) given the consensus on the significance of waste management and environmental protection, priority should be given to capacity strengthening in these areas. This includes allocating sufficient financial resources, enhancing personnel capacity, and aligning with EU directives to effectively implement Chapter 27; f) regular monitoring and evaluation mechanisms should be established to track progress in personnel management, skill development, and institutional capacity-building. This will allow for timely adjustments and improvements in strategies to ensure alignment with EU environmental standards.

Overall, these recommendations aim to guide future policy decisions and organizational strategies in Montenegro's journey towards EU accession in the environmental sector. By addressing the identified challenges and leveraging the opportunities for enhancement, Montenegro can strengthen its position and accelerate its alignment with EU standards in environmental governance.

6. Conclusions

This comprehensive research provides significant insights into the challenges and opportunities for Montenegro's accession to the European Union, particularly in the environmental sector. Through a thorough examination of personnel capacities, expertise, and institutional capabilities within the Ministry of Sustainable Development and Tourism (MoSDT) and the Agency for Nature and Environmental Protection (ANEP), several key implications have emerged. Based on these results, there is a pressing need to reinforce personnel within the Department for International Cooperation and European Integration, especially in areas where expertise is lacking, such as crafting strategic development documents and understanding global or European development policies.

Additionally, efforts should be made to diversify the age composition of the workforce, recruiting younger talent to infuse fresh perspectives and ideas. Also, continuous skill development programs are essential to ensure personnel possess the necessary competencies for executing Chapter 27 effectively. This includes enhancing computer literacy, foreign language proficiency, communication skills, and analytical prowess, crucial for successful negotiation proceedings and alignment with EU standards.

Furthermore, specialized training programs should be developed to address specific competency areas identified in the research, and integrated into higher education curricula to nurture competencies from an early stage. Institutions must also ensure legal regulations closely adhere to European standards, collaborating with the European Commission to address any discrepancies. Priority should be given to capacity strengthening in waste management and environmental protection, aligning with EU directives and allocating sufficient financial resources. Regular monitoring and

evaluation mechanisms should be established to track progress in personnel management, skill development, and institutional capacity-building, allowing for timely adjustments and improvements.

Scientifically, the findings contribute to the academic understanding of the complexities involved in aligning a country's environmental sector with EU standards during the accession process. By meticulously analyzing data on personnel capacities, expertise, and institutional capabilities, this study provides valuable insights into the specific challenges faced by Montenegro in this regard. Such insights can inform further scholarly research on EU accession processes, particularly in the environmental domain, offering a basis for comparative studies with other candidate countries. From a societal perspective, the implications of this research extend to the citizens of Montenegro and the broader European community. Effective alignment with EU environmental standards not only ensures sustainable development and protection of natural resources within Montenegro but also fosters regional cooperation and stability.

By addressing shortcomings in personnel capacities and institutional capabilities, Montenegro can better fulfil its commitments to environmental sustainability, thereby contributing positively to the well-being of its citizens and the wider European community. Overall, these recommendations aim to guide future policy decisions and organizational strategies in Montenegro's journey towards EU accession in the environmental sector. By addressing identified challenges and leveraging opportunities for enhancement, Montenegro can strengthen its position and accelerate alignment with EU standards in environmental governance.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

1. Questionnaire

I. Socio-demographic questions:

1. Gender: (tick)

- a. Female
- b. Male

2. Age: (tick)

- a. 21-25
- b. 26-30
- c. 31-40
- d. 41-50
- e. 51-67

3. Region where you live: (tick)

- a. Northern region (Andrijevica, Berane, Bijelo Polje, Mojkovac, Kolašin, Nikšić, Petnjica, Plav, Pljevlja, Plužine, Rožaje, Šavnik, and Žabljak)
- b. Central region (Podgorica, Prijestonica Cetinje, Tuzi, Danilovgrad)
- c. Southern/coastal region (Bar, Budva, Herceg-Novi, Tivat, Kotor, Ulcinj)

4. Education: (tick, specify)

- a. Secondary vocational education, _____ (city) _____
- b. Higher education: (university) _____, (city) _____, degree (VI - undergraduate/3 years, VII1 - 4 years/master, VII2 - master, VIII - doctorate), country _____
- c. Current education (if studying): (university) _____, (city) _____, degree (VI - undergraduate/3 years, VII1 - 4 years/master, VII2 - master, VIII - doctorate), country _____

5. Additional professional training: (tick, specify)

- a. Courses (specify: _____)
- b. Certified training (specify: _____)
- c. Other (specify: _____)

6. Institution and employment sector: (tick, specify)

- a) Ministry of Sustainable Development and Tourism, sector/director-ate _____
- b) Agency for Nature and Environmental Protection of Montenegro, sector _____

7. Years of work in the institution: (specify)

- a) (_____)

8. Total years of work experience: (specify)

- b) (_____)

II. Professional skills

9. General professional skills:

Answer: tick the appropriate field (1 = none, 2 = basic, 3 = intermediate, 4 = advanced, 5 = specialized)

- a. Information literacy (MS Office, web, email...) 1 2 3 4 5

- b. Use and knowledge of foreign languages:

- English
- Russian
- German
- French
- Italian
- Spanish

- Other (specify: _____)

- c. Level of communication skills (presentation, dialogue...) 1 2 3 4 5

- d. Level of case/data analysis knowledge 1 2 3 4 5

10. Advanced professional skills: (tick, specify)

- a) Leadership (position_____, ____ years)
- b) Management (position_____, ____ years)
- c) Consultancy/management (position_____, ____ years)
- d) Scientific (position_____, ____ years)
- e) Other (_____)

III. Competencies

11. Your professional field (according to Chapter 27 areas): (tick, specify)

- a) Horizontal legislation
- b) Water quality
- c) Air quality
- d) Waste management
- e) Nature protection
- f) Industrial pollution
- g) Chemicals
- h) Noise
- i) Civil protection
- j) Climate change
- k) Other (_____)

12. Years of work in the professional field: (specify)

- a) (_____)

13. Your competencies for working in the professional field: (tick, specify)

- a) Preparation of strategic development documents, _____ years
- b) Preparation of various studies in one of the Chapter 27 areas, _____ years
- c) Preparation of planning documentation in one of the Chapter 27 areas, _____ years
- d) Preparation of legal regulations in one of the Chapter 27 areas, _____ years
- e) Preparation of policies in one of the Chapter 27 areas, _____ years
- f) Establishing and implementing international cooperation in one of the Chapter 27 areas, _____ years

14. Which competencies contribute most to the transposition and implementation of Chapter 27: (tick, specify)

- a) Preparation of strategic development documents
- b) Preparation of studies
- c) Preparation/familiarity with planning documentation
- d) Preparation/familiarity with legal regulations
- e) Preparation/familiarity with policies
- f) Familiarity with global and/or EU development policies and trends/conventions/strategies
- g) Other (_____)

15. Does existing higher education/study programs contribute to and develop basic competencies needed for the transposition and implementation of Chapter 27: (tick, specify)

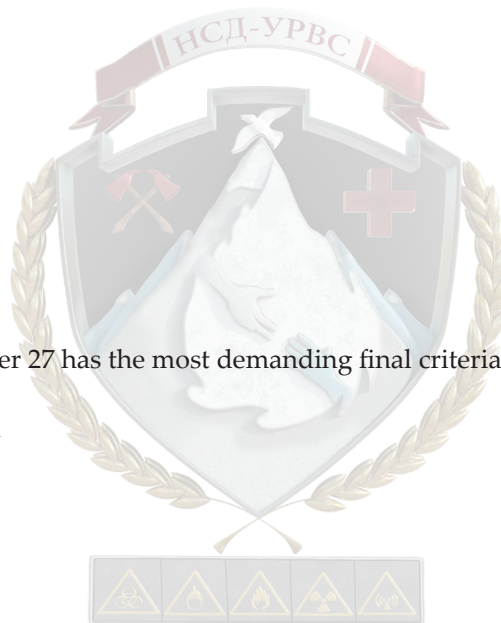
- a) YES
- b) NO
- c) If YES, specify which University/Faculty/Study program: _____

16. Which two areas/fields of competencies should become part of higher education: (tick, specify)

- a) Preparation of strategic development documents, in one of the Chapter 27 areas
- b) Preparation of studies, in one of the Chapter 27 areas
- c) Familiarity with planning documentation, in one of the Chapter 27 areas
- d) Familiarity with and acquisition of knowledge about legal regulations and policies, in one of the Chapter 27 areas
- e) Familiarity with and acquisition of knowledge about global and/or EU development policies and trends, in the Chapter 27 area
- f) Familiarity with and acquisition of knowledge about sustainable development and related global and/or EU development policies and trends.
- g) Other (_____)

17. From the perspective of initial criteria, choose the most significant area of Chapter 27 for Montenegro. (tick)

- 1. Horizontal legislation
- 2. Water quality
- 3. Air quality
- 4. Waste management
- 5. Nature protection
- 6. Industrial pollution
- 7. Chemicals
- 8. Noise
- 9. Civil protection
- 10. Climate change



18. Which area of Chapter 27 has the most demanding final criteria for Montenegro? (tick)

- a) Horizontal legislation
- b) Water quality
- c) Air quality
- d) Waste management
- e) Nature protection
- f) Industrial pollution
- g) Chemicals
- h) Noise
- i) Civil protection
- j) Climate change

19. Which area is financially most demanding for closing Chapter 27? (tick)

- a) Horizontal legislation
- b) Water quality
- c) Air quality
- d) Waste management
- e) Nature protection
- f) Industrial pollution
- g) Chemicals
- h) Noise
- i) Civil protection
- j) Climate change

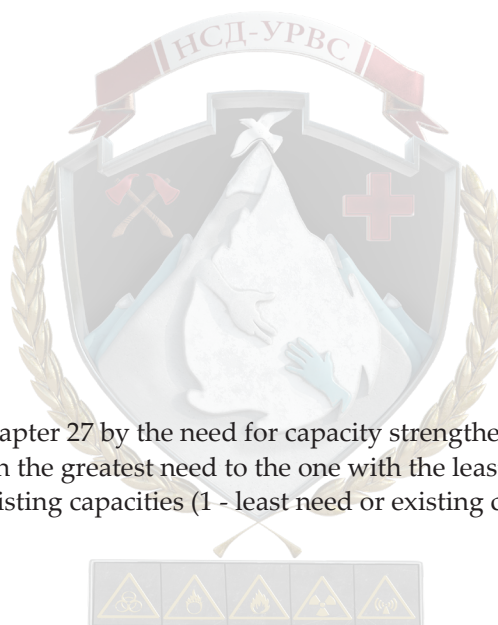
20. For which area(s) of Chapter 27 does Montenegro lack competencies? (Tick one or more)

- a) Horizontal legislation
 - b) Water quality
 - c) Air quality
 - d) Waste management
 - e) Nature protection
 - f) Industrial pollution
 - g) Chemicals
 - h) Noise
 - i) Civil protection
 - j) Climate change
- Specify the type of deficiency for

The selected answer: _____

21. Choose one area of Chapter 27 with the greatest need for capacity strengthening regarding transposition. (tick)

- a) Horizontal legislation
- b) Water quality
- c) Air quality
- d) Waste management
- e) Nature protection
- f) Industrial pollution
- g) Chemicals
- h) Noise
- i) Civil protection
- j) Climate change



22. Rank the areas of Chapter 27 by the need for capacity strengthening regarding implementation: from the area with the greatest need to the one with the least need for building and strengthening capacities – existing capacities (1 - least need or existing capacities, 10 - greatest need):

- Horizontal legislation
- Water quality
- Air quality
- Waste management
- Nature protection
- Industrial pollution
- Chemicals
- Noise
- Civil protection
- Climate change

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Research article

Analyzing in Post COVID-19 era: The Effect of Occupational Stress and Work-Life Balance on Employees Performance

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Abstract: For any organization, employee has a significant role in the overall performance and development. They have been considered the main asset of the organization. Employee performance has been dependent on various factors and contextual understanding. Drawing on the theory of self-determination, this research study focused on antecedents of employee performance in post COVID-19 context. The motivation behind this research study is to investigate the effects of occupational stress and work-life balance on employee performance in post COVID 19 era. To achieve the aim of the study 208 respondents were approached, who have been serving as middle-tier officers in reputed public sector medical universities and institutions. Statistical techniques (Normality of data, Correlation Analysis, Control Variables, Reliability Analysis and Regression Analysis) are applied to analyze the data through SPSS. The findings of this study depict that occupational stress and work-life balance create negative effects on employee performance in the context of fear of COVID-19. Accordingly, recommendations are provided for the targeted sector and others in general.

Keywords: Occupational stress, Work life balance, Employee performance, COVID-19, fear.

1. Introduction

Occupational Stress has unfavourable outcomes in both cases for the organization and the employees. Serious risks comprise the fitness of workers specifically health care due to occupational stress. Healthcare professionals can lead to mental illness, and social, psychological, and physical issues because of occupational stress. Disorders are associated with the following mentioned Stress: fatigue (chronic) (Van der Ploeg & Kleber, 2003); disordered eating (King et al., 2009); headaches (Schaubroeck & Fink, 1998); increased blood pressure (Melamed et al., 2001); high risk of cardiovascular diseases (Espnes & Byrne, 2008); and pains (musculoskeletal) (Eriksen et al., 2003).

Work-Life Balance is however on the other is badly affected during the situation of COVID-19. The employees whose preference is to work from home face real-time challenges just because of their maximum time of presence at home. The COVID-19 epidemic and nationwide sanctions have put pressure on even the most well-built relationships. Home space and the sharing of work, as well as the pressures of home online schooling and health-related concerns, have demonstrated too much for some and have formulated a 'perfect storm' for relationship breakdown. As a result, the performance of employees is poor.

The changing work patterns over all these years have posed a remarkable obstacle to both the families and social life of working adults. Having a day with a limited resource of 24 hours, working

individuals can face many hard challenges including official meeting deadlines, financial limitations, and family responsibilities. These kinds of situations can lead to character disputes, which can influence their level of involvement in family, work and social life. However, some scholars suggest domestic activities in high demand make it somehow very difficult to balance family and work life, especially in disasters (Chakma et al., 2020; Cruz et al., 2022; Cvetković, 2019; Cvetković et al., 2023; Cvetković & Janković, 2020; Goyal, 2019; Hossen et al., 2022; Hussaini, 2020).

Work-life imbalances among employees are known to be linked to various health problems, specifically poor physical health, self-explained health, psychological disorders, life dissatisfaction and poor mental health. However, health outcomes and work-life conflicts can vary by gender just because of the unequal distribution of work-related roles in the organization. For example, a positive correlation has been found in some previous research studies between self-reported health and working-life conflict among working women as compared to men, while some other studies show similar results between women and men.

Initially, it was not taken into consideration as it emerged in one region and the pictures and supporting videos showing the impact of this infection are somehow the movie's short clips, so it seems to be factious. It was treated as an epidemic, not a pandemic. After mid-January 2020, it spread like a wave of infection in other parts of the world, but the carriers were not initially considered as humans but through meat. Pakistan registered its first case on February 26, 2020, and later in March Government imposed the first lockdown in all parts of Pakistan. Now the real twist begins after the lockdown as it has become a Pandemic already and increased the mortality and infection rate worldwide. It is widely possible that coronavirus disease (COVID-19) started impacting species of animals, and then later spread to humans. Person-to-person contact has been reported main cause spread of the Novel coronavirus, but it is not yet understood how remotely it occurs. Other human interactive coronavirus strains are through person to person via contaminated droplets being carried from a person who's sick (through sneezing or coughing) or from uncleansed hands.

