

Original Article

Investigating Work Environment-Related Stress among Tamil Nadu Police Personnel with Fuzzy Cognitive Mapping

S. Sarala¹, T. Johnson²

^{1,2}Department of Mathematics, Dr. M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India.

¹Corresponding author: sarala.math@drmgrdu.ac.in

Received: 04 July 2025

Revised: 09 October 2025

Accepted: 16 October 2025

Published: 31 October 2025

Abstract - This study is to investigate the work environment-related stress among police personnel in Tamil Nadu. The work environment encompasses the setting, social aspects, and physical conditions in which individuals perform their jobs. The objective of this study will be to analyze the challenges faced by police personnel during their daily work. Experts from the police department and union officials have identified several major factors that impact officers both physically and mentally, due to the nature of their work. These factors are categorized as follows: staff shortages, excessive documentation, long commutes, long working hours, limited peer coordination, handling difficult situations, insufficient personnel time, conflicts with other departments, dealing with adverse climatic conditions, and inadequate equipment and facilities. To address these issues, we used the Fuzzy Cognitive Mapping (FCM) methodology to analyze the impact of the above factors one and another, and try to find a meaningful solution.

Keywords - Police personnel, Work Environment, Staff Shortage, Physical and Mental Stress, Fuzzy Cognitive Mapping (FCM).

1. Introduction

The work environment consists of the setting, social dynamics, and physical conditions in which an individual carries out their job. It can greatly influence employee morale, workplace relationships, performance, job satisfaction, and overall health. A positive work environment adopts employee safety, growth, and the achievement of goals. Such environments encourage a successful workforce by motivating employees to perform at their highest potential. In every job, I experienced different difficulties in various ways. Similarly, the police may also face the following ways of work, often occurring on-site at crime scenes or controlling and maintaining the traffic. They may also do many papers or require some desk work. Their job is not to work in the same place for a long time. For this reason, they may have to travel a long way for their particular work within a larger law enforcement organization. In this police work, every police personnel member has to experience their work full-time, but often completes the work in shifts.

2. Literature Review

Dr. Pinki et al. (2020) have discussed and analysed the police constables' work conflict by collecting the data from 300 police constables (an equal number of males and females) in the age range of 25 to 40 years, utilizing a random sampling technique. This study's findings reveal that male police

constables have better stress management than female police constables. Dr. Zaki Akhtar et al. (2023) have examined the level of occupational stress and burnout among police personnel and have checked the relationship between occupational stress and burnout. A total of 120 (one hundred twenty) police personnel from Ranchi district were included as a sample. The result of the study revealed that both variables positively and significantly correlated with each other.

Rajamanikandan Savarimalai et al. (2023) have examined the South Indian police personnel's highest level of stress from two dimensions of coping, adaptive and maladaptive, fewer than three levels, individual, family, and social, with eight major factors that affect and build a high level of work stress due to their work time. As a result of this study, social responsibilities help to reduce the mental stress of the police personnel.

Pavithra J et al. (2023) proposed the stress levels and coping strategies of police constables in urban-related stations in Bengaluru to develop information-based strategies to reduce stress levels. The survey was conducted among 60 police constables. It was analysed using a descriptive survey, using Sister Callista Roy's Adaptation model. To study this problem, collecting data such as Gender, age, education



qualification, marital status, and the family of the police personnel, is challenging due to the stress within the workplace.

A study conducted by Kavya C et al. in 2016 investigates the occupational stress and health problems faced by the female police constables from the Hassan District in Karnataka. The 50 female police constables in Hassan district were interviewed using a qualitative approach. To find the health problems, such as diabetes, high blood pressure, heart problems, and many physical health issues among female police personnel due to their work pressure, by using simple random sampling. The objective of this study is to analyse the importance of occupational stress and to promote a good health and safety work environment.

Shanmuga Sundaram et al. (2012) discussed the stress management techniques among the Tamil Nadu police officers. Researchers analysed the primary data collected from 250 police personnel using the questionnaire method and applying stratified random sampling. In this study, the data were analysed, and the Garret ranking techniques were proposed. This study ranked the mean scores of the stress management techniques.

