

Problems Encountered by the Bureau of Fire Protection Personnel in the Province of Pangasinan

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Abstract

This study examined the problems encountered by Bureau of Fire Protection (BFP) personnel in Pangasinan in terms of human, financial, and material resources, including their seriousness and frequency and their relationship with selected personnel characteristics. Anchored in Systems Theory and guided by an Input-Process-Output approach, the study employed a descriptive-comparative research design involving BFP personnel from selected city and municipal fire stations in Pangasinan. Data were gathered through a validated three-part survey questionnaire administered electronically through Google Forms and analyzed using descriptive and inferential statistics. The findings showed that human, financial, and material resource problems were generally rated as somewhat serious. Traffic-related delays emerged as the most serious human resource concern, while inadequate budgets for vehicle repair, preventive maintenance, and updated equipment were the leading financial concerns. Among material resources, poorly maintained fire trucks, insufficient fire hydrants, old fire hoses, and inadequate protective equipment were identified as major operational concerns. No significant relationship was found between respondents' demographic and professional characteristics and their assessment of the seriousness of these problems, indicating that the concerns were organizational and commonly experienced across personnel. The study recommended stronger coordination with local government units and concerned agencies, additional qualified personnel and continuous training, increased financial support, and the maintenance, replacement, and modernization of essential firefighting resources. The study is relevant to SDG 3, SDG 9, SDG 11, SDG 16, and SDG 17 through its emphasis on public safety, infrastructure, resilient communities, institutional capacity, and interagency collaboration. Its sustainability impact lies in strengthening emergency preparedness, resource management, institutional effectiveness, community resilience, and the long-term capacity of public fire services to protect lives and property.

Keywords: Bureau of Fire Protection, Emergency Response, Financial Resources, Fire Protection, Human Resources, Material Resources, Pangasinan, Resource Management

1. Introduction

Fire departments perform essential functions in protecting lives, property, and communities, but their effectiveness may be affected by limitations in personnel, equipment, funding, mobility, and institutional support. These concerns are particularly important to the Bureau of Fire Protection (BFP), which is responsible for fire prevention and suppression and other emergency response functions. This study examines the problems encountered by BFP personnel in Pangasinan, particularly those involving human, financial, and material resources, to determine their seriousness and frequency and provide a basis for appropriate recommendations.

Firefighting involves dangerous and demanding operations intended to protect lives and property (Veszprémi, & Pántya, 2021). Fire incidents may result in death, injury, financial losses, and damage to structures and equipment (Adegboro & Ojoye, 2019). In the Philippines, these incidents also affect socioeconomic development (Asor et al., 2021), while limited resources and technological development may prolong firefighting operations and increase losses (Zadeh et al., 2021). The BFP, under the Department of the Interior and Local Government and Republic Act 6975, is responsible for preventing and suppressing destructive fires, enforcing the Philippine Fire Code, investigating fire incidents, and assisting during national emergencies (Metazorl, 2017). Its personnel must meet qualification requirements and undergo appropriate training. Newly recruited firefighters complete the Fire Basic Recruit Course covering fire suppression, rope training, incident command systems, and BFP management (Petinglay, 2018). Nevertheless, firefighters may encounter unfamiliar situations that require them to apply their training and previous experiences in making operational decisions (Cambridgeshire Fire and Rescue Service Headquarters, 2018). Resource limitations remain a major concern. International Fire and Security Exhibition and Conference (2018) reported shortages in fire stations, fire trucks, hoses, nozzles, and self-contained breathing apparatus. The Commission on Audit (2022) likewise reported insufficient fire stations and manpower compared with national requirements. These conditions emphasize the need for modernization and adequate resources. Pangasinan has 48 of the 125 fire stations in Region 1. As of October 2024, it had 779 BFP personnel and various emergency vehicles and equipment. The province recorded 299 fire incidents as of June 2024, compared with 381 in 2023 and 199 in 2022. Effective fire services depend on appropriate station location, staffing, equipment, vehicles, organization, and technology (Tishi & Islam, 2019), while adequate staffing based on population demand is necessary for effective fire suppression (Brzezińska et al., 2019). These conditions provide the basis for examining the problems encountered by BFP personnel in Pangasinan.