In April 2020 National Command and Control Center NCOC started working on the instructions/orders of the Prime Minister of Pakistan, Mr. Imran Khan, to collect, examine and inspect information received from all provinces, AJK, GB, and Islamabad. It formulated the guidelines and new mandatory policies to be followed in every government and private institution/organization. According to the government's new policies and guidelines a new concept of "Work from home" and "Virtual" emerged across Pakistan. Though this might be previously applicable to some sectors specifically Information Technology IT, but majority was unaware of it. Initially, it seems that the government had provided the solution to the problem during this uncertainty, but this became the main cause of Occupational stress.

Now the employees have been segregated into two groups. The ones who are working in the office are the real pressure as they must do double jobs as there is no paperless environment in Pakistan and physical interaction is only applicable across Pakistan. Female employees got an edge they must only work from home whether it was their turn to work from the office as they must look after family which leads to gender discrimination. This point is raised not for any cause but just for building an argument during this situation. The ones who are working from home as their no concept of a virtual and paperless environment, so they are not bound to do any work that is required. They proclaim a lack of internet service, laptops and working conditions availability.

2. Underpinning Theory

According to Van den Broeck et al., (2016) Theory of Self-Determination (SDT) considers the primary psychological needs for autonomy, competence, and relationship to be essential to natural and ongoing psychological development, introspection, and well-being. The theory of self-determination (SDT) (Hart & Cooper, 2002) became one of the most influential theories. The SDT commonly used to describe human stimuli was originally a broad-based theory. SDT presents the existence of the three basic psychological needs: autonomy, competence, and relationship needs. The autonomy for need is expressed as the people's desire to determine their behaviour and take responsibility for the outcome. (Deci & Ryan, 1985; Little, 1991).

The competence for need refers to the desire of people to acquire their potential and to feel confident in expressing it (Hart & Cooper, 2002). Ultimately, the need for relationships is the desire of people to connect with others and their community. Be cared for, cared for, and respected by others; and a sense of unity (Hart & Cooper, 2002; Uebuchi, 2004). The SDT offers a variety of incen-

tive and regulation degrees to interpret the level of motivation, depending on how well the needs are met. Thus, the more their behaviour becomes internally dynamic the more individuals' natural psychological needs for autonomy, competence, and connection are met.

The exposure of autonomy can be created from characteristics of a job, such as controlling all or one's work in most aspects or increasing the scope for decisions, but it has been often the most powerful. When individuals know exactly the goals and objectives of their work, they, therefore, reflect them. Have deep-rooted values and long-lasting interests. (Sheldon & Houser-Marko, 2001).

The self-concordance model of Sheldon and Elliot's (1998), SDT sub-theory, further explains the internal stimulus based on this value. Self-made goals are internally motivated because they seem to be born of selfishness that reflects personal belief and individuality's true sense (Bono & Judge, 2003; Sheldon & Hauser-Marco, 2001; Sheldon et al., 2003). Self-coordination increases when workers identify with the goals of the work they are progressing (identity motivations) or when they figure out that the purpose and goals are very enjoyable and interesting. (Sheldon & Houser-Marko, 2001; Sheldon et al., 2003).

According to self-determination theory, when individuals figure out that achieving goals of work reflects their values and interests, or even when they understand work internally pleasurable and interesting, their performance increases. When they are sure they are getting the job. To achieve extrinsic goals rewards or to accomplish the tasks assigned to them, this reduced their stress.

For this research paper self-determination theory fits because it results in the performance of employees by fostering work-life balance. Likewise, if a person believes in their ability to face challenges and stress at his workplace and can keep his work family balanced is motivated by his / her preference he will also prove self-determination theory by engaging more and more in his job. The theoretical framework concerning variables is in Figure 1.

3. Materials and Methods

The quantitative research methodology through deductive approach and applied type was executed. This study includes both participation from male and female gender as per population point of view. The size of the sample is always less than the total group of the population. The data was collected from the middle-tier employees of universities located in twin cities of Pakistan (Islamabad and Rawalpindi)

3.1. Sampling

Convenient sampling under the nonprobability sampling technique was used for this study (Letchumanan & Rohani, 2011). Target subjects from the population are dependent on sample selection. The current study in discussion is a survey-based based that requires responses in due time. The unit of analysis of this study was individuals such as the employees of public sector Universities of twin cities Rawalpindi and Islamabad. A total number of 300 questionnaires were distributed through personal and via internet source Google form.

3.2. Measuring Instruments and Scale

The questionnaire was drafted for this section of the study. All variables of research have been designed and incorporated to get the maximum output through the questionnaire, therefore self-administered questionnaire with closed questions will be used. This study will use the hypothesis to analyze the effect of occupational stress and work-life balance on employee performance in the post-COVID-19 era.

The Likert Scale in the current study is a five-point scale that is used to give an opinion and understanding of how he perceives the statement by pointing out the required scale mentioned in the statement. The intensity of behaviour is linear and is assumed in the Likert scale, that is, does not strongly agree with the constant agreement, and an assumption that attitudes are measurable. Likert scale includes Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree. A 5-point Likert scale was established and therefore used to measure work-life balance in which the endpoints are 1 = strongly disagree and 5 = strongly agree. The results received in responses by interpreting will help to balance or neutralize any kind of tendency to over-reported difficult and unacceptable behaviours

in workplace situations faced by the respondents. (Fairbrother & Warren, 2003). The 5-point scales are mostly aggregated in WLB research (e.g., Boyar et al. 2003; Fairbrother & Warn 2003; Forsyth & Polzer-Debruyne 2007). Six conceptualizations of work-life balance found in the literature: (1) multiple roles; (2) equity across multiple roles; (3) satisfaction between multiple roles; (4) fulfilment of role salience between multiple roles; (5) a relationship between conflict and facilitation; and (6) perceived control between multiple roles. Based on a review of this research identifies the two primary features of the work-life balance definitions and proposes a new definition of this construct. Fairbrother & Warn (2003) added the respondents face confusion because of ambiguity in questions, thus requiring reframing of the question.

3.3. Measures of occupational stress

Occupational stress is the independent variable. Occupational stress mainly covers the various aspects of the job covering the reason for its occurrence and impact on the organization. All the responses in the questionnaire are measured based on a 5-point Likert scale to guarantee consistent results. The questions are designed in such a way, that after reversing necessary items, the average of all items is computed to present the overall stress level score for an individual. In simple terms, the OS uses questionnaire statements to assess, a) how you feel about your job b) how you assess your current state of health, c) the way you behave generally, d) how you interpret events around you e) sources of pressure in your job, and f) how you cope with the stress you experience. Lambert, Hogan, Camp and Ventura (2006). Sample items included "I feel that my tasks are more challenging than my co-workers'" and "During the past six months, my actual performance at work is decreasing day by day." The higher the score, the higher the stress level, with a minimum of 1 and a maximum of 5.

3.4. Dependent Variable

Employee performance (EP) is the dependent variable for the study. A questionnaire is designed to test the constructive validity of employee performance factors based on some previous studies (Nassazi, 2012) THI, 2012); The first dimension, the utility of the work, consists of five items, the second dimension, work plan, consists of five items, while third dimension is creativity and innovation consists of six items, the last dimension making efforts comprise of seven items. Thus, a maximum number of 7 items for the questionnaire are used to measure the external accuracy of the employee after evaluating his performance (expert judgment). This was achieved by giving the questionnaire to experts in this area scale ranging from 1 to 5 therefore all the items are scored on a five-point rating.

3.5. Moderating Variable

Developing the fear of COVID-19 scale various steps were taken (McCoach et al. 2013). Primary scale of fear was assessed after a broader reviewing the availability of literature. The fear of measures that have been studied and identified are almost thirty through different populations and diseases (availability through corresponding authors). The most relevant items that are more prospective are the combined efforts collected through two researchers (i.e., the third and final authors). About 28 items were finally retained for further examinations after excluding items that had similar content or expression. Secondly, furthermore, 11 more items were removed from the list by the recommendation of an expert panel who reviewed all 28 items in general. This panel constitute the following members general physician, health psychologist, psychiatrist, virologist, and nurse. 17 items have been retained in the third portion, for whom recommendation is sent to different panels that include further review health experts and educators, sociologists, social psychologists, and pulmonologists. Seven more items further were omitted following the recommendations from another expert panel. In conclusion, an 8-item scale was administered to 46 individuals (26 of them were male participants and 20 of them were female participants with a mean age of 39.63 years and an education 9.38 number of years) to obtain a primary scale estimate. A five-point Likert scale was used to understand the items and to get the required details. After reviewing the results, it was concluded that the respondents understood the item description (mean 3.81, SD = 1.04). In addition, all the participants were approached through telephone-based cognitive interviews with similar pilot

participants to ascertain their views and responses to each scale item. Furthermore, no changes were recommended by the pilot participants as no more changes were required.

3.6. Sample Characteristics

White-collar employees were used as the population for the current study, and they were working in the public sector universities in the twin cities of Pakistan, Rawalpindi, and Islamabad. Due to the non-availability of the population listings convenience sampling technique was used. A total number of 300 questionnaires were drafted and distributed in physical and through Google form but the questionnaires that were filled were 208. 69.30% was the rate of responses. To retain confidentiality and unanimity the questionnaires distributed had a cover page. Complete assurance was provided to the respondents in all manners, and it was ensured to all the participants that this data collection was solely for educational research only. After acceptance of will from the respondents the data collection was conducted. The sampling of demographics is mentioned in Table 1 to Table 5.

3.7. Normality of Data

The normality of data is a basic assumption for regression. The correct estimation of the relationship of variables under study from non-normal data poses a threat to generalizability and even leads to spurious regression for violation of assumption. (Jackson, 2018). Further for reliability of normality of data for advanced analysis normal distribution was assured. For this purpose, Skewness and Kurtosis were calculated for data. Skewness and Kurtosis are if it is 3 times less than their respective standard error is the acceptable value. Skewness and Kurtosis values in -2 and +2 are acceptable as per the recommendation of George and Mallery (2010). Kurtosis and Skewness result is mentioned in Table 6.

3.7. Research Tables

Table 1. Gender distribution.

Frequency		Percent	Valid Percent	CumulativePercent
Valid	Female	99	47.6	47.6
	Male	109	52.4	100.0
	Total	208	100.0	

Gender is considered one of the most important demographic variables, it elaborates the division of male and female. The sample of the study was 208 out of which 47.6% were female respondents and 52.4% respondents were male. The frequencies are represented in the pie chart graph given below (Table 1).

Table 2. Age distribution.

Frequency			Percent	Valid Percent	CumulativPercent
Valid	20-35	174	83.7	83.7	83.7
	36-50	29	13.9	13.9	97.6
	51-60	5	2.4	2.4	100.0
	Total	208	100.0	100.0	

The sample included responses from different age groups of which 83.7% were between the ages of 20- 35, 13.9% were between the age of 36-50 and 2.4% were between the age of 51-60. The frequencies are given in presented in the form of a graph for better understanding (Table 2).

Table 3. Education Level of Employees.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduation	35	16.8	16.8
	Master	52	25.0	41.8
	MS/M-Phil	46	22.1	63.9
	PhD	17	8.2	72.1
	Under Graduation	58	27.9	100.0
	Total	208	100.0	

The education level of employees was an important factor, and it was ensured that the sample included employees with a graduation degree to further carry out the research. The white-collar employees of different universities were included for them to understand the question statements properly and therefore to respond accordingly. The education levels of the sample employees were 8.2% had PhD level of education, 22.1% had MS/M-Phil level of education, 25% had a master's Level of education, 16.8% had a Graduation level of education and 27.9% had under graduation level of education. The frequencies are given below with a graphical representation (Table 3).

Table 4. Employee Designation.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manager	38	18.3	18.3
	Officer	31	14.9	33.2
	Others	123	59.1	92.3
	Senior Manager	6	2.9	95.2
	Supervisor	10	4.8	100.0
	Total	208	100.0	

The sample comprised different employee designations that were working in the Universities. 2.9% of the respondents were senior managers, 18.3% were Managers, 14.9% were Officers, 4.8% were supervisors, and 59.1% were others. However, others are specifically those who are on a special pay scale and in higher positions the frequencies are represented below as a figure (Table 4).

Table 5. Total years of Experience.

	Frequency	Percent	Valid Percent	Percent
Valid	Less than 5	124	59.6	59.6
	More than 5	84	40.4	100.0
	Total	208	100.0	

The sample comprised of different employee tenure (years) the respondents have worked in the universities. 59.6% of the respondents had worked less than in the current organization, and 40.4% had working experience of more than 5 years. The frequencies are given in Table 5.

Table 6. Kurtosis and Skewness Results

	Variables	Total OS	Total WLB	Total EP	Total COVID
N	Valid	208	208	208	208
	Missing	0	0	0	0
	Std. Error of Mean	.337	.363	.295	.464
	Skewness	-.307	-.316	.443	.310
	Std. Error of Skewness	.169	.169	.169	.169

Kurtosis	-.014	.103	.950	-.122
Std. Error of Kurtosis	.336	.336	.336	.336
Minimum	6	8	8	9
Maximum	30	35	33	45

The above table reflects the results of Kurtosis and Skewness of all the variables of the current study. The values of Kurtosis are between -0.014 to -1.22 whereas the Skewness values are between -.337 to 0.443. The above-mentioned values are acceptable as values fall within prescribed limits thus, depicting that current study data is normally distributed.

Table 7. Correlation results.

Variables.	1	2	3	4
1. EP	1			
2. OS	0.077	1		
3. WLB	0.024	0.628 **	1	
4. COVID	0.152 *	0.428 **	0.423 **	1

* $p < .05$, ** $p < .01$, *** $p < .001$

The association reflected in the table is within the defined range.

Demographics	Employee Performance	
	f statistics	p value
Gender	15.881	.000***
Age	3.995	.080
Marital Status	12.007	.001**
Qualification	.861	.424

Experience 16.273.020*

* $p < .05$, ** $p < .01$, *** $p < .001$

One-way ANOVA was performed to see the influence of demographics on the dependent variable. Three demographic effects were noted and controlled in regression analysis, accordingly.

Table 9. Reliabilities of the scales.

Variable Name	Mean	Cronbach's Alpha
EP	2.869	0.765
OS	3.010	0.718
WLB	3.414	0.707
COVID	3.501	0.734

Table 10. Moderated Regression Analysis.