In this study, the aim is to analyse the challenges faced by the police personnel in their work environment. Here, it will investigate the police personnel's work stress with respect to the level of physical and mental stress. This research paper aims to examine the result of finding the optimum solution by using the Fuzzy Cognitive Mapping (FCM) methodology. The above method identifies factors affecting work-related stress, as it simplifies the understanding of human knowledge across various scenarios. It will provide a feasible solution depending on the affecting factors.

3. Materials and Methods

The main objective of the study is to examine the challenges faced by police personnel in their daily routine work. To identify the following major factors which affect the Police personnel, based on the experts' opinion, as (i) Physically, (ii) Mentally, and (iii) Both

3.1 Factors Involving Work Stress on the Police Personnel of Tamil Nadu

- Staff Shortage (W1) (Physically/Mentally)
- Excess Document work (W2) (Physically)
- Conflict with other department (W3) (Mentally)
- Dealing with climatic issues (W4) (Physically)
- Need Advanced equipment and Facilities (W5) (Physically/Mentally)
- Long travel to work(W6) (Physically/Mentally)
- Long working Hours (W7) (Physically/Mentally)
- Less peer co-ordination(W8) (Mentally)
- Handling difficult situation(W9) (Physically/Mentally)
- Insufficient personnel time (W10) (Mentally)

3.1.1. Staff Shortage (W1)

A shortage of police personnel has led to heavier workloads, particularly in metropolitan areas where officers frequently work extended shifts. With fewer staff available, officers must take on additional responsibilities, increasing stress and job dissatisfaction. The Lack of sufficient personnel can slow emergency response times and reduce the overall effectiveness of crime prevention efforts. Moreover, officers may be assigned duties beyond their expertise, leading to inefficient resource allocation. This situation also limits mentorship opportunities, which are crucial for the growth of junior personnel. Additionally, managing multiple responsibilities can take a toll on officers' physical and mental health.

3.1.2. Excess Document Work (W2)

In every profession, proper documentation is crucial for managing work details effectively, which assists in tracking both current and future tasks relevant to the field. In the field of law enforcement, maintaining paperwork is especially important. This includes keeping copies of First Information Reports (FIRs), daily reports, route schedules for higher authorities, crime reports, work charts for public order (bandobast), case records, and traffic signal reports, among others. Excessive documentation can divert police officers' focus away from important activities such as patrolling, investigating crimes, and interacting with the community. These responsibilities can often create a sense of overwhelming burden for individuals in the work environment.

3.1.3. Conflict with Other Departments (W3)

Tamil Nadu police personnel may face conflicts or challenges while interacting with other departments. The following are the departments in which the police personnel experience conflicts during their work times. The police personnel may lead the conflicts under the revenue department, like land disputes, property disputes, or revenue collection. One of the important departments that has a relationship with police personnel is the transport department, which plays a role in vehicle registration, licensing, and controlling traffic; at the same time, some disruption will happen between them. The health department always works together with the police personnel for many reasons. At that time, they may have a Conflict with the work. During the COVID-19 period, these two worked on the ground level together. Local municipalities and corporations were also different departments that related to the police department. Mainly, their department itself will face Conflict sometimes, like the Central Bureau of Investigation (CBI), National Investigation Agency (NIA), Intelligence Agencies, and Other State Police Forces. These conflicts can be mitigated through effective communication, coordination, and mutual understanding. Regular training programs, workshops, and joint exercises can also help build trust and foster cooperation among different departments and agencies.

3.1.4. Dealing with A Climate Crisis (W4)

Police responsibilities must be performed during all seasons, including winter, summer, and rainy seasons. Tamil Nadu police personnel face numerous difficulties due to the climate crisis, including: Due to traffic control, police officers face a disproportionate number of challenges, including exposure to excessive temperatures and UV radiation, which are particularly prevalent during the summer. Police personnel are exposed to heat-related illnesses, water-borne diseases, and other health risks due to climate change. Rising temperatures and heat waves affect their health and productivity while performing outdoor duties. Police personnel face challenges in responding to emergencies and maintaining law and order during floods and heavy rainfall events. During the rainy season, they confront several challenges, such as floods and catastrophes, which should be addressed by police officers to safeguard and protect the people via law and order. At that time, they may be influenced by climatic circumstances. Climate change exacerbates social and economic tensions, leading to increased Conflict and law-and-order issues. Climate-related disruptions affect police training programs and operations, hindering their ability to respond effectively to emergencies. They must deal with unforeseen scenarios like COVID-19. During COVID-19, the police played an important role in locating contacts on the ground to prevent the virus from spreading. The occupation was demanding and required 24-hour availability. The entire police force performed an excellent job on this front.