Studies consistently identify staffing, equipment, funding, physical readiness, communication, and response time as important elements of fire service effectiveness. National Fire Protection Association (2022) identified increasing call volumes, personnel and equipment shortages, budget constraints, and expectations to accomplish more with fewer resources as major challenges. Similarly, Starnes (2021) emphasized that understaffing affects training, equipment maintenance, firefighting, rescue operations, water supply, and timely response. Firefighter preparedness also involves physical and psychological capacity. Heydari et al. (2021) identified physical, psychological, organizational, and management factors as important to firefighter resilience. Future Firefighters (2020) noted risks associated with extreme heat, heavy protective clothing, public aggression, and traumatic experiences. Langford et al. (2020) further emphasized the physical demands of firefighting, while International Association of Firefighters (2019) stressed the importance of sufficient personnel for firefighter and public safety. Firefighters must therefore maintain adequate physical condition (Kowal, 2018), despite occupational stress, toxic exposure, fatigue, and unpredictable working conditions (Canadian Centre for Occupational Health and Safety, 2018). Protective equipment may also affect mobility, balance, fatigue, and movement (Alvar et al., 2017). Material resources are similarly important. Larson (2022) showed how shortages and outdated emergency vehicles can contribute to delayed response, while Team (2021) identified personnel, water supply, communication, and modernization challenges. Appropriate equipment and interagency coordination are essential during roadside emergencies (Hughes, 2020) and complex vehicular rescues (Duemmel, 2017). Firefighting equipment is also essential for protecting both communities and firefighters (Holt, 2017), while reliable radio communication depends on appropriate training, budget, and policy (Burroughs, 2017). Additional medical training and equipment can further improve firefighters' ability to provide emergency assistance before ambulance personnel arrive (International Firefighter, 2016). The importance of proper equipment to fire safety and responder protection was also emphasized by Holt (2017). Financial resources affect staffing, training, certification, equipment maintenance, and response capability. Porter and Lamers (2019) identified insufficient funding as a factor that may reduce operational performance. Effective emergency preparedness likewise requires adequate organizational resources, policies, multidisciplinary participation, and management commitment (Canadian Centre for Occupational Health and Safety, 2020). Response time is another major indicator of emergency service performance. National Fire Protection Association (2020) explained that station location, apparatus deployment, staffing, and response-force assembly influence emergency outcomes. Traffic congestion and population growth may delay emergency response (Golter, 2019), while The Times of India (2019) illustrated how traffic can prevent fire vehicles from reaching incidents promptly. Al-Jarrah (2015) identified station location, accessibility, population density, traffic, sociocultural factors, and administration as determinants of response time. Motorists must therefore safely give way to emergency vehicles (Queensland Government, 2017). Large-scale road incidents also require sufficient resources, effective communication, staging, and unified command (Spell, 2016), while clear and timely communication is necessary to prevent confusion during emergencies (Eastern Kentucky University, 2019).

Fire departments worldwide face common issues involving manpower, equipment, funding, safety, communication, and response time. In the Philippines, modernization initiatives are intended to improve the BFP's disaster and emergency response capability through equipment acquisition, additional fire stations, recruitment, and personnel training (Caliwan, 2021). Firefighter performance also depends on physical and mental readiness (Bureau of Fire Protection Region 3, 2020). In Batangas City, Cantos (2020) found effective response time and

medical assistance but identified limited personnel, inadequate first aid kits, and difficulties securing scenes involving multiple victims. Funding also affects staffing, training, equipment, and emergency response capability (Porter and Lamers, 2019), while local government support can contribute to fire stations, equipment, training, and timely response (See, 2019). Nationally, shortages in personnel and protective equipment have increased operational burdens during major emergencies (Tupas, 2019). Similar concerns regarding insufficient personnel and inaccessible fire hydrants were identified by Bauan et al. (2018). Commission on Audit (2018) also emphasized that personnel shortages affect fire suppression and other BFP services, while International Fire and Security Exhibition and Conference (2018) documented shortages in trucks, hoses, nozzles, and breathing apparatus. Local findings vary across provinces. Aquino et al. (2017)'s study found that BFP personnel in Ilocos Sur were highly capable because of trained personnel and adequate firefighting resources. In contrast, Metazorl (2017) identified human/personnel, material/facilities, and economic/financial problems in Capiz. Hernandez et al. (2016) similarly reported inadequate personnel and inaccessible fire hydrants in Batangas City. External conditions also affect operations, as traffic, road obstructions, and motorists who fail to give way can delay emergency response (Dioquino, 2015). These varying conditions highlight the need to specifically assess the situation of BFP personnel in Pangasinan.