Predictors	Employee's Performance		
	β	R^2	R^2
Step 1			
Control Variables		.112	
Step 2			
OS	-.510**		
WLB	.169***	.228	.116
COVID	.137*		
Step3			
OS * COVID	.624*		
WLB * COVID	.417**	.293	.065*

* $p < .05$, ** $p < .01$, *** $p < .001$

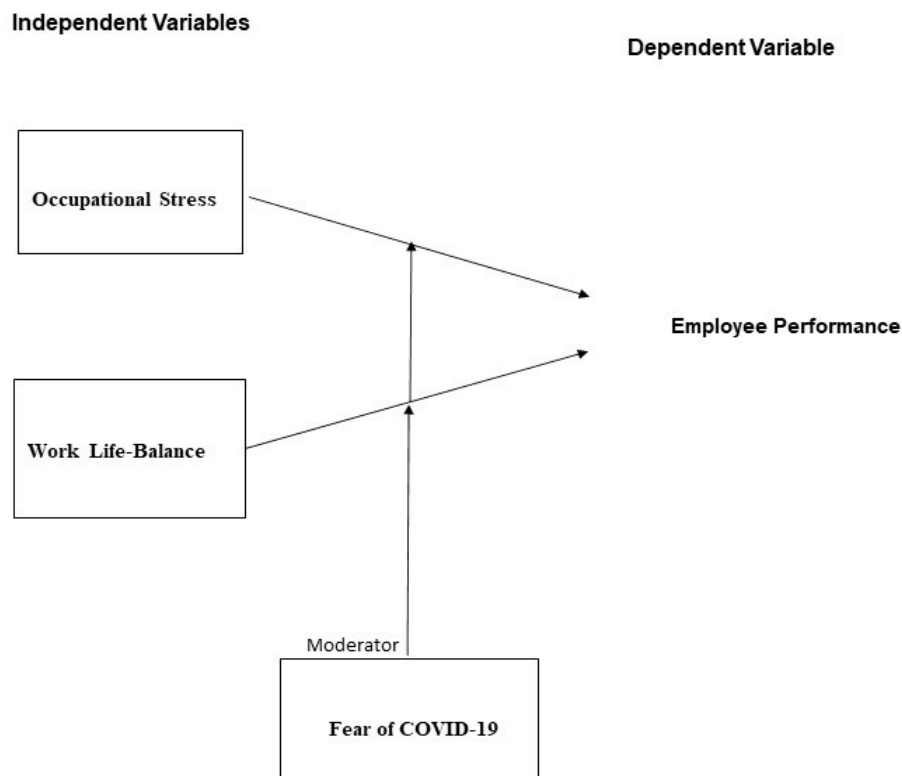


Figure 1. Relationship between variables.

6. Data Analysis

6.1 Correlation Analysis

Correlation between variables indicates that with a change in the value of one variable, the other variable changes in a specific direction. The purpose of correlation is to check the association between the variables. Variables that are positively related or negatively related define the direction of the relationship. A greater than zero correlation coefficient provides a positive relationship whereas the value less than zero is a negative relationship indication. There is no relationship between the variables if the value is zero. The below correlation table represents the positive relationship among the variables and there is a strong association between the variables. The correlation between occupational stress and employee performance is positive so there is an association between them. Similarly, the correlation between Work-life balance and employee performance is positive and there is an association between the variables. Whereas the moderator's fear of COVID-19 shows the correlation between the independent variables and therefore association with the dependent variable. The association reflected in Table 7 is within the defined range.

6.2 Control Variables

All variables that may affect the outcome must be controlled, except for the independent and dependent variables. If you do not control for relevant variables, you may not be able to show that they did not affect your results. Uncontrolled variables are alternative explanations for your results and affect the reliability of your arguments. Control variables have significance to develop causal relationships that may lead to over or understatement between the independent variable and dependent variables. The below-mentioned Table 8 below represents the beta coefficients, standard error, and the t-statistic of the beta coefficients with significance.

6.3 Reliability Analysis.

Reliability analysis was performed to analyze the instrument reliability of respective variables in the current study. To measure consistency of data reliability analysis is required. For this purpose, a value of more than .7 is consistent. The result of reliability analysis includes the variable's instrument's reliability present in the model. Whereas the employee's performance scale has 0.765 Cronbach alpha reliability, occupational stress shows .718, work-life balance is .707 and fear of COVID-19 has .734 Cronbach alpha reliability. The consistency of the variable's scales was reflected in Table 9.

7. Regression

According to the results of regression analysis, the one unit increase in occupational stress will bring by -.510 units change in employees' performance, one unit increase in work-life balance will bring .169 units change in employees' performance and one unit change will bring .137 units to change in employees performance whereas moderating effect of occupational stress and fear of COVID 19 will bring .624 units change in employees performance and moderation effect of work-life balance and fear of COVID 19 will bring .417 units to change in employees performance. The relationship between variables due to the moderating effect is statistically significantly positive as $p < .01$. As per these results from regression analysis the hypothesis is accepted. The regression analysis in Table 10 shows that employee performance is predicted through occupation stress and work-life balance and moderation is established with a 65% overall effect.

8. Theoretical Implications

The current study was mainly focused on discussing and through light to give some theoretical contributions and practical contributions in such a way as to enlighten the prescribed literature that existed previously and therefore for identification of stress types and provide guidelines for policymakers along with the recommendations to the management. Furthermore, for an enriched healthy working environment formulated guidelines to change the style to improve employee outcomes and balance their professional as well as their family lives.

Theoretically, the significance of current study findings has contributed its part towards the existing literature on occupational stress, and work-life balance highlighting the dark side of fear of COVID-19 and its implication along with the literature on employee performance. The focus of this research is the foremost contribution regarding the study of employee performance to understand which kind of employees can work without retrogression in the job outcomes under an uncertain situation of COVID-19. In the context of Pakistan on the other hand current study has an important theoretical contribution is the utilization of the social exchange theory to describe the preventative and safety measures taken to overcome and reduce of fear of COVID-19.

9. Practical Implications

The valuable practical implications have been provided by this study as it has described the harmful effects of fear of COVID-19 on employee performance.

- Working circumstances in the organizations were adjusted to the distinctions in individuals' physical, mental, and logical circumstances of life. Thus, organizations ought to focus closely on the balance between work-life balance (WLB) of their employees by trying to carry out an assortment of WLB practices and strategies, for example, strategic scheduling, position sharing, seasonal work, home working from home, sponsored sporting, and relaxation exercises among other family-accommodating strategies.

- Subsequently, embracing a more essential way to deal with WLB can assist with advancing superior worker execution, better mental and actual well-being, position fulfilment and decreased turnover (Kossek et al., 2012). To get the maximum performance the employee's manager must be clear about the approach he is adopting to get the required outcomes.

- Managers need to focus on implications that can reproduce positive outcomes and need to be acquainted with the fact that their roadmap and guidelines have a significant positive outcome

on employee performance and so therefore their mental and physical health collectively benefits the operations of the organization.

- Understanding the critical negative effects of occupational stress and work-life balance, limits and restricts organizations to avoid recruiting such managers with capabilities to work under uncertain conditions.

- For improvement of employee's performance by implementing a mechanism of anonymous feedback and complaint handling suggestions this can benefit the organizations. This will benefit employees to stand up and raise their voices against heavy workloads, poor working conditions, nepotism, disturbance in work life, and wrongdoings of their managers and increase organisational citizenship behaviour.

- The organization should derive a mechanism of anonymous feedback of office culture for the identification of issues and problems. There should be a grievance policy which should not be hidden and displayed for the employees to register their concerns, in this case, whistleblowers should be kept anonymous to protect them from unfavourable policies, they may be a hurdle and obstacle to employees for the attainment of their interests.

- For this reason, they should formulate a separate department that handles such sort of issues or even at business level organizations, especially the public sector departments, e.g. universities should ask their strategy and policymakers to present such sort of acts which give security to workers.

10. Conclusion

This research study is an attempt to fill the gap that appeared in the previous research studies. The results of this study were discussed in light of previous research findings. The theoretical agenda of this research study is to contribute to the existing research about how employee performance has been affected by occupational stress and work-life balance. However, the result supported that occupational stress and work-life balance had a significant negative effect on the employee's performance due to the moderating effect of fear of COVID-19. The research work suggested that employee performance plays an important role in the development of the organization. These findings constitute very important and valuable implications for the organization. The recommendations which are given in the research work are for future results. To conclude the research will depict that employees' primary priority is to focus on their work and try to balance both their working life as well as their families even in circumstances created by the effects of COVID-19. By following the preventive measures, the employee can get full satisfaction from his/her work and give time to his/her family. The success and the outcomes of the organization are dependent on the employee's performance. Different organizations according to perceived measures need to adopt some activities like online learning skills and few training programs for the employees so that these employees can perform with proper efficiency.

11. Recommendations

The following focal points of the current study were to analysis that how occupational stress and work-life balance affected the performance of employees in post post-COVID-19 era. As per Universities perspective by maintaining a diligent, reasonable work pace, employees can prevent procrastination and consistently finish the tasks they begin. Additionally, employees should place importance on things like punctuality, regularity, time management, honesty, diligence, and discipline, as these characteristics help promote a positive, professional attitude that's often recognized and rewarded by upper management personnel. Fear of COVID-19 has imposed insurgency in establishing a new reason for occupational stress and therefore the relationship between work-life balance and employee performance has become fatal. The research study achieved its objectives by using the technique of questionnaire. Many of the researchers are in favour that it is hard for how employees to manage their work while in stressful situations. For the future purpose, this research can help a lot of researchers to find out their results.

12. Limitations and Future Discussions

This research study has some of the limitations that are important and need to be addressed in future research works. The current study is not an exception also because none of the research studies is without limitations. The data which was included is self-reported which gives the opinion of the employees of the universities. The researcher collected the data from both males and females of different universities. So, future research could be conducted by taking gender as a moderator. This research work is conducted in Pakistan so; future research could be done on the organization of any multinational to generalize the results. The reason why multinational is recommended is that there is a huge difference in working environment in public and private sectors. Public sector organizations have a different working environment than the private sector. A well-reputed multinational organization or even more one adopt the best practices that have been used all over the developing countries in terms of organizations and for the betterment of its employees.

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Research article

Changes in Lulc and Drainage Network Patterns the Cause of Urban Flooding in Karachi City

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Abstract: Karachi is a strategic city in Pakistan that was once known as a fishing village. An increase in industrialization and urbanization had been seen in the city. Karachi's land use, land cover as well as drainage networks have been changed because of Industrialization and urbanization. Flooding in Karachi because of late summer season monsoon rainfall has resulted in urban flooding. Poor urban planning and management had severely affected both rivers and linked tributaries. This study used secondary data that shows changes in LULC and poorly maintained drainage networks are the factors that caused urban flooding in Karachi. DEM, GIS, and SRTM have been used to mark the boundaries of Karachi and drainage networks on the digitized map. These maps could be utilized for improving the natural drainage networks as well as flood mitigation and preparedness measures. This study may provide a guideline to disaster planning, management, and development authorities.

Keywords: Urban flood, Monsoon rainfall, Karachi, Drainage networks, Land use, Land cover, DEM, GIS, SRTM

1. Introduction

Karachi, one of the largest cities of Pakistan having a population of twenty million is the most populated metropolitan and is situated on the southern coastline of the country and is connected to the Arabian Sea. In the start, the city was inhabited by a community that used the sea for carrying out fishing which after some time turned into a port that was then used for carrying out trading with international communities. Sixty percent of tax revenue and fifteen percent of GDP were generated by trading and fishing and were collected by FBR.

But as a result of urbanization and industrialization change in the climate has been observed. Because of this climate change all of the areas surrounding Karachi city have been greatly affected. These effects resulted in extreme heat causing deaths (Ghumman and Horney, 2016), urban flooding resulting in disruption of city activities as well as seawater intrusion (Zia, 2017).

Monsoon rains of historic magnitude recently wreaked havoc in Pakistan, notably in Karachi, where both the volume and quantity of land inundated were unprecedented. Between the 24th and the 27th of August, the city of Karachi saw record-breaking rainfall, with 230 mm of rain falling on a single day on August 27. The National Disaster Management Authority estimates 184 deaths in rain-related accidents across the nation, with 80 deaths in Sindh and 47 fatalities in Karachi alone, according to the statistics. Drowning, electrocution, and falling roofs were the causes of these deaths. In all, Karachi received 604 millimetres of rain in August, making it the wettest August in 89 years. The monsoon's fury was compounded by antiquated flood warning equipment, failed drainage, and crippled infrastructure, missing or blocked nullahs, damaged or closed down electrical supplies, flooded homes, and economic and infrastructural losses in all regions of the city, causing mayhem across the metropolis. Water logging, flash floods, and power outages beset the city during this strong rainy wave.

The goal of this study is to determine and assess the preliminary causes of floods in Karachi. Monsoon rains are most common in Karachi from June to September. Karachi receives an average of 174.6 millimetres (6.87 inches) of rain each year (1981-2010). Water logging, urban floods, and power outages beset the city during this strong rainy wave. The year 1967 had the most annual rainfall, with 713 millimetres. The city received the most rain in a single day on August 27, 2020, when 230 mm of rain fell on the city. The amount of rain increased in the city in 2003, 2006, 2007, 2009, 2010, 2017, and 2019. The study aimed to determine how changes in drainage networks, land use and land cover are responsible for urban flooding in Karachi city.

2. Methodology

The methodology adopted for this research was based on secondary data. With the help of secondary data new maps were created using DEM, GIS. These maps will show how with time urbanization, industrialization, population growth and climate change have made Karachi city prone to urban flooding. Flood and rainfall data were obtained from the Climate Ministry and Pakistan Meteorological Department. The obtained data was then incorporated into the DEM and GIS software from where the maps were developed that showed how urbanization, climate change and industrialization have changed the drainage patterns over time and led to the increased amount of urban flooding in Karachi in the past few years.

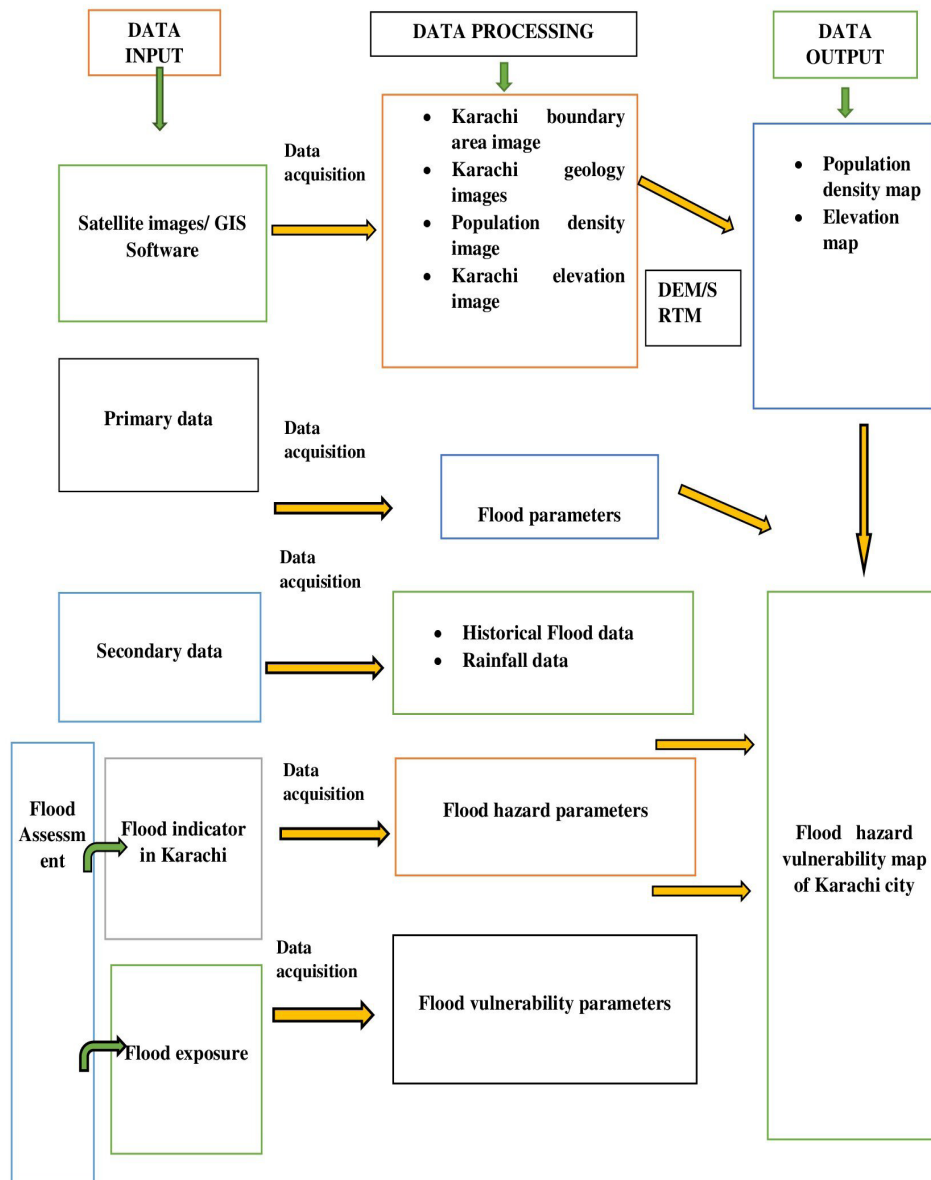


Figure1. Flowchart of Methodology.