3.1.5. Need Advanced Equipment and Facilities (W5)

The police personnel's main duty is to control and prevent crime in their area. For this purpose, they have to get the fullest support from their higher officials. The police department has to guide and conduct more training on modern innovations and new technology for the present working conditions of the police. Due to the police personnel's continuous work, they feel a sense of satisfaction in their work, which leads them to deal with their postings. Improving outdated vehicles and providing advanced transportation will help them more while on patrol duty. Nowadays, technology has improved throughout the world; due to that, the work of the cybercrime department becomes very strenuous. If the police department has to make CCTV cameras and drones available, it builds to monitor and control the crimes. The police personnel need sufficient record-keeping systems and technology to avoid work delays and maintain accurate and up-to-date records. Generally, police personnel should have the basic tools required, such as protective jackets, in such situations and attack the mob to keep them safe. If we improve these facilities, it brings trust to the public about the police personnel's work.

3.1.6. Long Travel to Work (W6)

Police officers are spending more time travelling for their jobs. They commute for significant periods to their working station or areas from home. Most of them do not live near their

employment. Because their employment is 24 hours a day, seven days a week, this condition causes police officers to leave two or three days without their family time. It primarily occurs in districts outside of major cities such as Chennai.

The police strength is not to be equally distributed if more, and vice versa, it also occurs on the other side. If the police are assigned to temple functions, festival celebrations, and election days, they must go to several locations to provide safety duty. At the time, the worker was not only assigned from their station limits; they may be sent to any location requiring additional police strength. For this reason, they had to travel for longer periods. During court duty, police officers face the danger of accompanying the accused for extended periods from court to jail. In these ways, it may create problems for police officers and also affect or harm them physically while on the job.

3.1.7. Long Working Hours (W7)

Long working hours are defined as the weekly overtime hours that exceed regular working hours. This study aims to analyse the psychological and physical challenges faced by Tamil Nadu Police officers as a result of their extended workdays. The police department is one of the most significant agencies responsible for maintaining law in society. Long working hours refer to the additional hours worked each week beyond the standard working hours. Many work environments struggle with the issue of fatigue, but the risk is considerably higher for law enforcement professionals. During a 16-hour shift, police officers may encounter high-stress situations while responding to late-night emergencies. Some overtime is unavoidable, yet the demanding schedules place officers in difficult circumstances that can lead to significant challenges, including working overtime, functioning without necessities, multiple responsibilities, duty completion targets, and handling crises. Irregular meal times and inadequate nutrition result in health problems, such as digestive issues and weakened immune systems. Excessive working hours lead to conflicts with family and friends, affecting their personal relationships. Increasing personnel strength and providing adequate resources to reduce workload and stress. These factors may have a profound impact on the well-being of police personnel.

3.1.8. Less Peer Coordination (W8)

Work-related stress significantly affects the morale and mental well-being of police officers. However, many officers hesitate to seek professional psychological help because they perceive it as a sign of weakness, fear, or an inability to perform their job effectively. Peer support counselling can be highly effective, especially for populations with specific education or occupational training. Implementing peer support within law enforcement and other emergency services has led to an increase in professional mental health referrals, as well as a decrease in on-the-job suicides, sick days, and poor work performance.