The study is anchored in Systems Theory, which views organizations as systems composed of interrelated elements. Changes in one organizational component may influence other components, and organizations continuously interact with their environments (Kast & Rosenzweig, 1972; Scott, 1981). From this perspective, an organization must be understood as a whole rather than as isolated parts (Newman & Newman, 2020). Interdependent elements are better understood by examining their reciprocal relationships within the larger system (Tennant et al., 2022). Senge (1990) further explained systems thinking as understanding how actions shape existing and future realities. Applied to this study, Systems Theory suggests that human resources, financial resources, and material resources within BFP Pangasinan are interconnected. Problems in one resource area may affect other areas and influence overall operational capability. The study also follows an Input-Process-Output approach. Inputs include the personnel profile in terms of age, sex, and length of service and the problems involving human, financial, and material resources. The process consists of survey administration and statistical treatment, while the output involves identifying the problems encountered and developing recommendations to address them.

Existing literature demonstrates that staffing, equipment, funding, training, communication, physical preparedness, and external conditions affect firefighting operations. Philippine studies have documented these concerns in several locations, including Batangas City, Ilocos Sur, and Capiz. However, these findings do not establish the degree of seriousness and frequency of human, financial, and material resource problems experienced by BFP personnel across Pangasinan. The present study therefore determines the problems encountered by BFP Pangasinan personnel in terms of human resources, financial resources, and material resources. It examines their degree of seriousness and frequency and determines whether these are related to age, sex, and length of service. The study also seeks to formulate recommendations based on the identified problems. The research covers commissioned and non-commissioned officers assigned to the four city fire stations and 44 municipal fire stations in Pangasinan. A total of 252 respondents were selected from 728 fire station personnel using Slovin's formula and proportional sampling. Data were collected electronically through a researcher-administered Google Forms survey.

The study aligns primarily with SDG 3 - Good Health and Well-Being, SDG 9 - Industry, Innovation and Infrastructure, SDG 11 - Sustainable Cities and Communities, SDG 16 - Peace, Justice and Strong Institutions, and SDG 17 - Partnerships for the Goals. Improving human, financial, and material resources supports safer emergency operations, adequate infrastructure, and stronger institutional capacity. Because the BFP protects communities from fires and other emergencies, strengthening its operational capability also contributes to safer and more resilient communities. The study further supports collaboration among the BFP, DILG, local government units, emergency agencies, and communities. Such coordination is relevant to strengthening institutional capacity and improving emergency preparedness and response.

The study contributes to institutional, public health, community, socio-economic, and governance sustainability. Identifying problems in manpower, funding, and equipment may assist the BFP, DILG, and local government units in improving staffing, resource allocation, training, equipment, and modernization. Strengthening fire and emergency services also contributes to protecting lives, reducing property losses, improving community resilience, and sustaining the capacity of public institutions to respond to emergencies. By examining interconnected human, financial, and material resource concerns, the study provides a multidisciplinary perspective on sustainable public safety and emergency management.

2. Material and methods

2.1 Research Design

The study employed a descriptive-comparative research design to determine the problems encountered by BFP personnel and examine the relationship between the respondents' profiles and the seriousness and frequency of these problems. According to Bhandari (2020), a descriptive-comparative research design analyzes groups based on a particular variable without manipulating the conditions. This design was appropriate because the study examined problems related to human resources, financial resources, and material resources and compared responses according to selected personnel characteristics.

2.2 Locale of the Study

The study was conducted in selected Bureau of Fire Protection stations in the Province of Pangasinan. It covered personnel assigned to four city fire stations and 44 municipal fire stations across the province.

2.3 Respondents of the Study

The respondents were personnel of the Bureau of Fire Protection assigned to selected fire stations in Pangasinan. From a total population of 728 fire station personnel, 252 respondents participated in the study.