3. Result and Discussion

3.1. Analysis

Secondary data regarding LULC and drainage networks obtained from different sources was utilized, analyzed, processed, and interpreted with the help of DEM, GIS, and SRTM in the form of maps.

3.2. Flooding in Karachi

For the treatment and dumping of municipal as well as industrial wastewater into the Arabian Sea two rivers are used in the Karachi city namely Lyari and Malir (Akhtar, 1997). For the draining of monsoon rainwater these two rivers play a vital role but because of the rapid increase in urbanization and encroachment toward the bank of the rivers a decrease in the drainage efficiency of these rivers has been observed (Zafar & Zaidi, 2016). Although most of the city's industrial and sewage wastewater drainage to the Arabian Sea took place through the Lyari River because of the population living along the bank of the river it became susceptible to flooding threatening and risking the lives of about 0.8 million individuals (Mansoor & Mirza, 2007; Irfan, 2018). As the Malir River passes from within Karachi city's mostly densely populated areas and is larger as compared to the Lyari River flooding caused by this river is extreme and worst (Ahtar & Dahnani, 2012).

Table 1. Major floods in Karachi City

Flood year	Rainy hours	Rainfall (mm)	People Killed
1953	24	278.1	-
1977	24	207	248
1984	24	298.4	150
2003	48	284.5	-
2005	-	77	13
2007	-	110.2	228
2009	-	80	-
2010	-	191	21
2011	4	245	20
2013	-	147	-
2015	-	145	-
2019	-	150	28
2020	72	345	50

Table 1 shows the major flood events that took place in Karachi resulting in a large number of casualties. Since the flood event had been occurring more likely it seems that the measures adopted for prevention and flood control were inefficient and insufficient resulting in loss of life, property and critical facilities.

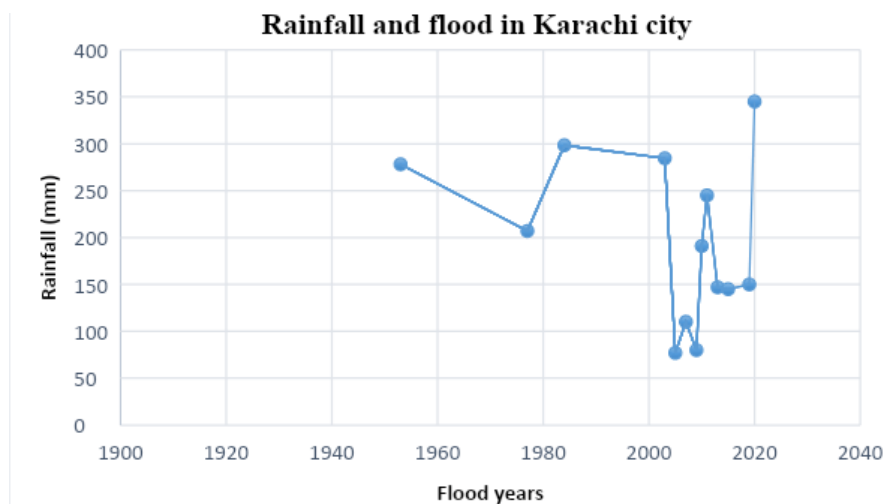


Figure 2. Shows the relation between Flood years and Rainfall occurred in Karachi city

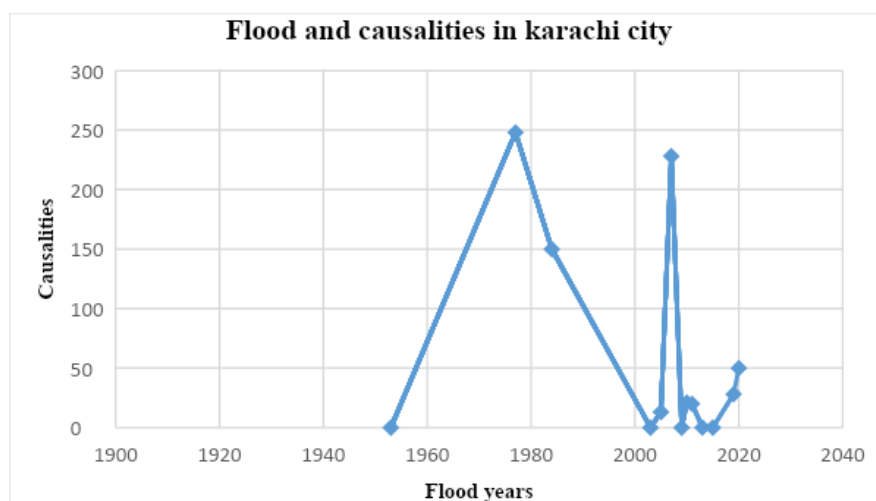


Figure 3. Shows the relation between Flood years and Casualties that took place in Karachi city

3.3. Land cover of Karachi city

One of the biggest and largest cities in Pakistan is Karachi which has a population of about more than 9.8 million inhabitants living there (GOP, 2000). A digital thematic map has been developed to monitor the land use and land cover of this megacity. For the classification and distribution of Karachi land use/cover multispectral data Landsat-5 thematic mapping has been used.

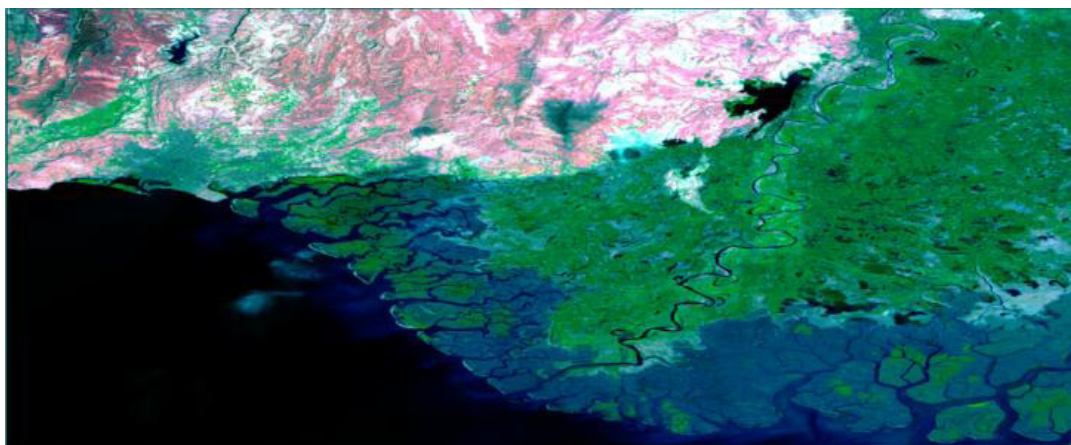


Figure 4. Spatial view of Karachi using Landsat-5

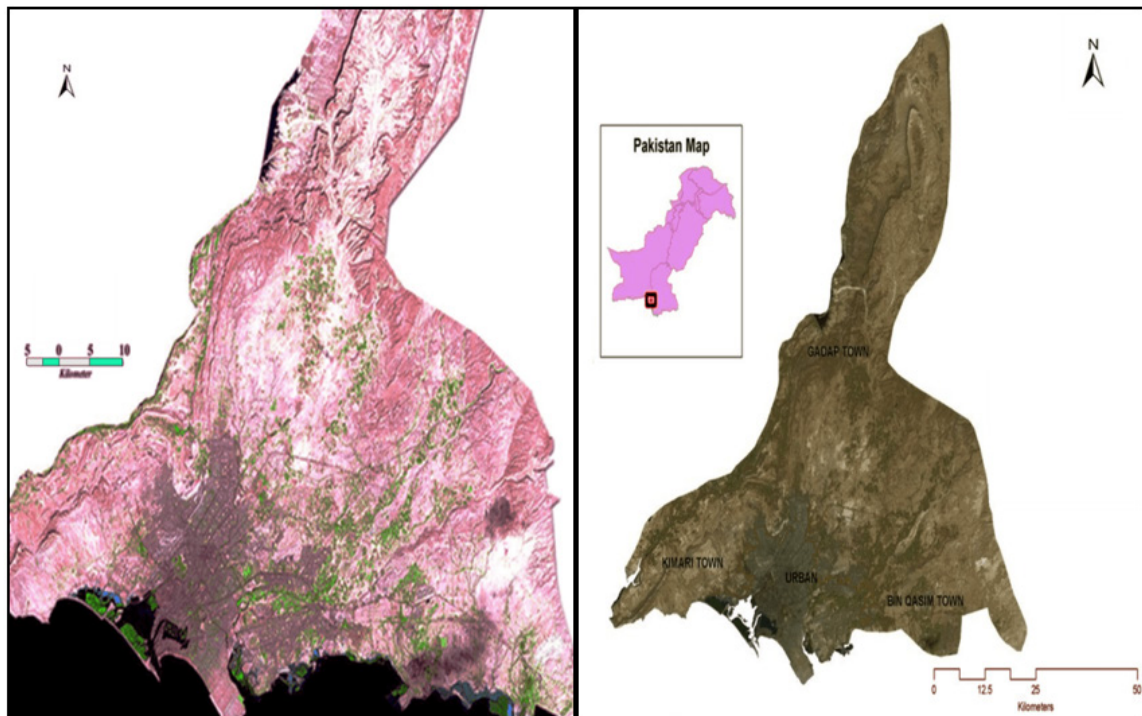


Figure 5. Study area-Karachi city (Satellite images)

A map has been developed that shows the classification of this land cover into eleven sections. From the data obtained it has been concluded that about 79.9% of the area consists of barren land, seawater, and mountains. 4.9% of the land has been covered by vegetation. 15% of the area has been used as urban land which is increasing day by day due to population growth. As a result of urbanization and population, growing land is being cleared to make space for people to live.

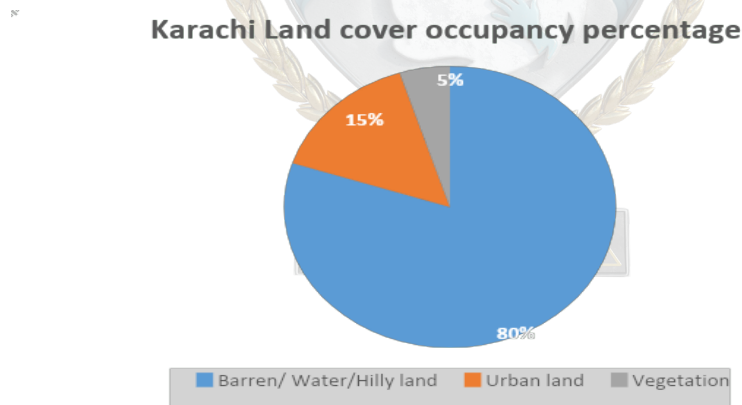


Figure 6. Different occupancy percentages of the Karachi land cover

Karachi city is a mixture of hilly, coastal and plain land. It has been found from the images developed that the plain area is 740 square miles. Out of this area, urban settlements occupy about 25% of this land while the rest being too far from the settlement is not in use by the people and is also hilly. Because of urbanization, there are chances that in the future an increase in urban land use and cover will occur around the area of Malir, Gadap, and Hawksbay. An expansion of about more than 75% has been seen from the image that shows an increase in coastline area that has occurred as a result of the built environment as compared to the past because of the shore repossession around DHA and Clifton. The Arabian Sea is located on the southern side of the city. The figure below shows the overall land cover of Karachi city.

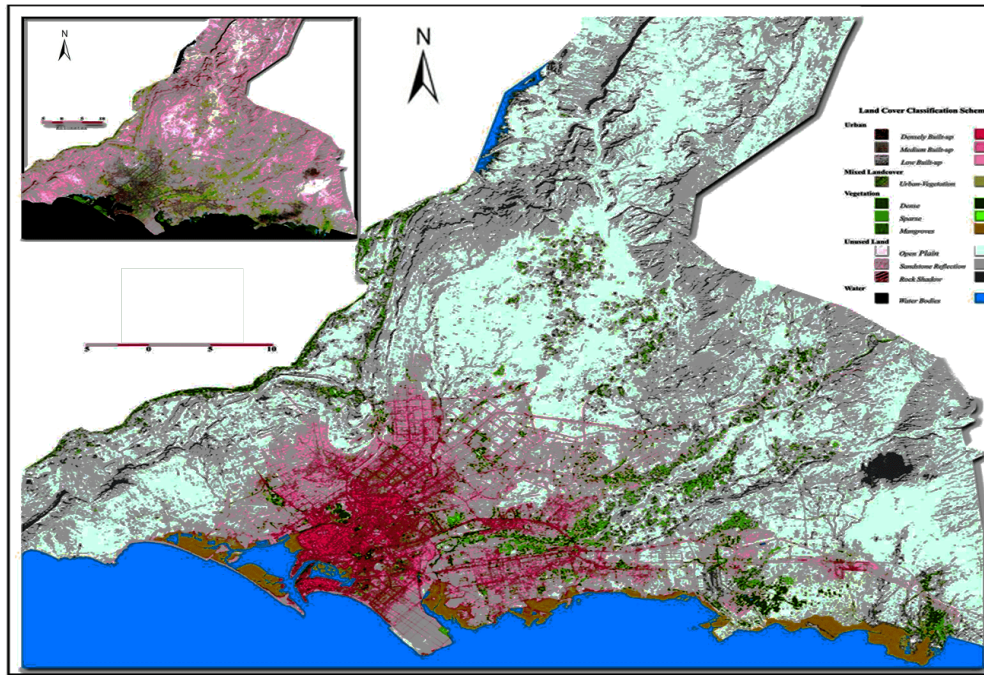


Figure 7. Classification of Karachi land covers area

The classification figure 7 of Karachi land cover shows four groups among which the most visible is the one having dense built-up land use/cover and the areas that come under it are Liaquatabad, Nazimabad, Shah Faisal Colony, and Shireen Jinnah colony. Since the activities related to economy and residents had been increasing as compared to the past, the areas under this group have become fully occupied and resulted in the mixed-use of land for different purposes. Transportation routes like roads had covered up all the available areas along with which population growth has reached as high as 1,800 persons per acre (URC, 2002). From the thematic map, it has been devised that sub-urban areas and city periphery areas come under the heading of low built-up areas and it includes DHA phases 4 and 5, Krangi Town, Gulshan-e-Hadeed, and Gulshan-e-Maymar. From the map generated it is seen that in the densely built-up class, there is no vegetation whereas medium built-up shows vegetation and the areas that come under this are Nazimabad, Clifton, Shahrah-e-Faisal as well as DHA.