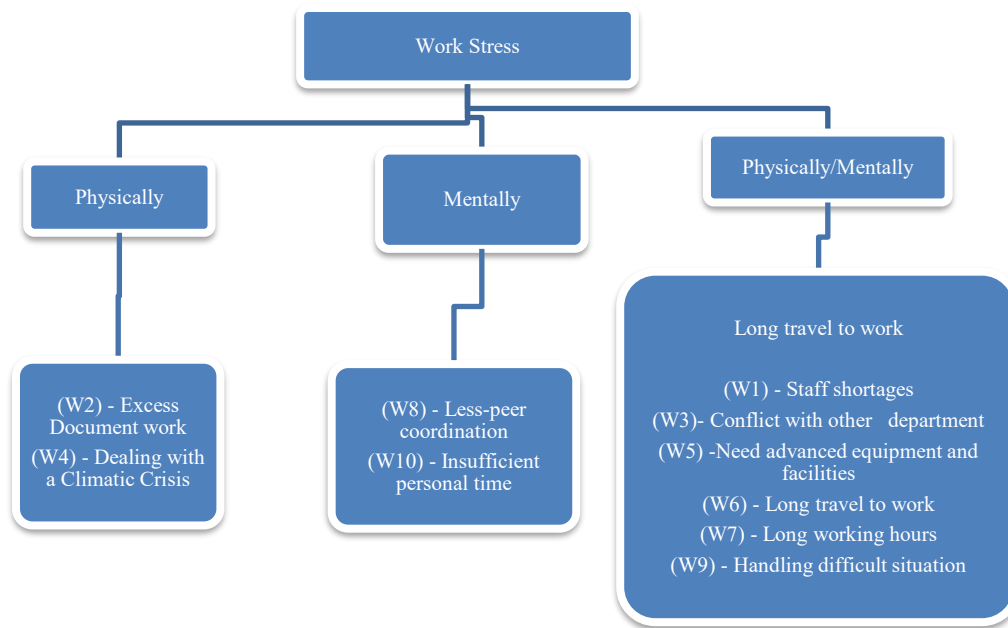


Fig. 1 Hierarchical structure for police personnel work stress factors

3.1.9. Handling Difficult Situations (W9)

Tamil Nadu police personnel face various challenging situations while performing their duties. We can discuss some of the situations, such as maintaining Law and Order, which is the important work of all other work. Tamil Nadu is the state with the largest population and a complex socio-political landscape. Here, the police personnel face sensitive situations, such as protests, demonstrations, and communal tensions. Crime Investigation is conducted by the police personnel to reduce the crime rate, such as violent crimes like murders, robberies, and kidnappings. Tamil Nadu Police personnel must investigate these crimes, every so often, under powerful public scrutiny. Traffic management is a very difficult situation to control with a large population and rapid urbanisation in many districts like Chennai, Coimbatore, Madurai, Trichy, and other main cities in Tamil Nadu. Police personnel must manage traffic, prevent accidents, and enforce traffic regulations. Tamil Nadu is liable to natural disasters like cyclones, floods, and droughts. Police personnel must respond to these situations, often risking their own lives. Terrorist activity and extremist groups threaten Tamil Nadu, while the war or problem on the India border impacts here, prompting the police personnel to take measures to be proactive and prevent such threats. Police personnel may face pressure from corrupt politicians, businessmen, or other influential individuals, which can compromise their ability to perform their duties independently. Police work is physically and mentally demanding, and police personnel may face health risks due to long working hours, stress, and exposure to violent or traumatic situations. Police personnel face scrutiny for public expectations; it is very difficult to bear the criticism and debate about them. Limited Resources in the police departments in Tamil Nadu may face challenges like resource

constraints, including inadequate infrastructure, outdated equipment, and insufficient personnel.

3.1.10. Insufficient Personnel Time (W10)

Tamil Nadu police may have issues with other departments. Here are some of the reasons for facing insufficient time in their work. Professional Demands such as Long Working Hours: Police personnel often work extended hours, including night shifts, weekends, and holidays.

They may be required to respond to emergencies at any time, leaving them with limited personal time for every emergency call. Police personnel spend a significant amount of time conducting investigations, patrols, and other law enforcement activities. Administrative Tasks also bring insufficient time, such as Police personnel must complete paperwork, reports, and other administrative tasks, which can be time-consuming. They may be required to attend court hearings, which can take up a significant amount of time. The police personnel need some Training and Development programs, such as Mandatory Training, Workshops and Seminars, Self-Care, and Data Management. These factors can contribute to police personnel having insufficient personal time, leading to burnout, stress, and decreased job satisfaction.

3.2. Methodology

Fuzzy-Logic Cognitive Mapping (FCM) is a method of concept mapping that allows for the development of qualitative static models, which can then be translated into semi-quantitative dynamic models. Originally developed by Bart Kosko in 1986, FCM aims to structure expert knowledge using a soft systems programming approach that is “fuzzy.” This approach is considered similar to how the human mind

makes decisions. Fuzzy Cognitive Maps (FCM) represents knowledge by outlining three key characteristics of a system:

- The components of the system
- The relationships between the components, which can be either positive or negative
- The degree of influence one component can exert is expressed using qualitative weightings such as high, medium, or low influence.