2.4 Sample and Sampling Procedure

The study used proportional sampling or proportional allocation to ensure that the composition of the sample represented the personnel distribution of the participating fire stations. The total personnel strength of each station was considered in determining its corresponding number of respondents. Through proportional allocation, the 252 respondents were distributed among the four city fire stations and 44 municipal fire stations according to their respective personnel populations.

2.5 Research Instrument

Data were gathered using a three-part survey questionnaire. The first part collected the respondents' socio-demographic profile in terms of age, sex, and length of service. The second part measured the degree of seriousness of the problems encountered by BFP Pangasinan personnel, while the third part determined the frequency of problems involving human resources, financial resources, and material resources. The questionnaire was validated by three competent validators: the Chief of the Administrative Branch of BFP Pangasinan, the Chief of the Operations Section of BFP Pangasinan, and the Provincial Fire Marshal of BFP Pangasinan. After validation, the instrument was pre-tested among personnel of the Provincial Headquarters of Pangasinan who were not included in the actual study.

2.6 Data Gathering Procedure

The researcher first secured approval from the Provincial Fire Marshal to conduct the study. After approval, the authorized request was presented to the respective City and Municipal Fire Marshals to obtain their support and permission to administer the questionnaire. The survey was distributed electronically through Google Forms. Respondents were informed about the confidentiality of the information they provided. Their identities were protected through the use of pseudonyms, and they were informed before answering the questionnaire that they could withdraw from the study for any justifiable reason.

2.7 Data Analysis Techniques

Descriptive and inferential statistics were used to analyze the collected data, with statistical computations performed using StatPlus. The encoded responses were organized into a frequency distribution matrix. Percentages were used to describe the respondents' profiles, while weighted means were employed to determine the degree of seriousness and frequency of problems involving human resources, financial resources, and material resources. A four-point rating scale was used to interpret the degree of seriousness and frequency of the identified problems, using the categories Very Serious/Always, Somewhat Serious/Often, Barely Serious/Seldom, and Not Serious/Never. Welch's two-sample t-test was used to determine the relationship between the respondents' profiles and both the degree of seriousness and frequency of the problems encountered. This statistical test was selected because the sample sizes and variances were unequal.

3. Results and Discussion

3.1 Profile of the Respondents

3.1.1 Age

Among the 76 respondents, the largest group was aged 33-38 years at 34.21%, followed by those aged 39-44 years at 21.05%, 27-32 years at 18.42%, and 21-26 years at 17.11%. Only 7.89% were aged 45-50 years and 1.32% were 51-56 years old. Thus, most respondents were within the prime working-age groups. This profile indicates that a large proportion of the personnel were within ages associated with physical capability, operational maturity, and field experience. This is consistent with the study of Langford et al. (2020) who mentioned that firefighting is a physically demanding and strenuous activity that requires a lot of muscular strength and physical fitness because of the strenuous work of emergency operations and the utilization of heavy protective equipment. In the

same vein, the Bureau of Fire Protection Region 3 (2020) underscored that physical and mental fitness should be sustained to ensure that firefighters can perform operational duties in a safe and effective manner.

3.1.2 Sex and Civil Status

The respondents were almost equally distributed by sex, with males comprising 52.63% and females 47.37%. In terms of civil status, 59.21% were married, 35.53% were single, 3.95% were widowed, and 1.32% were separated. The nearly balanced distribution by sex reflects the participation of both men and women in BFP operations based on professional qualifications and competence. The predominance of married personnel further indicates that many respondents perform their public safety responsibilities while maintaining family responsibilities.

3.1.3 Years in Service

Most respondents had relatively shorter periods of service. Those with 1-5 years comprised 35.53%, followed by 6-10 years at 30.26% and 11-15 years at 25.00%. Only 5.26% had served for 16-20 years, 2.63% for 21-25 years, and 1.32% for 26-30 years. The distribution shows that most respondents were in the early to middle stages of their careers. They had already gained operational exposure while remaining capable of performing physically demanding field assignments.

3.1.4 Educational Attainment and Training

More than half of the respondents were Bachelor's degree graduates at 55.26%. Those with Master's units and Master's degrees each comprised 18.42%, while 7.89% had doctoral units. Regarding training, 51.32% had attended 1-3 trainings, 39.47% had attended 4-6, and 9.21% had participated in 7-9 trainings. These findings indicate that the respondents possessed educational qualifications and professional training relevant to their responsibilities, although opportunities for more advanced and specialized training could still be expanded. Continuous capability development is particularly important in firefighting because personnel respond to varied and complex emergencies. This is consistent with the International Association of Firefighters (2019) assertion that firefighting is a labor-intensive profession that requires competent and well-trained personnel to ensure the safety of firefighters and effective response to emergencies.