3.4. Land use of Karachi city



There is a dependency between infrastructure and land use both of which are responsible for triggering different hazards. With the increase in urbanization land in Karachi has been cleared for obtaining space to build houses, industries, roads, etc. Since all of the areas are covered by impermeable construction substances there is little or no space left for the infiltration of rainwater that then leads to flooding. Although better facilities of life are being enjoyed by the people, it triggers many hazards that when not controlled properly lead to disaster in that area like floods, earthquakes, and hurricanes thus creating social instability in the city (Barrow, 1995).

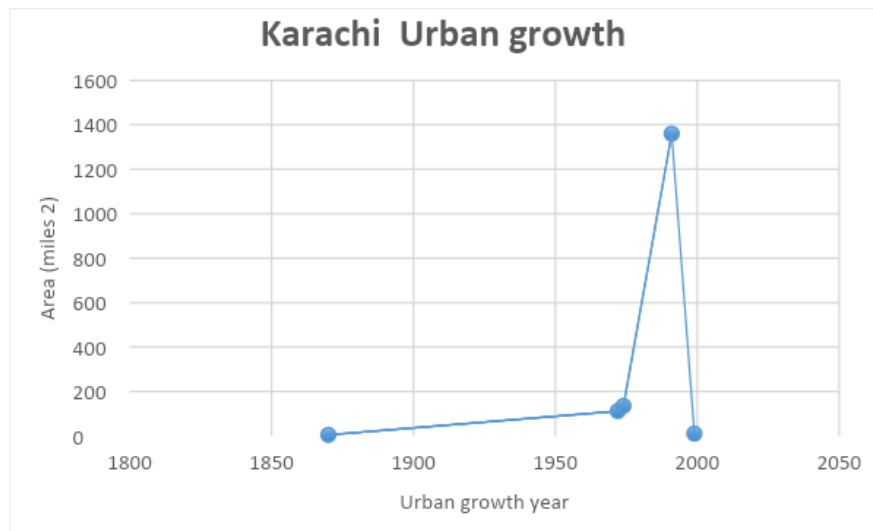


Figure 8. Karachi Urban growth

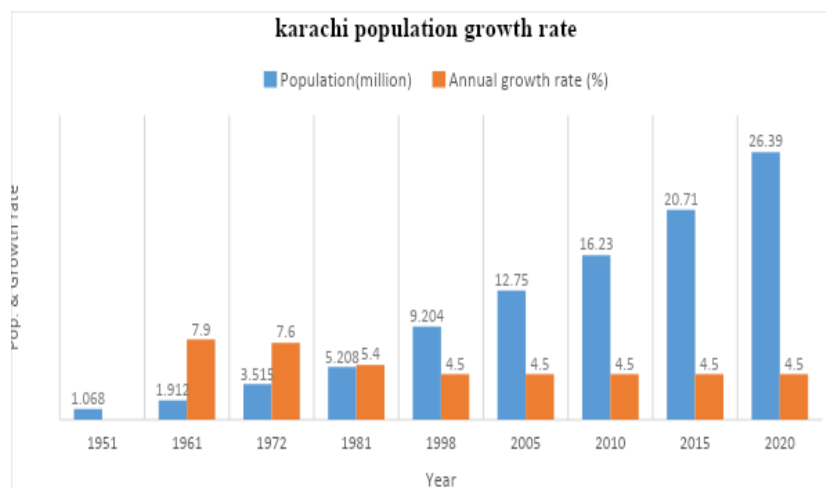


Figure 9. Graph Karachi population growth rate

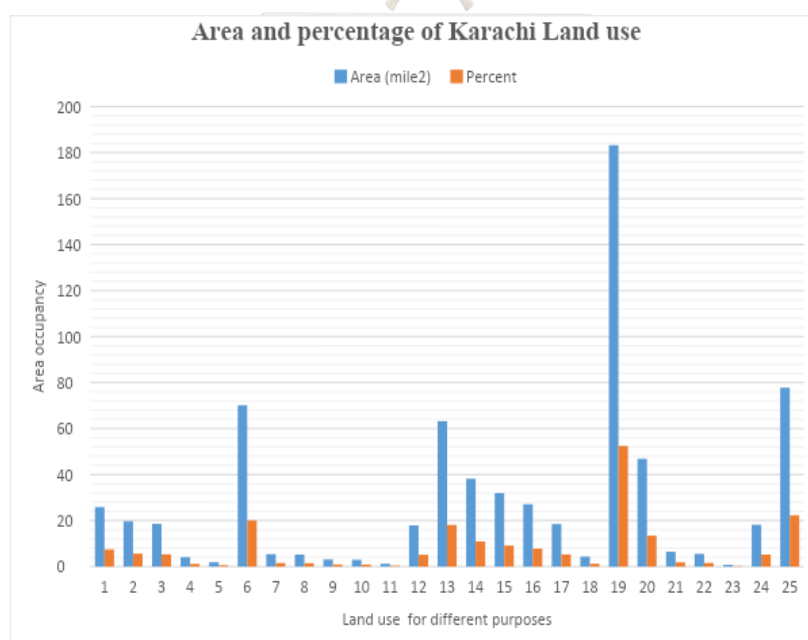


Figure 10. Graph Area and percentage of Karachi land use

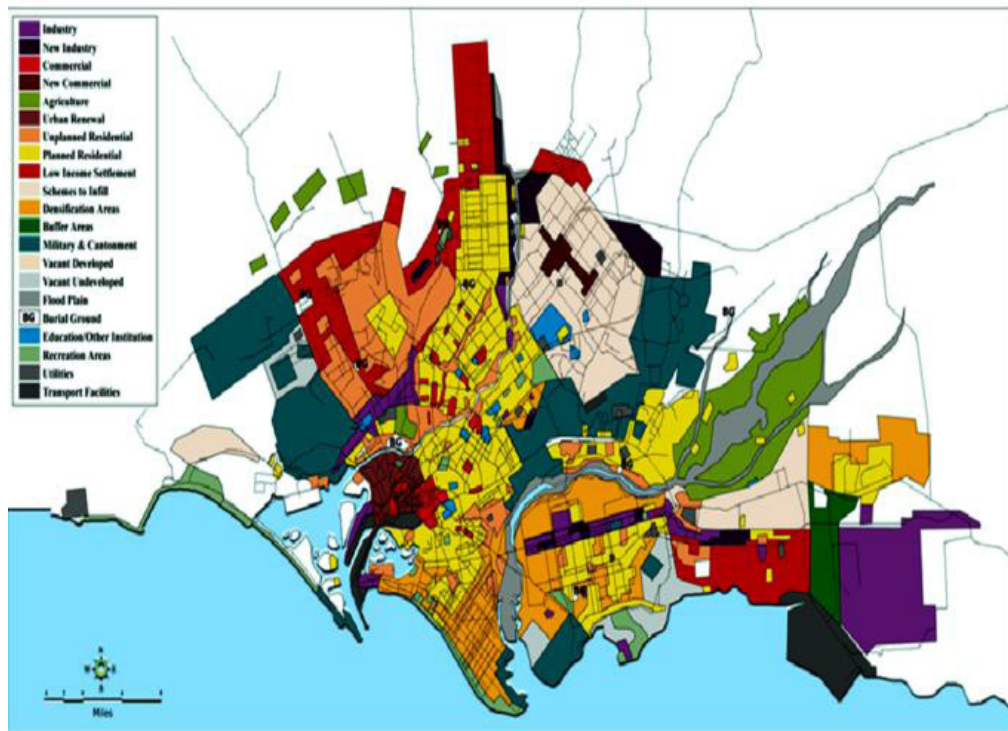


Figure 11. Land use of Karachi city

3.5. Stormwater Drainage

For Stormwater, due to excessive rainfall the process of collection, transference, and discarding along with the main stormwater infrastructure preservation and channelization is carried out by the KWSB. There are about 40 main nullahs and drains that are 167 km long. The discharge point of these is the Lyari and Malir rivers that pass through the district of the city. The Stormwater drainage system also deals with the disposal of wastewater due to which preservation of the drains and nullahs is ignored and results in dense and heavy encroachment of the drainage lines as well as excessive amounts of waste being disposed of in these lines resulting in flooding.

3.5.1. Karachi's main drainage networks

About 44 drains of stormwater in Karachi had been devised which includes mapping of the drainage network of Karachi. Existing drains have eight networks that are identified. These networks are named Gujjar, Manzoor, South, Korangi, Orangi, West, Malir, and East network. The drainage networks of Karachi are shown in the figure given below which based on districts are further classified into 7 networks.

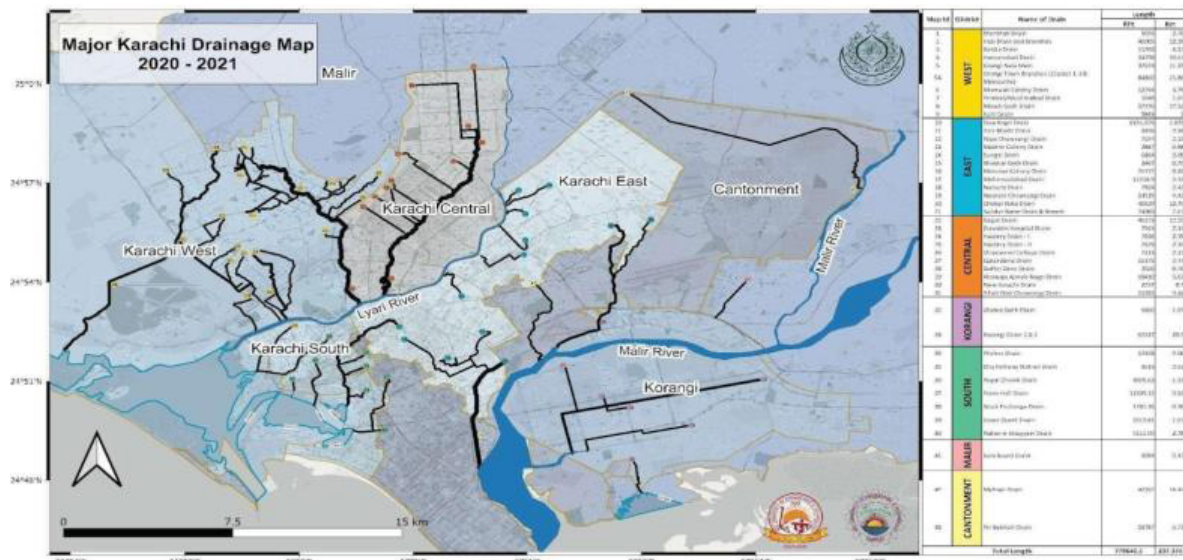


Figure 12. Karachi's main drainage networks

3.6. Impact of change in LULC on the Karachi drainage and river system

With the help of satellite images, the change in the land use and land cover of Karachi city has been mapped. This map shows how over the past fifteen years changes in the land area, vegetation, and agricultural land have been affected because of rapid urbanization and poor development planning. Vegetation has increased from 3.6 to 5.2%, land area has also increased from 9.7 to 21.5% whereas agricultural area has decreased from 7.3 to 5.9%. The map given below shows how changes in the land cover and land use have affected the drainage and sewerage networks throughout the city. Most of the blockages along with the city drainage networks, Malir, and Lyari rivers are caused by the development of agriculture as well as urban land.

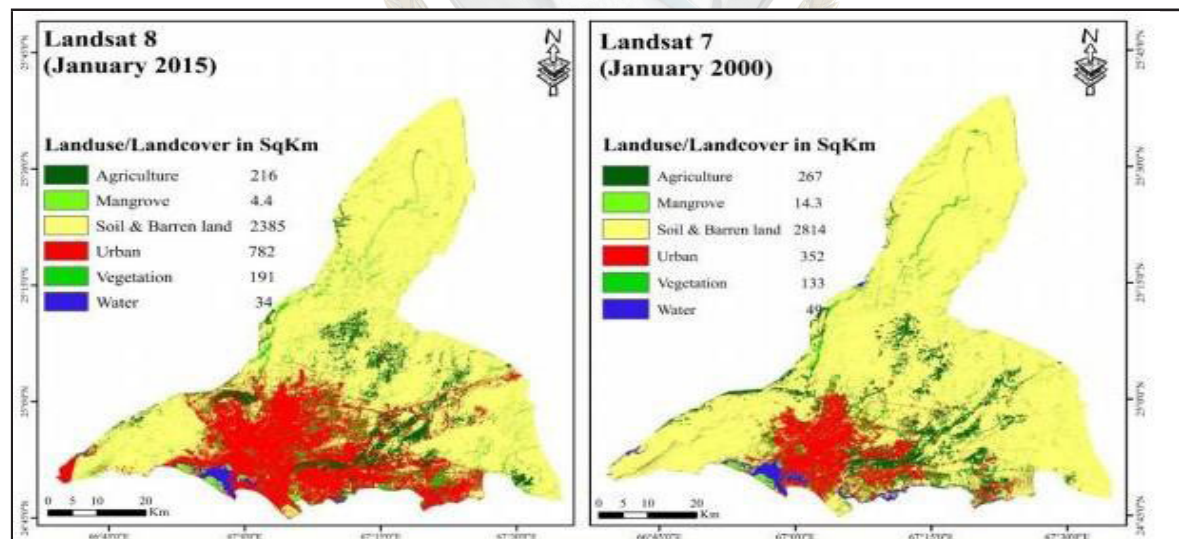


Figure 13. Impact of change in LULC on the Karachi drainage and river system

Because of the poor control and management of solid waste, an increase in the generation of waste has been observed from 2001 to 2020 ranging from 6500 to 150000 tons. With time, the drainage networks as well as riverbeds were encroached by illegal embankments, irrigated crops, land encroachment, dumping of waste as well as urban development (Odero & Mahiri, 2022; Cvetković & Martinović, 2020; Faicel, 2022). Due to the increased production and poor management, it has become very difficult to manage because of this the overall system of the Karachi drainage has been severely affected.