The analytical mechanics of Framework Concept Mapping (FCM) involve analysing the structure and function of concept maps. This is done through graph theory-based analyses of the pairwise relationships between concepts included in a model. These models are valuable for examining perceptions of environmental or social issues and for modelling complex systems characterized by high uncertainty and limited empirical data.

3.2.1. Mathematical Formulation

Mental Modeller provides an easy and intuitive way to create Fuzzy-Logic Cognitive Maps. Once you have built their own models, you can adjust the levels of the components within the model to explore various scenarios of change. Due to their flexibility, Fuzzy Cognitive Maps (FCMs) have been applied across a wide range of scientific disciplines, including political science, economics, and ecology.

3.2.2. Density in FCM

Density refers to the overall level of interconnectedness in an FCM model. It measures how densely the concepts in the cognitive map are connected to one another.

Mathematically, it is calculated as:

$$D = \frac{E}{N^2} \quad (1)$$

- D = Density of the FCM
- E = Total Number of weighted connections (edges)
- N = Number of concepts (nodes) in the map

A higher density indicates a more interconnected system, while a lower density suggests a loosely connected model.

3.2.3. Centrality in FCM

Centrality represents the importance of a concept within the FCM network. It measures how influential a node is in the overall system.

There are different types of centrality measures:

- In-degree Centrality: Sum of the weights of incoming connections, showing how much a concept is influenced by others. It is called a Driving factor.

- Out-degree Centrality: Sum of the weights of outgoing connections, indicating how much a concept influences other concepts. It is called an Ordinary factor.
- Total Centrality: Sum of in-degree and out-degree centrality, representing a concept's overall significance in the model. It is called a Receiver factor.

High-centrality nodes play a crucial role in shaping the system's behaviour.

3.2.4. Baseline Scenario in FCM

The Baseline Scenario in FCM refers to the initial or default state of the system before any changes or interventions are applied. It represents the system's natural behaviour under normal conditions, providing a reference point for comparison with alternative scenarios.

By running simulations starting from the baseline scenario, analysts can evaluate the impact of different interventions, policies, or decisions on the system's dynamics. This study seeks to apply open-source software, namely Mental Modeller, to the FCM methodology and analyse the different scenarios by giving appropriate values to the driving factors. Using the mapping interface, experts can easily construct a map that represents actual relationships between nodes through two different colours (blue for positive and red for negative) and thickness (strong, medium, weak) of edges.

The weighted relationships among concepts are represented in a matrix form, where each row and column corresponds to the identified concepts. This matrix helps in computational modelling and simulation.

This matrix is filled using qualitative scores of positive relationships (weak, medium, strong), and they adopt FCM values of 0.25, 0.5, and 0.75, respectively. The relationships between concepts are represented using directed edges (arrows), indicating how one factor influences another.

Each connection is assigned a weight (ranging from -1 to 1), which represents the strength and direction of the influence:

- Positive weight (+): An increase in one concept leads to an increase in another.
- Negative weight (-): An increase in one concept leads to a decrease in another.
- Zero weight (0): No influence exists between the concepts.

4. Result and Discussion

The components and edge relationships of fuzzy cognitive mapping of this problem are shown in Figure 2. The matrix relationship of this objective study of the problem is shown in Figure 3.