3.2 Seriousness of Problems Encountered by BFP Personnel

3.2.1 Human Resource Problems

Human resource problems obtained an overall weighted mean of 2.81, interpreted as "Somewhat Serious." Traffic-related delay in fire response received the highest weighted mean of 3.29 and was rated "Very Serious." This was followed by deficiency in personnel at 3.12, deficiency in personnel training and management at 2.96, slow response due to physically unfit personnel at 2.88, and lack of trained or qualified fire investigators at 2.80. Poor planning, lack of refresher programs, inexperienced personnel, and communication difficulties were also "Somewhat Serious." Limited knowledge in treating fires using specific chemicals received the lowest weighted mean of 2.46 and was rated "Barely Serious." Traffic congestion emerged as the most critical human resource-related operational concern because it can directly delay firefighters from reaching emergency scenes. This result is in support to the findings of Dioquino (2015) who stressed that heavy traffic and the failure of the motorists to give way to emergency vehicles greatly delays the response time of the Bureau of Fire Protection and may put lives and properties at greater risk. Similarly, Golter (2019) stated that the increase in traffic congestion results to the delay in emergency responses and the difficulty to timely intervene. The ratings for manpower, training, physical readiness, and specialized competence further emphasize the importance of sufficient and capable personnel. These findings are in agreement with the report of the Commission on Audit (2018) that the absence of manpower negatively affects the Bureau's quick response to fire incidents and delivering of needed services. Similarly, Starnes (2021) stressed that understaffing hampers fire departments' ability to carry out essential operational functions. Metazorl (2017) also noted that lack of personnel and inadequate training are ongoing issues for the Bureau of Fire Protection. Concerns involving planning, refresher training, experience, and communication also support the study of Burroughs (2017) that emphasized the significance of continuous training, adequate policies, and communication systems to ensure the safety and operational effectiveness of emergency responders.

3.2.2 Financial Resource Problems

Financial resource problems obtained an overall weighted mean of 2.80, interpreted as "Somewhat Serious." Inadequate budgets for motor vehicle repair and preventive maintenance and for purchasing up-to-date equipment received the highest weighted means of 3.20. Improper fund allocation obtained 2.91, insufficient resources for fire prevention activities 2.79, inadequate local government financial support 2.70, insufficient gas allocation 2.67, and slow utilization of the 20% LGU share from Fire Code Fees Collection 2.66. Hazard pay incentives, office supplies, and delayed disbursement of the LGU share were also rated "Somewhat Serious." The results show that maintaining emergency vehicles and acquiring modern equipment were the most significant financial concerns. These resources are essential to operational readiness, and inadequate funding may affect response capacity and service delivery. This finding is consistent with the National Fire Protection Association (2022) that identified budget constraints and lack of equipment as persistent problems facing fire departments and could have a negative impact on emergency response results. Likewise, Porter and Lamers (2019) found that a lack of funding leads to

aging equipment and reduced operational capacity, which impacts the quality of service delivery of fire departments. Concerns involving fund allocation, fire prevention activities, fuel, local government support, and delayed financial releases further indicate the importance of adequate and timely funding. The results support the claim of Caliwan (2021) that government funding should be given for the continuation of the Bureau of Fire Protection modernization, especially in the upgrading of equipment, facilities, and personnel competencies to meet the changing emergency needs. These results are consistent with the study of Metazorl (2017) which states that the lack of financial allocation results to the lack of maintenance of facilities, development of personnel and operational resources of the Bureau of Fire Protection.