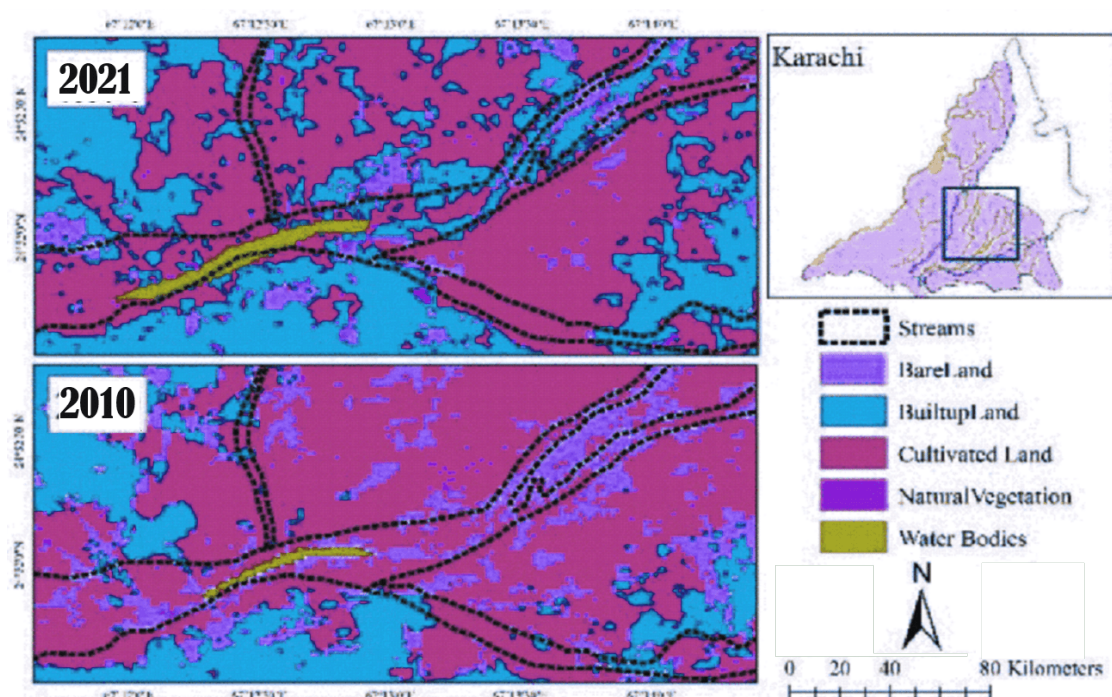


Figure 14. Blockages in the riverbeds because of urbanization

4. Recommendation

A master plan for the whole city drainage and stormwater needs to be developed and implemented that will focus on repairing, cleaning, and covering the drains, sewage networks, and tributaries, as well as the solid waste accumulated in the drainage pipes, should be reduced and recycled. Construction of trunks and plantation of trees along the bank of the nullahs should be done as it reduces the effect of the flood since they will act as natural barriers. Also, all the illegal settlements around the bank of the nullahs should be shifted to some other safe place as these not only are prone to flood but also cause a reduction in the width of the size of the drain. Green infrastructure should be promoted in the city that will increase the infiltration of water and will stop encroachment in the city thus the cost of the drainage system would be reduced.

5. Conclusion

It has been concluded that urbanization and population growth have caused a change in LULU and drainage networks of Karachi city. As the population has increased area is reduced and people are forced to live along the bank of the drains and tributaries which not only makes the width of these drains shorter but also makes these settlements vulnerable to flooding. Lack of proper implementation of policies related to the sustainable development of social housing a large amount of sewage by the residents has continuously been discharged into the nullahs and drains. Because of the lack of any alternate option, the formal developments have started to use drains and nullahs as a place for disposal which causes the clogging of the drains and the tributaries because of the sludge present in the sewage. As the population is increasing day by day the drain areas are being covered with illegal settlements causing choking and blocking of nullahs and drains.

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Research article

Management of COVID: The Creeping Disaster in the Indian Scenario

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Abstract: The COVID-19 pandemic has posed an enormous challenge to the Indian healthcare system, leading to a creeping disaster in the country. This research article aims to analyze the management strategies adopted by the Indian government to mitigate the impact of COVID-19 and highlight the challenges faced in the Indian scenario. The study is based on a qualitative analysis of various secondary sources, including government reports, scientific literature, and news articles. The findings suggest that the Indian government implemented several measures to manage the COVID-19 pandemic, including nationwide lockdowns, scaling up testing and treatment facilities, and vaccination drives. However, the implementation of these measures was plagued by several challenges, including inadequate healthcare infrastructure, inadequate funding, shortage of medical supplies, and misinformation. The study also highlights the need for a coordinated response from different stakeholders, including the government, healthcare workers, and the general public, to effectively manage the COVID-19 pandemic. Additionally, the study recommends the need for a robust healthcare infrastructure, investment in research and development, and public awareness campaigns to address the challenges posed by COVID-19. Overall, this research article provides insights into the management of the creeping disaster COVID-19 in the Indian scenario and underscores the need for concerted efforts from all stakeholders to effectively mitigate the impact of the pandemic.

Keywords: COVID-19, Creeping Disaster, Management Strategies, Healthcare Infrastructure.

1. Introduction

The COVID-19 pandemic has emerged as one of the biggest global health crises of the 21st century, causing significant socio-economic and public health implications worldwide. The pandemic has presented unprecedented challenges to governments and healthcare systems worldwide, with over 4 million deaths and 190 million confirmed cases reported globally as of July 2021 (WHO, 2021).

European countries implemented a range of containment measures to slow the spread of the virus and prevent healthcare systems from being overwhelmed. These measures included lockdowns, travel restrictions, mask mandates, and social distancing guidelines. While some nations adopted stringent measures early on, others faced challenges in achieving consensus and coordination, leading to disparities in response efforts (Hale et al., 2021).

In the Indian scenario, the COVID-19 pandemic has led to a creeping disaster, straining the already burdened healthcare system and resulting in a significant loss of life. India, with its vast population and limited healthcare infrastructure, faced enormous challenges in managing the COVID-19 pandemic. The pandemic exposed the weaknesses of the Indian healthcare system, including inadequate healthcare infrastructure, shortage of healthcare workers, and inadequate funding (The Hindu, 2021). However, the Indian government has adopted several measures to mitigate the impact of COVID-19 to manage the creeping disaster.

This research article aims to analyze the management strategies adopted by the Indian government to manage the creeping disaster of COVID-19 in India. The study aims to provide insights into the challenges faced by the Indian healthcare system and recommend strategies to effectively manage the COVID-19 pandemic in India.

2. Methods

The COVID-19 pandemic has posed significant challenges to the Indian healthcare system, leading to a creeping disaster in the country. The literature review focuses on the management strategies adopted by the Indian government to mitigate the impact of COVID-19 and the challenges faced in the Indian scenario. Several studies have highlighted the importance of implementing strict public health measures, such as lockdowns, to contain the spread of COVID-19 (Lewnard and Lo, 2020; Mandal and Ponnambath, 2021). The Indian government implemented a nationwide lockdown in March 2020 to curb the spread of COVID-19 (Press Information Bureau, 2020). However, the implementation of lockdowns was plagued by several challenges, including the displacement of migrant workers, loss of livelihood, and inadequate healthcare infrastructure (The Lancet, 2020). The scaling up of testing and treatment facilities is crucial in managing the COVID-19 pandemic (Nandy *et al.*, 2020).

The Indian government has ramped up testing and treatment facilities across the country, including setting up dedicated COVID-19 hospitals and quarantine centres (Press Information Bureau, 2020). However, the healthcare infrastructure in India was already strained before the pandemic, and the surge in COVID-19 cases overwhelmed the system (The Lancet, 2020). Vaccination drives are essential in curbing the spread of COVID-19 (Dong *et al.*, 2020). The Indian government launched a nationwide vaccination drive in January 2021, targeting healthcare workers, frontline workers, and individuals over the age of 60 years (Ministry of Health & Family Welfare, 2021). However, the vaccination drive faced several challenges, including vaccine hesitancy, vaccine shortages, and technical glitches in the CoWIN platform (The Hindu, 2021). The COVID-19 pandemic has also highlighted the role of misinformation in exacerbating the crisis (WHO, 2020).

The Indian government has launched several public awareness campaigns to dispel myths and promote accurate information about COVID-19 (Press Information Bureau, 2020). However, the spread of misinformation continues to pose a challenge in the Indian scenario (Gupta *et al.*, 2020).

3. Results and Discussions

The management of the creeping disaster of COVID-19 in the Indian scenario can be understood through the lens of disaster management frameworks. Disaster management is a cyclical process that involves four stages: mitigation, preparedness, response, and recovery (Coppola, 2015). Mitigation involves reducing the risk of disasters through various measures, such as land-use planning, building codes, and public awareness campaigns (Coppola, 2015). In the context of COVID-19, mitigation measures include public health measures, such as social distancing, mask-wearing, and hand hygiene, to reduce the transmission of the virus.

Preparedness involves developing plans and procedures to respond to disasters, such as emergency response plans, evacuation plans, and communication plans (Coppola, 2015). In the context of COVID-19, preparedness measures include scaling up testing and treatment facilities, setting up quarantine centres, and developing vaccination plans. The response involves the immediate actions taken to save lives and reduce the impact of disasters, such as search and rescue operations, providing emergency medical care, and restoring essential services (Coppola, 2015). In the context of COVID-19, response measures include the implementation of lockdowns, contact tracing, and isolation of infected individuals.

Recovery involves the restoration of normalcy and the rebuilding of communities following a disaster, such as the restoration of essential services, repairing infrastructure, and providing long-term support to affected individuals (Coppola, 2015). In the context of COVID-19, recovery measures include the restoration of healthcare services, the revival of the economy, and the provision of mental health support to affected individuals.

3.1. Socialization

Socialization during the management of the creeping disaster of COVID-19 in the Indian scenario is a crucial aspect to consider. Socialization refers to the process of individuals acquiring cultural norms, values, beliefs, and behaviours through interactions with others in society (Berk, 2017). Socialization plays a critical role in the implementation of mitigation and preparedness measures, the response to the pandemic, and the recovery of communities. In the context of COVID-19, socialization can occur through various channels, such as traditional media, social media, and interpersonal communication. Traditional media, such as television and newspapers, have been widely used to disseminate information about the pandemic, including public health measures, updates on the number of cases, and guidelines on testing and treatment (Basu, 2020). Social media platforms, such as Facebook and Twitter, have also been used to disseminate information and combat misinformation about the pandemic (Sharma et al., 2020). Interpersonal communication has played a vital role in reinforcing social distancing measures, promoting mask-wearing, and encouraging hand hygiene (Chen et al., 2020).

Socialization has also played a crucial role in the response to the pandemic. Community-based organizations, such as self-help groups, have been mobilized to provide support to vulnerable populations, including the elderly and low-income households. Socialization has also facilitated the implementation of contact tracing and isolation measures, as community members have played an active role in identifying and reporting suspected cases (Abdullah et al., 2020). In the recovery phase, socialization has played a crucial role in restoring essential services, such as healthcare and education. Socialization has facilitated the mobilization of resources and volunteers to support the reopening of schools and the resumption of healthcare services (Patel et al., 2020). Socialization has also been critical in providing mental health support to affected individuals, as community members have played a vital role in identifying and referring individuals to mental health services (Banerjee, 2020).

3.2. Social Identity

Social identity refers to the part of an individual's self-concept that is derived from their membership in a particular social group (Tajfel & Turner, 1979). Social identity has been shown to play a critical role in shaping individual behaviours, attitudes, and beliefs, particularly during times of crisis (Reichert et al., 2020). In the context of COVID-19, social identity can be a powerful tool for promoting adherence to public health measures, such as social distancing and mask-wearing. Research has shown that individuals are more likely to follow public health guidelines if they perceive themselves as part of a larger group that is collectively responsible for mitigating the spread of the virus (Van Bavelet et al., 2020). Social identity can also facilitate the mobilization of resources and volunteers to support community-based efforts to combat the pandemic (Jetten et al., 2020).

In the Indian scenario, social identity has played a crucial role in the response to the pandemic. For example, the Indian government has leveraged social identity by launching the "Janata Curfew" campaign, which encouraged citizens to stay at home on a designated day to prevent the spread of the virus (Ministry of Health and Family Welfare, 2020). The campaign was successful in mobilizing citizens across the country to participate in the collective effort to combat the pandemic.

Social identity has also played a critical role in the recovery phase of the pandemic. For example, social identity has facilitated the mobilization of resources and volunteers to support the reopening of schools and the resumption of healthcare services (Patel et al., 2020). Social identity has also been used to promote the use of technology-based solutions, such as contact tracing apps, by positioning their use as part of a collective effort to combat the pandemic (Ramkumar, 2020).

3.3. Social Interaction

Social interaction is an important factor to consider in the management of the creeping disaster of COVID-19 in the Indian scenario. Social interaction plays a crucial role in the transmission of the virus, and therefore, understanding the nature of social interaction can help inform public health strategies to mitigate the spread of the virus (Park *et al.*, 2020). In the context of COVID-19, social interaction can be broadly classified into two categories: physical and virtual. Physical interaction refers to in-person interactions between individuals, while virtual interaction refers to interactions mediated by technology, such as video conferencing and social media.

Physical interaction has been identified as a key driver of the spread of COVID-19 in the Indian scenario. For example, large gatherings, such as weddings and religious events, have been linked to the spread of the virus in several parts of the country (Chopra *et al.*, 2020). Social interaction in public spaces, such as markets and public transport, has also been identified as a risk factor for the transmission of the virus (Gupta *et al.*, 2020).

Virtual interaction, on the other hand, has emerged as an important tool in mitigating the spread of the virus. Video conferencing and telemedicine have been used to enable remote communication between healthcare providers and patients, reducing the risk of transmission (Bhaskaret *et al.*, 2020). Social media has also been used to disseminate public health messages and promote adherence to public health guidelines (Kang *et al.*, 2020).

The use of technology-based solutions to enable virtual interaction has also facilitated the delivery of essential services during the pandemic. For example, e-commerce platforms have been used to enable the delivery of groceries and other essential items to households, reducing the need for individuals to venture out into public spaces.

3.4. Social Structure

The social structure in the Indian scenario plays a crucial role in the management of the creeping disaster of COVID-19. The structure of society affects how people interact with each other, and this, in turn, can impact the transmission of the virus (Hossain *et al.*, 2020). India has a highly complex social structure, with multiple caste, class, and religious groups. The pandemic has exposed the fault lines in this social structure, with marginalized communities being disproportionately affected by the virus (Kundu, 2020). The Indian government has taken steps to mitigate the impact of the pandemic on marginalized communities, such as migrant workers, by providing financial support and shelter (Chakraborty & Maity, 2020). However, the social structure has created barriers to the effective implementation of these measures, with bureaucratic and logistical hurdles hindering the distribution of aid (Dasgupta, 2020). The social structure has also influenced adherence to public health guidelines, such as wearing masks and maintaining social distancing. For example, in some communities, wearing a mask is seen as a sign of weakness or submission (Roy and Bhattacharjee, 2020). In other communities, the importance of social interaction and community gatherings has made it difficult to enforce social distancing measures (Bhatia, 2020).

3.5. Social Change

The management of the creeping disaster of COVID-19 in India has also led to significant social changes in the country. The pandemic has highlighted the need for improved healthcare infrastructure, access to healthcare, and social safety nets for marginalized communities (Ghosh, 2020). The pandemic has also led to changes in the way people work and interact with each other. Remote work and virtual communication have become more prevalent, and there has been a shift towards online learning and education (Chatterjee *et al.*, 2020). The pandemic has also led to changes in the way people perceive public health and hygiene. The importance of personal hygiene and public health measures such as wearing masks and maintaining social distancing has become more widely recognized (Roy and Bhattacharjee, 2020). Additionally, the pandemic has led to changes in social norms and practices. For example, the pandemic has led to the cancellation or postponement of large social events such as weddings and religious festivals, which are usually an important part of Indian culture (Bhatia, 2020).

3.6. Implications and applications

The management of the creeping disaster of COVID-19 in India has had significant implications and applications in various domains. These include healthcare, social policy, education, and technology.