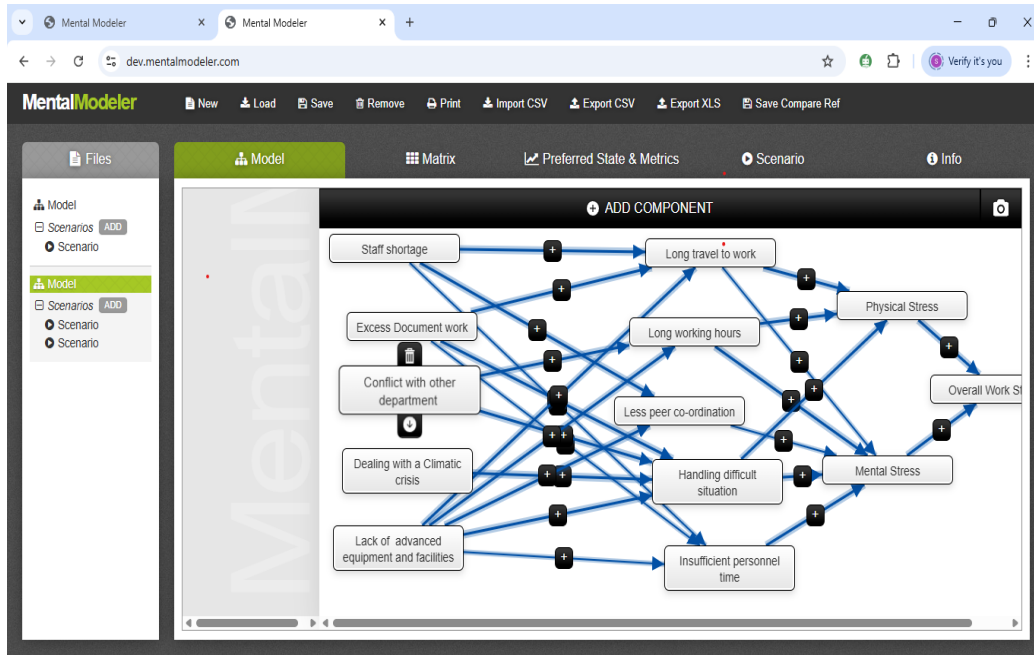


Fig. 2 Network relation between factors affecting the stress of police personnel in the place

	Staff shortage	paper work	with other department	climate crisis	and Facilities	travel to work	working hours	peer-coordination	difficult situation	personnel time	Physical stress	Mental stress	work stress
Staff shortage						0.6		0.5		0.4			
Excess paper work						0.5			0.5	0.25			
Conflict with other department							0.5		0.75				
Dealing with a climate crisis									0.7				
Need Advanced equipment and Facilities						0.6	0.6	0.5	0.5	0.3			
Long travel to work											0.5	0.5	
Long working hours											0.5	0.6	
peer-coordination												0.4	
Handling													

Fig. 3 Matrix representation of factors affecting the stress of police personnel in the place

From the above Figure 3, to understand that the following factors were play a driving factors such as Staff shortage, Excess document work, Conflict with other department, Dealing with a climatic crisis and Lack of advanced equipment and facilities for this by using the FCM methodology assigned the weightage points between (-1 and +1) by the experts knowledge for all type of situations. It is defined as the values of driving factors that implement the result of receiving factors. In this FCM method, changing the

values of the driving factors will provide different results for the receiving factors.

According to the expert's opinion, to increase or decrease the level of stress in each factor that may change the values, various scenarios are presented to choose the most affected situations for police personnel, both physically and mentally, in the workplace due to work stress. The following are some of the scenarios that vary in each factor and its result.