3.2.3 Material Resource Problems

Material resource problems recorded an overall weighted mean of 2.56, interpreted as "Somewhat Serious." Poorly maintained fire trucks obtained the highest weighted mean of 2.71, followed by the lack of fire hydrants near incident areas at 2.68 and old or busted fire hoses at 2.66. Old or dilapidated fire trucks and lack of fireproof uniforms both obtained 2.63. Meanwhile, lack of investigative equipment, gender-responsive facilities, updated firefighting equipment, communication equipment, and advanced firefighting technology were rated "Barely Serious," with weighted means ranging from 2.41 to 2.49. The results indicate that the condition and availability of frontline firefighting equipment were more serious concerns than specialized resources and facilities. This is in line with the International Fire and Security Exhibition and Conference (2018) that the Bureau of Fire Protection continues to have a shortage of serviceable fire trucks, fire hoses, nozzles and self-contained breathing apparatus which all affect the firefighting capability of the agency. Holt (2017) similarly stressed the importance of functional firefighting equipment for effective fire protection and the safety of firefighters during emergency responses. Although specialized equipment and technological concerns received lower ratings, they remain relevant to operational readiness. These findings are consistent with the study of Metazorl (2017) who found that the Bureau of Fire Protection has problems with old firefighting technology, poor facilities, and lack of resources to help repair the equipment and develop the personnel. The identified shortage of fire hydrants also supports the findings of Bauan et al. (2018) who identified the lack of accessible operational fire hydrants as one of the common problems encountered by the Bureau of Fire Protection personnel during fire suppression and rescue operations.

3.3 Relationship Between Respondent Profile and Seriousness of Problems

The results showed no significant relationship between the respondents' profile and their assessment of the seriousness of human, financial, and material resource problems. All significance values for age, sex, civil status, years in service, highest educational attainment, and number of trainings attended were greater than the 0.05 significance level. Pearson correlation coefficients ranged from -0.193 to 0.168, indicating very weak positive and negative relationships. Thus, differences in demographic and professional characteristics had little or no association with how respondents perceived the seriousness of the identified problems. The findings suggest that the operational concerns were generally shared across personnel rather than being dependent on individual characteristics. This supports the Systems Theory underlying the study, which views organizational components as interconnected and affecting the organization as a whole. This is consistent with the findings of Metazorl (2017) who stated that the Bureau of Fire Protection often encountered organizational problems on human resources, financial resources and material facilities which impede the overall operational performance. Institutional problems such as staffing shortages, budget constrictions, and inadequate equipment also affect the capacity of fire departments to provide efficient emergency response (National Fire Protection Association, 2022). The Commission on Audit (2018) also noted that the lack of manpower and operational resources negatively impacts the Bureau's service delivery in general, not to any particular group of personnel. Accordingly, the null hypothesis that there is no significant relationship between the respondents' profile and the degree of seriousness of the problems encountered was accepted.

4. Conclusion & Recommendations

The study concluded that BFP personnel in the 2nd District of Pangasinan are generally qualified, physically active, and adequately experienced to perform their duties; however, human, financial, and material resource concerns remain somewhat serious. Traffic congestion was the most significant human resource concern, while insufficient funding for vehicle maintenance and updated equipment affected operational capability. Material resource issues, particularly poorly maintained fire trucks, limited fire hydrants, old fire hoses, and protective equipment, also influenced emergency response. The seriousness of these problems was not significantly related to the respondents' demographic or professional characteristics, indicating that the concerns are primarily organizational and commonly experienced across personnel.

The Bureau of Fire Protection should strengthen coordination with local government units and concerned agencies to address traffic-related delays, improve human resource capacity through additional qualified personnel and continuous training, and increase financial support for vehicle maintenance, updated equipment, and essential operational resources. Priority should also be given to maintaining, replacing, and modernizing fire trucks, hoses, communication equipment, fire hydrants, and personal protective equipment. Since the identified concerns are

organizational in nature, institution-wide policies and resource development programs should address the needs of all personnel.

The study was limited to BFP personnel in the 2nd District of Pangasinan and focused on problems involving human resources, financial resources, and material resources in relation to selected demographic and professional characteristics. Future studies may cover larger geographical areas and examine additional organizational and operational variables to provide a broader understanding of factors affecting fire protection and emergency response services.

5. Compliance with ethical standards

The authors observed ethical considerations appropriate to the conduct of the study by securing the necessary permission from concerned Bureau of Fire Protection authorities, protecting the confidentiality and identities of the participants, and informing them of their right to withdraw from participation. The authors ensured that information obtained from the respondents was handled with appropriate confidentiality throughout the data-gathering process.

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