One of the most significant implications of the pandemic has been the need for improved healthcare infrastructure and access to healthcare. The pandemic has highlighted the existing gaps in the healthcare system, and there is a need for increased investment in healthcare infrastructure, medical equipment, and trained healthcare personnel (Gupta and Bajpai, 2020). Additionally, there is a need to improve the coordination between the central and state governments in managing public health emergencies (Sahoo and Kumar, 2020). The pandemic has also had implications for social policy, particularly for marginalized communities. The pandemic has highlighted the need for social safety nets such as unemployment benefits, health insurance, and food security measures for vulnerable populations (Sharma, 2020). There is a need to design policies that are inclusive and address the unique needs of marginalized communities such as women, children, and migrants (Dey and Joshi, 2020). The pandemic has also had implications for education. The closure of schools and universities has highlighted the need for online learning and digital technologies in education (Mishra, 2020). There is a need to develop effective online learning platforms and improve access to digital technologies for students from diverse socioeconomic backgrounds.

Lastly, the pandemic has had implications for technology. The use of digital technologies such as telemedicine and contact tracing apps has become more prevalent in managing the pandemic (Chowdhury *et al.*, 2020). However, there is a need to ensure that these technologies are accessible, and equitable, and protect individual privacy.

5. Conclusion

In conclusion, the creeping disaster of COVID-19 has had a significant impact on the Indian population, economy, and society. The pandemic has highlighted the existing gaps and weaknesses in the healthcare system, social policies, education, and technology. The management of the pandemic has required a coordinated effort between the central and state governments, healthcare professionals, and the public.

The theoretical framework of socialization, social identity, social interaction, social structure, and social change provides valuable insights into the social dimensions of the pandemic in India. Socialization and social identity have played a crucial role in shaping individual and collective responses to the pandemic. Social interaction and social structure have influenced the transmission of the virus and the impact of the pandemic on different groups. Social change has been both a consequence and a response to the pandemic.

The management of the creeping disaster of COVID-19 in India has had significant implications and applications in healthcare, social policy, education, and technology. There is a need for increased investment in healthcare infrastructure and coordinated public health response. Social policies need to be inclusive and address the unique needs of vulnerable populations. The pandemic has highlighted the need for online learning and digital technologies in education, and the use of digital technologies in managing the pandemic needs to be equitable and protect individual privacy.

In the face of the ongoing pandemic, it is essential to continue to monitor and evaluate the management strategies in place. The lessons learned from the Indian experience can be applied to future pandemics and public health emergencies. Overall, the management of the creeping disaster of COVID-19 in India requires a multi-dimensional and interdisciplinary approach that considers the social, economic, and cultural aspects of the pandemic.

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Research article

Use of New Technologies in the Field of Protection and Rescue During Disasters

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Abstract: Nowadays, dealing with natural disasters is becoming more and more challenging due to climate changes that lead to more frequent and intense natural disasters. Traditional protection and rescue methods are often not sufficient to meet all the challenges posed by these disasters. Therefore, the integration of new technologies becomes crucial for more effective risk management. Research of various aspects use of modern technologies in prevention, detection, response and restoration, in the context of natural disasters, it is necessary to focus on innovative approaches. By using artificial intelligence (AI), drones, sensor technologies, advanced communication systems, and the NICS system (Next-Generation Incident Command System), the goals of protecting civilian populations, reducing damage and improving the efficiency of rescue operations are achieved. Since 2016, the ARCECP Project (Advanced Regional Civil Emergency Coordination Pilot Project) has enabled the partner countries of the Western Balkans to acquire, implement and adapt the NICS system, in strengthening the capacity of emergency response and management in the region. The NICS system has partially taken root in Bosnia and Herzegovina (BiH), and this paper will mostly refer to the implementation of the application in BiH and recommendations for its development at all levels of the BiH government. Through the analysis of existing case studies and the application of new technologies, the work identifies key success factors, challenges and potential directions for future development in this area.

Keywords: Modern technologies, Natural disasters, Artificial intelligence, Sensors, NICS.

1. Introduction

After the disintegration of the former state, the Socialist Federal Republic of Yugoslavia (SFRY), a large number of independent states that were linked to each other economically, politically, infra-structurally, security-wise, etc., emerged (Cvetković et al., 2018). The disintegration of the former state happened as a result of the war, so there were negative consequences, especially in the area of protection and rescue. Most of the legislation that dealt with this area, especially in the planning part, was taken over by the former state, which no longer corresponded to the theory or practice that is applied in the world. Practice around the world tells us that when it comes to post-authoritarian and post-conflict countries, the processes of making emergency action plans and the processes of applying modern methods are largely influenced by transition processes (Cvetković et al., 2018). The very fact that as a result of inattention, negligence, intent, natural disasters and various other reasons

can cause fires and arson, breakdowns, sabotage and other forms of danger to persons and property, indicates how much attention must be paid to prevention, i.e. protection and rescue of people as the greatest value of a society, as well as saving the material goods that man created (Aktar, Shohani, Hasan, & Hasan, 2021; Cvetković, Nikolić, & Lukić, 2024; Cvetković & Šišović, 2023; Cvetković, 2023; Dukiya & Benjamine, 2021; Grozdanić, Cvetković, Lukić, & Ivanov, 2024; Hussaini, 2020; Kaur, 2020; Olawuni, Olowoporoku, & Daramola, 2020; Thennavan, Ganapathy, Chandrasekaran, & Rajawat, 2020).

Bosnia and Herzegovina is a federal state union consisting of two entities and the Brčko District, which by international arbitration belonged both to the Federation of BiH and the Republic of Srpska, but all with their territorial organization, autonomy and power. It was created after a four-year civil war, from 1992 to 1995, and it got its current form by the provisions of the General Framework Agreement for Peace in Bosnia and Herzegovina, better known as the Dayton Peace Agreement, signed on 21 November 1995. Bosnia and Herzegovina is a state union in which different forms of state organization known by legal practice are interwoven. Namely, Bosnia and Herzegovina as a state union has a decentralized form of organization, because it consists of two almost independent entities that have the attributes of a state, and which also differ in the form of organization. More precisely, the Federation of Bosnia and Herzegovina has a decentralized system of state organization with ten cantons, each of which has its way of organization and functioning and its autonomy, while the Republic of Srpska has a centralized system of organization and its autonomy. (Sudar, Ivanov & Cvetković, 2016).

Following the prescribed jurisdictions, the Parliamentary Assembly of BiH adopted the Framework Law on protecting and saving people and material goods from natural and other disasters in BiH (Official Gazette of BiH No. 50/08). Based on the Constitutional provision, that the entities on their territory and under their jurisdiction organize a safe environment for everyone in such a way that they will form civil institutions for law enforcement, the National Assembly of the Republic of Srpska adopted the Law on Protection and Rescue in Emergency Situations in 2012. By this Law, the term protection and rescue means a unified form of management and organization of the forces and subjects of the protection and rescue system for the implementation of preventive and operational measures and the execution of the tasks of protection and rescue of people and property from the consequences of natural disasters, technical-technological accidents, catastrophes, epidemics, the consequences of acts of war, the consequences of terrorism and other dangers and accidents that may threaten the population, material and cultural assets and the environment, including recovery measures from the resulting consequences (Official Gazette of the Republic of Srpska No. 121/2012).

Also, the Federation of BiH has prescribed the Law on the Protection and Rescue of People and Material Goods from Natural and Other Disasters (Official Gazette of the Federation of BiH, No. 39/03, 22/06 and 43/10). The Brčko District of BiH passed its own Law regulating the area of protection and rescue (Official Gazette of the Brčko District of BiH, number 2/10). The organization of the Protection and Rescue System in BiH is best seen from the following schematic representation:

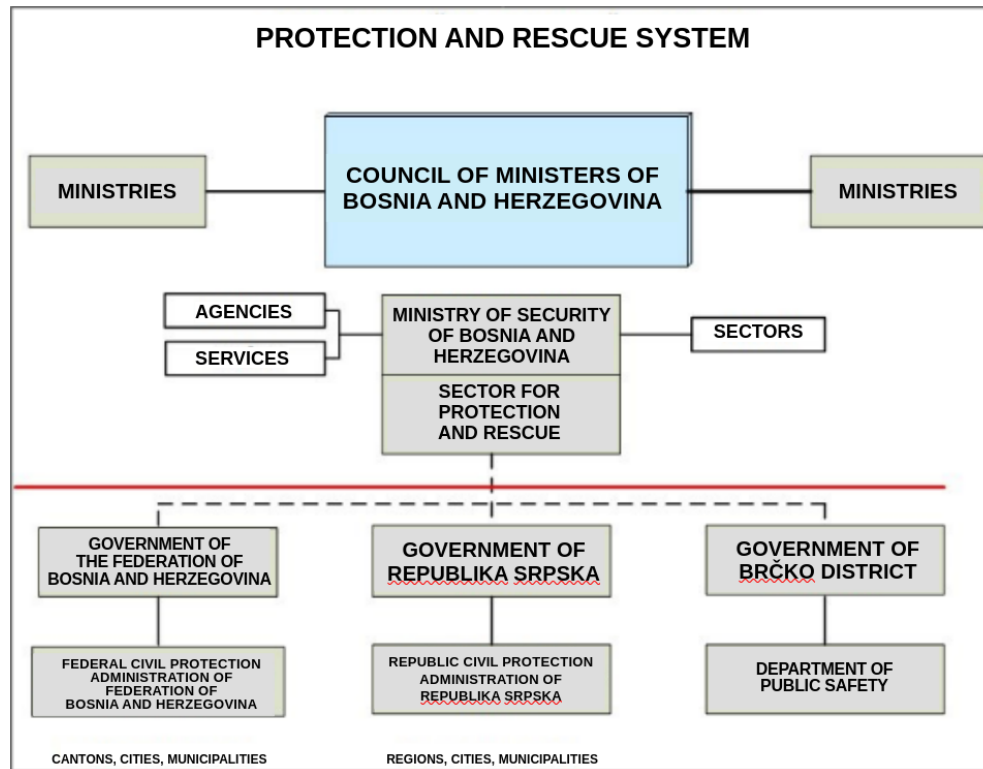


Figure 1. Schematic representation of the connection between protection and rescue institutions (Source: Ministry of Security of Bosnia and Herzegovina Sector for Protection and Rescue)

It is certainly necessary to take into account the best practices and recommendations (Al-ramlawi, El-Mougher, & Al-Agha, 2020; Mano, A, & Rapaport, 2019; Perić & Cvetković, 2019; Xuesong & Kapucu, 2019; Cvetković, Öcal, & Ivanov, 2019) of the European Union contained in the Decision, which, among other things, states: “Given the significant increase in the number and severity of natural and man-made disasters in recent years, and in a situation where it is likely that future disasters will be more extreme and complex with far-reaching and long-term consequences, caused especially by climate change and the potential interaction of several natural and technological hazards, an integrated disaster management system is increasingly important. The European Union should support solidarity, complement and facilitate the coordination of actions of member states in the field of civil protection with the aim of improving the efficiency of the system for prevention, preparation and response to natural disasters and man-made disasters” (Official Gazette of the European Union number: L 347/924). The protection that should be ensured under the Union Civil Protection Mechanism should firstly cover the population, but also the environment and property, including cultural heritage, from all kinds of natural and man-made disasters, including ecological disasters, marine pollution and emergency health situations, which occur inside or outside the Union. Within the framework of the Union Mechanism, it is possible to request civil protection and other types of assistance in emergency situations to supplement the response capacity of the affected country in the event of any of the listed disasters. Also, through the EU Civil Protection Mechanism, it is possible to get access to new technologies, which is very important for BiH at all its levels of administrative activity, as previously stated.

2. New technologies, application possibilities

The use of new technologies in the field of protection and rescue represents a revolutionary step in the management of natural disasters. By integrating artificial intelligence AI (*artificial intelligence*), drones, sensors, and various other tools and devices, it is possible to significantly improve the capacities for early warning, rapid evacuation, and efficient distribution of aid, thereby saving lives and reducing material damage (Aleksandrina, Budiarti, Yu, Pasha, & Shaw, 2019; Carla S, 2019; Cruz & Ormilla, 2022; Cvetković, 2019; Cvetković et al, 2020; Cvetković, Adem, & Aleksandar, 2019; Cvetković & Filipović, 2018; Cvetkovic & Martinović, 2020; El-Mougher, 2022; Faicel, 2022; Hossen,

Nawaz, & Kabir, 2022; Kumiko & Shaw, 2019). Although there are a number of challenges, including the need for standardization, privacy protection, and ensuring interoperability among different technology systems, the potential benefits that these technologies offer are unquestionable. Therefore, the continuous development and integration of new technologies should be a priority in strategies to reduce disaster risk and strengthen the resilience of communities around the world (Cvetković, 2023). In addition to technologies that are directly applied in real situations, it is also possible to apply technologies for preparing for action in emergency situations, and various software for simulation exercises (JANUS, JCATS, VBS3, XVR, VSTEP). It is also necessary to highlight the inadequate capacities of local authorities and professional services to improve society's resilience to disasters (Cvetković, Filipović, & Jakovljević, 2017; Cvetkovic, 2016; Cvetković, 2016; Cvetković, Öcal, & Ivanov, 2019; Cvetković and Stanišić, 2015; Islam, 2023; Rajani, Tuhin, & Rina, 2023; Starosta, 2023; Ulal & Karmakar, 2023).

2.1. Artificial intelligence (AI) in disaster management

Artificial intelligence is increasingly used to analyze large amounts of data collected from various sources, including satellites, ground sensors, and social networks, in order to predict the occurrence of natural disasters, assess their possible damage, and optimize the allocation of resources for emergency interventions (Crawford & Finn, 2018). AI systems can quickly analyze data on earthquakes, floods, forest fires, and other disasters, enabling early warning and rapid evacuation of threatened areas. It is characterized by the ability of machines to perform tasks that would otherwise require human intelligence, including perception, language comprehension, decision making and learning. Within AI, we can say that there is a kind of subset that we can call ML (machine learning) that focuses on the development of algorithms that allow computers to learn and adapt to data without explicit programming for specific tasks.

The applications of AI and ML models are most visible in forecasting and early warning, as they use the analysis of meteorological data and the detection of patterns that may indicate the occurrence of natural disasters such as strong winds, floods, forest fires and earthquakes. These models can predict the occurrence and intensity of disasters with greater accuracy, enabling timely activation of early warning systems. Also, after a disaster, AI can be used to quickly analyze images and videos taken by drones or satellites to assess the damage. This allows for faster decision-making on the allocation of resources and prioritization of areas for rescue operations. Machine learning algorithms can analyze data from various sources, including social networks, to identify the most urgent needs and optimize the deployment of rescue teams and resources (Cvetković & Andrić, 2023; Cvetković, Čvorović, & Beriša, 2023; Cvetković, Nikolić, & Ivanov, 2023; Cvetković & Šišović, 2023).

Just like the application in any system, the application of AI and ML systems in the management of natural disasters (Ali & Sciences, 2013; Chatfield & Brajawidagda, 2013; Westen, 2013) also brings certain challenges, including issues of privacy, data security, and ethical dilemmas around decision-making based on algorithmic predictions. There is also a risk of bias in the data that can influence decisions made by AI systems, which requires careful validation and monitoring (Cvetković et al., 2015). Artificial intelligence and machine learning offer significant opportunities to improve disaster management, from forecasting and early warning to optimizing post-disaster response. However, it is crucial to direct these technologies to serve the public good, with careful consideration of ethical, security, and privacy implications (Cvetković & Šišović, 2024; Cvetković, 2024a, 2024b; Cvetković, 2023; Kabir, Tanvir, & Haque, 2022; Mohammed & Maysaa, 2022; Öcal, 2021). Further development and application of these technologies requires a multidisciplinary approach, including collaboration between technologists, researchers, government agencies, and communities to maximize benefits while minimizing potential risks and inequities (CRC Press).

2.2. The use of drones in disaster management

Drones, also known as UAVs (Unmanned Aerial Vehicles), are increasingly becoming an indispensable tool in the management of natural disasters. Thanks to their flexibility, accessibility and ability to quickly collect data from hard-to-reach or dangerous areas, drones play a key role in disaster prevention, response and recovery (Cvetković et al., 2022). Before a disaster occurs, drones can be used to map and analyze the terrain, identify potential risks, and develop detailed evacuation and response plans. This includes analyzing topography to predict flooding, identifying weak points in infrastructure, and modelling fire spread scenarios. In the phase immediately before or during a

natural disaster, drones provide crucial information through real-time monitoring of weather conditions, fire activity, watercourse behaviour, and other critical factors. This enables faster and more accurate early warning of the population and mobilization of resources. Drones are extremely useful in coordinating and conducting rescue operations, allowing teams to identify survivors, access hard-to-reach locations, and deliver emergency aid, such as medicine, food, and water, to isolated regions (Cvetković et al., 2022).

After a disaster, one of the first steps in the response is to assess the damage. Drones can quickly cover large areas, providing high-quality photos and videos that help determine the extent of damage, identify affected areas, and prioritize rescue and recovery efforts. In the recovery phase, drones help in mapping the destroyed infrastructures and monitoring the reconstruction process. They can also support reconstruction efforts, allowing planners to effectively allocate resources and monitor the progress of reconstruction (Cvetković et al., 2021). Advances in drone technology, including improvements in autonomous flight, camera quality, and integration with AI and analytics tools, are continuously expanding the possibilities of their use. In addition, the development of specialized sensors, such as thermal cameras for heat detection and multispectral sensors for vegetation analysis, further increases their effectiveness in natural disaster management. Although drones have numerous advantages, their use carries certain challenges such as regulatory restrictions, privacy and data security issues, as well as technical limitations such as flight time and resistance to bad weather conditions. Addressing these challenges requires collaboration between government agencies, industry, and academia (Cvetković et al., 2020). Despite the aforementioned shortcomings, drones are a powerful tool in the hands of disaster managers, offering fast, flexible, and efficient technology for disaster assessment, monitoring, and response. As technology advances, their role is expected to become even more important, contributing to saving lives and reducing damage from disasters.

2.3. The use of sensors and IoT devices in disaster management

The Internet of Things (IoT) and sensor technologies are key elements in modern natural disaster management. By connecting various devices and sensors in a single network, it is possible to collect, analyze and exchange data in real-time, which significantly contributes to the efficiency of prediction, detection, response and recovery from disasters. Sensors placed at key locations can continuously monitor changes in the environment, such as rising water levels, seismic activity, and changes in temperature and humidity, which is crucial for early detection of potential disasters. This data is used to activate the early warning system, which enables the population to take the necessary protective measures. IoT devices provide detailed information about the state of infrastructure and the environment, enabling authorities and organizations to better assess the risks associated with natural disasters. Analysis of data collected from sensors can help identify areas that are particularly vulnerable and require additional protection measures.

In the event of a disaster, IoT can play a key role in coordinating rescue operations. Sensors can provide real-time information on the condition of roads, bridges, and other key infrastructure elements, enabling the rapid and safe mobilization of rescue teams. Also, with the help of IoT devices, it is possible to track the movement and location of people in real-time during an evacuation, which helps to effectively manage evacuation routes and reduce congestion.

After a disaster, sensors and IoT devices can monitor the progress of infrastructure recovery and the state of the environment, providing key information that helps direct efforts and resources where they are most needed. The development of advanced sensor technologies, such as sensors for detecting humidity, pressure, temperature, and air quality, together with advances in battery technology and wireless communication, enables the widespread use of IoT devices in the management of natural disasters. Integration with technologies such as AI further improves the ability to analyze and secure data. Although sensors and IoT devices offer significant benefits, there are also challenges such as the need for robust and secure communication networks, protecting data privacy and security, and managing the vast amount of data these devices generate. Also, there is a need for standardization to ensure interoperability between different systems and devices. Despite these limitations, sensors and IoT devices play a key role in modernizing natural disaster management, offering new opportunities for early warning, risk assessment, and effective coordination of disaster response. Their application promises a reduction of damage and losses and a faster recovery of the affected areas. However, to maximize their potential, it is important to address existing challenges and work on developing safe, reliable and interoperable technological solutions (Cvetković et al., 2021).

3. The next-generation incident command system

When a disaster strikes, multiple agencies can take over and respond to the call. Organizing, coordinating and managing large-scale events presents significant challenges for those involved in such a response. To overcome these challenges, effective collaboration, shared situational awareness and decision support requires timely distribution of information across different systems and platforms. NICS is a web-based command and control environment for small, large extreme scale incidents that facilitates state, county and local/municipal preparedness, planning, response and recovery collaboration for all risks/ hazards. NICS facilitates situational awareness for widely distributed crisis responders. Two key attributes give the system its strength (Öcal et al., 2020): simplified geospatial referencing, user familiarization that enables teams to be quickly formed and collaborate within an incident; sharing information using drawings and speech; and a basic modular design that allows the system to be quickly adapted to different user needs and changing mission requirements.

The NICS architecture is a cloud-based system which emphasizes open standards for software development, user interface display, and external data interfaces. Recognizing that the crisis management and disaster response communities are always spread across a wide range of organizations that have different tools, and communication systems, NICS is designed around some key principles: non-proprietary: not owned by the supplier, no proprietary IP, community development effort; based on open standards: works on any computer, any operating system, any browser; uses the “app store” model: applications can be developed by anyone, with easy plug-play functionality; designed for the tired-dirty-hungry: it doesn’t try to do everything, it’s carefully designed for people who are under extreme stress; focused on scalability: technologies for small and large to extreme scale incidents that enable the ability of processes, networks, software or organizations to grow and manage increased demand (Cvetković et al., 2018).

3.1. The origin and history of NICS

The Massachusetts Institute of Technology, USA, (MIT), more precisely, Lincoln Laboratory, has a long history of research and development of architectures for information exchange, situational awareness and decision support in the military. Recognizing that many aspects of these architectures were directly applicable to civilian disaster response applications, in 2007 the Office of Laboratory Technology initiated a study to explore applications for large wildfire response in California. The Lincoln Laboratory research team partnered with California Department of Forestry and Fire Protection (CALFIRE) units in San Diego and Riverside CA to jointly identify the requirements for such a system and demonstrate its utility (Gregg & Stephanie 2023).

With guidance from these operational partners, MIT Lincoln Laboratory designed and implemented a prototype system that enabled shared situational awareness and collaboration during response operations. The architecture of the next-generation incident command system (NICS) is based on network-centric paradigms, services, combined sensors, communication, and visualization and collaboration technology with all components connected in real-time. The performance of this prototype system and the impact of the new technologies on then-current concepts of operations were evaluated through a limited objective experiment (LOE) conducted over a three-day period in August 2009 in Riverside, California, and included professional responses from CALFIRE, the US Forest Service departments and local agencies. The utility of the favoured tactical system for collaboration and shared situational awareness among field operators and command centres was clearly recognized by participants and by the US Department of Homeland Security, which initiated sponsorship for further research and development in 2010.

Following the limited-goal experiment, the NICS team worked intensively over the next several years with a growing number of responsible agencies in California to refine the basic platform and expand the system’s capabilities driven by strong user participation. Early on there was a desire for a system; by 2012, a NICS User Group was formed consisting of over 450 organizations across fire, legal, medical, emergency services, emergency management, emergency management agencies, US Border Patrol, private industry, utilities, non-governmental organizations, etc. During this period, it has been used in thousands of training exercises and live incidents to coordinate various emergency response activities, including disaster management and law enforcement. In 2009, the devastating bushfires in Australia prompted Australian officials to look around the world for a large-scale crisis management system. As a result, the state of Victoria, Australia, chose NICS as its new system. The

state of Victoria, Australia, adopted the NICS in 2014 to facilitate their preparation and response to emergencies such as fires and floods. In 2014, the Emergency Management Directorate of Australia's largest state, Victoria, began to implement the NICS Open Platform into its emergency management system, and the Directorate continues to share software updates with the NICS community. NICS, which was used to call for responses to wildfires (*cal fire*), mudslides and floods, was transferred in 2015 to the California Office of Emergency Services. Renamed SCOUT, the system supports emergency and law enforcement officials across the state.

3.2. NICS in Bosnia and Herzegovina

The NATO Science for Peace and Security program through the pilot project "Advanced System of Regional Coordination for civil emergencies" in the period 2017-2021 implemented the new generation incident command system - NICS and accompanying technology in Bosnia and Herzegovina, Croatia, Montenegro and Northern Macedonia. Within the Science for Peace and Security (SPS) program, NATO has approved the SPS G6188 project "Improvement of the New Generation Incident Command System (NICS) in Bosnia and Herzegovina (BiH). Since 2017, Bosnia and Herzegovina has organized numerous workshops, trainings and exercises where hundreds of rescuers have been trained. As a result, the NICS system has proven to be an integral tool in the field of protection and rescue. It is a tool that has demonstrated numerous benefits in real-time events directly supporting civil protection teams on the ground and is used for mobile tracking and management of rescuers and resources. Respecting the constitutional structure of Bosnia and Herzegovina, as well as legal jurisdictions in the field of protection and rescue, NICS was implemented at the following levels: Ministry of Security of Bosnia and Herzegovina; Ministry of Defense of Bosnia and Herzegovina; Republic Administration of Civil Protection of the Republic of Srpska; Federal Administration of Civil Protection of the Federation of Bosnia and Herzegovina; Department of Public Security of the Brčko District of Bosnia and Herzegovina.

The implementation of NICS went primarily to the umbrella bodies with the intention that in the following period, the implementation will be brought down to the level of the local community because it is estimated that this tool will have its full effect only in this way. During the implementation at the top levels of government, and through various types of exercises as well as real situations, more than 200 incidents and more than 2,500 reports submitted (via the mobile application) and more than 1,500 rooms for cooperation in support were recorded (OKC 112 BiH).

The NICS system is an example of a pilot project of new technology produced and adapted to the specific needs and requirements of the geographical characteristics and institutional arrangement of Bosnia and Herzegovina. Partner institutions from Bosnia and Herzegovina continuously upgrade the system and implement it in real-time events, including simulation of different scenarios. As a result, the system is well supplied with data and information that serve daily in complex situations in the field of civil protection. In order to continue the implementation of NICS system activities, its continuous upgrading and use is required. The Ministry of Security of BiH in cooperation with all competent institutions in BiH, including entities, cantons and the Brčko District of BiH must continue activities related to the NICS system in terms of regular maintenance and management of the system and creating, coding, designing and organizing special system components: adaptation and harmonization of the system for the needs of Rescue Services in Bosnia and Herzegovina; training of IT experts and technical staff for system maintenance; Development of standard operating procedures (SOP); training, conferences, seminars and exchange of expertise for working on the system; training of rescuers; procurement of equipment for all levels of NICS users;

4. Conclusion

The integration of advanced technologies is increasingly becoming a key strategy in improving protection and rescue operations during natural disasters. This entails harnessing the power of innovative solutions to strengthen resilience and response mechanisms on various fronts, including natural disasters and other crises. In the field of disaster management, resilience is essential. It refers to the ability of systems, communities or societies to withstand, absorb and recover from hazards, preserving and restoring essential functions and structures. Resilience effectiveness is measured by the speed with which a system returns to its original state after a disturbance, taking into account many factors.

Natural resources such as land, water, forests and minerals play a key role in building resilience. Financial resources, including savings, pensions and income, provide important support for recovery. Human capital, which includes health, knowledge and skills, is the backbone of resilience, while social cohesion factors such as family ties, social networks, trust and the sharing of information and resources strengthen collective resilience. In addition, physical resources such as infrastructure, roads, shelters, transportation and health systems are necessary parts of a resilient framework.

Within the framework of protection and rescue efforts, modern technologies provide unprecedented opportunities for progress. From early warning systems using artificial intelligence and predictive analytics to real-time platforms using drones and satellite imagery, technological innovations enable proactive risk management and rapid response actions. In addition, communication technologies facilitate seamless coordination between response teams, which improves the efficiency and effectiveness of rescue operations. Additionally, advances in robotics and automation are making search and rescue missions easier, reducing the risk to people in dangerous environments. Also, the use of advanced sensors and Internet of Things (IoT) devices enhances situational awareness, enabling responders to make data-driven decisions in dynamic disaster scenarios.

In essence, the use of new technologies in protection and rescue efforts during natural disasters represents a paradigm towards more proactive, adaptive and resilient approaches to disaster management. By embracing technological innovation, stakeholders can improve preparedness, response and recovery capacities, ultimately minimizing the impact of disasters on communities and protecting lives and livelihoods.

The use of technology for the process of planning and responding to natural and other disasters is inevitable. What its scope will be depends on the technology itself that is available. By joining the EU Civil Protection Mechanism, Bosnia and Herzegovina gained access to some new technologies and systems that can now be used more easily to increase the country's resistance to natural and other disasters. In addition, during the great floods in BiH and the Balkan region, the need for the use of modern satellite systems for creating maps of flooded areas was visibly expressed. There are also technologies related to prevention, communication, early warning and elimination of consequences, which develop and progress in their development on a daily basis. Given that Bosnia and Herzegovina is a small and undeveloped country, the use of modern technologies in the preparation and planning of response to natural and other disasters uses quite modest modern technologies. It is not only a question of money, but also of education for working with new technologies. All this modern and new technology gives many advantages, but it also has some requirements that must be met for its use to be successful. First of all, it is the human factor and its ability and training to use this technology. Technology itself cannot be harmful if it is used correctly and if we know how to use it. On the other hand, no technology is good without its familiarity and knowledge of its use, and in that case, the effects of its use can be negative.

The agility of response to various natural or other disasters, in the context of the use of modern technologies, enables timely and realistic planning, and early warning, i.e. the use of technologies for that segment, then modern technologies that enable the monitoring and coordination of responses (NICS) and the transfer of information in real-time, as well as technologies that enable the rescue of people from the affected area. As can be seen, these are all phases of response to natural or other disasters.

A higher degree of use of modern technologies is directly proportional to the number of people trained and familiarised with these technologies. It is in human nature to be afraid of the unknown and thus of new technologies with which he or she is not familiar. There is also a generational gap where the older generations who are now in the managerial top or in top management are not so familiarised with new technologies, which creates additional resistance among the older generations. It means that to use new technologies, it is necessary to educate, to change the way of thinking about modern technologies, as well as to understand generational differences. In addition, the use of new technologies implies clear conditions for its application, so without clear SOPs (standard operating procedures), confusion and mistrust is created. Modern technologies are tools that can be used in all phases of managing natural or other disasters, but they are not and cannot be a substitute for humans. Man must not be a servant but a ruler of modern technologies. This implies that training must not stop only at the use of modern technologies, because in the case of major disasters, the capacity to use certain technologies may be questionable. Man must remain the main driver and know alternative ways of acting in all phases without relying only on technology. To trust technology to a certain extent, but not to be blind to subsequent technological innovations, because technology still has no soul.

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