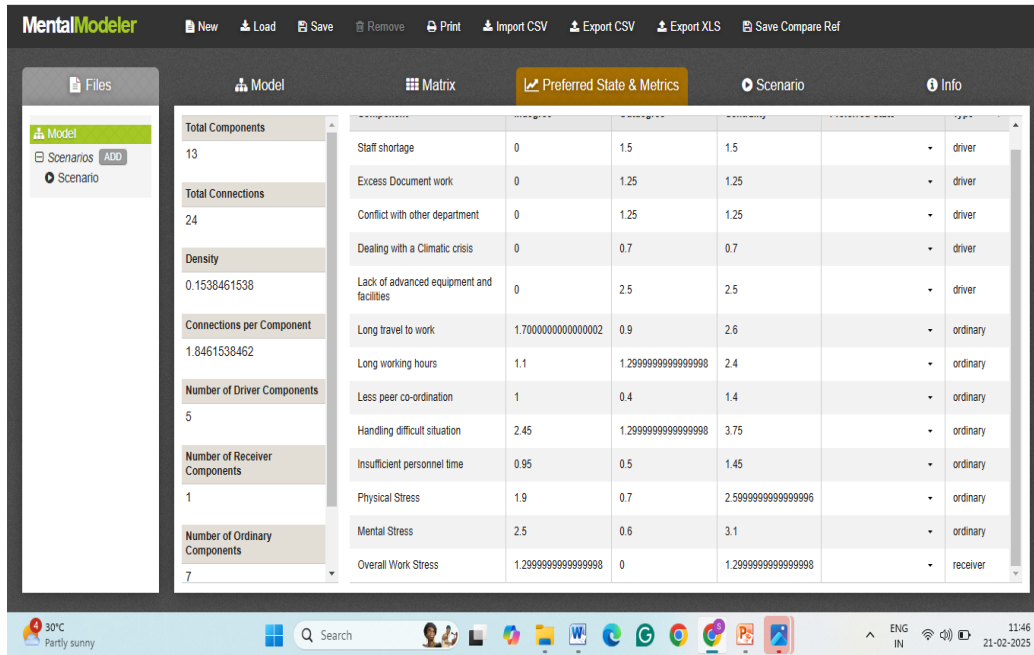


Fig. 4 Components that affect the stress of police personnel in the place

Table 1. Different scenarios

Scenario	Staff shortage	Excess paperwork	Conflict with another department	Dealing with a Climate crisis	Need advanced equipment and facilities	Long travel to work	Long working Hours	Peer Coordination	Handling a difficult situation	Insufficient personnel time	Physical stress	Mental stress	Overall Work Stress
1	-0.2	-0.2	-0.25	0.3	-0.4	-0.43	-0.35	-0.29	-0.27	-0.24	-0.57	-0.65	-0.62
2	-0.2	0.2	-0.25	0.3	-0.4	-0.25	-0.35	-0.29	-0.08	-0.15	-0.4	-0.56	-0.52
3	-0.2	0.2	-0.5	0.3	0.4	0.22	-0.01	0.1	0.13	0.09	0.19	0.24	0.27
4	0.2	0.2	0.3	0.3	0.1	0.27	0.21	0.15	0.53	0.16	0.57	0.6	0.64
5	0.25	0.2	-0.2	0.3	0.2	0.35	0.02	0.22	0.25	0.21	0.35	0.46	0.48
6	0.3	0.3	0.4	0.3	0.3	0.47	0.36	0.29	0.67	0.28	0.74	0.79	0.76
7	0.4	0.3	0.4	0.3	0.3	0.52	0.36	0.34	0.67	0.31	0.75	0.81	0.77
8	-0.4	0.4	0.4	0.5	0.3	0.14	0.36	-0.05	0.76	0.03	0.69	0.62	0.7
9	-0.4	0.4	0.4	0.5	-0.4	-0.27	-0.04	-0.38	0.57	-0.18	0.23	-0.03	0.14
10	-0.4	-0.2	0.25	0.3	-0.4	-0.52	-0.11	-0.38	0.1	-0.32	-0.27	-0.49	-0.44
11	-0.5	0.2	0.2	0.2	-0.2	-0.31	-0.22	-0.34	-0.01	-0.21	-0.35	-0.46	-0.43
12	-0.5	-0.2	0.2	0.2	-0.7	-0.68	-0.31	-0.54	-0.16	-0.43	-0.58	-0.75	-0.7
13	-0.6	0.2	0.3	0.3	-0.2	-0.45	0.13	-0.38	0.41	-0.24	-0.26	-0.45	-0.43
14.	-0.6	0.5	0.4	0.3	-0.4	-0.34	-0.04	-0.46	0.51	-0.23	0.16	-0.15	0.02
15.	-0.7	0.3	0.4	0.3	-0.2	-0.37	0.08	-0.42	0.51	-0.26	-0.22	-0.09	0.1

Now we will see some of the scenarios that are taken in the table to understand the changes happening in the factors and how they relate to all the factors and give the impact result.

4.1. Scenario 3

If the staff shortage is decreased with actual weightage to 0.2, Excess paper work is increased the weightage level as 0.2,

Conflict with other department is increased the weightage level as 0.5, Dealing with a climatic crisis is increased the weightage values as 0.3 and Advance equipment and facilities increased as the weightage values 0.4 and then the result of receiving factors Physical stress increased as 0.19, Mental stress increased as 0.24 and Overall work stress increased as 0.27 and is given in the Figure.

4.2. Scenario 5

If the staff shortage is increased as 0.25, Excess paper work is increased as 0.2, Conflict with other department is decreased as 0.2, Dealing with a climatic crisis is increased as

0.3 and Advance equipment and facilities increased as 0.2 and then the Physical stress increased as 0.35, Mental stress decreased as 0.46 and Overall work stress decreased as 0.48 and is given in the below Figure.

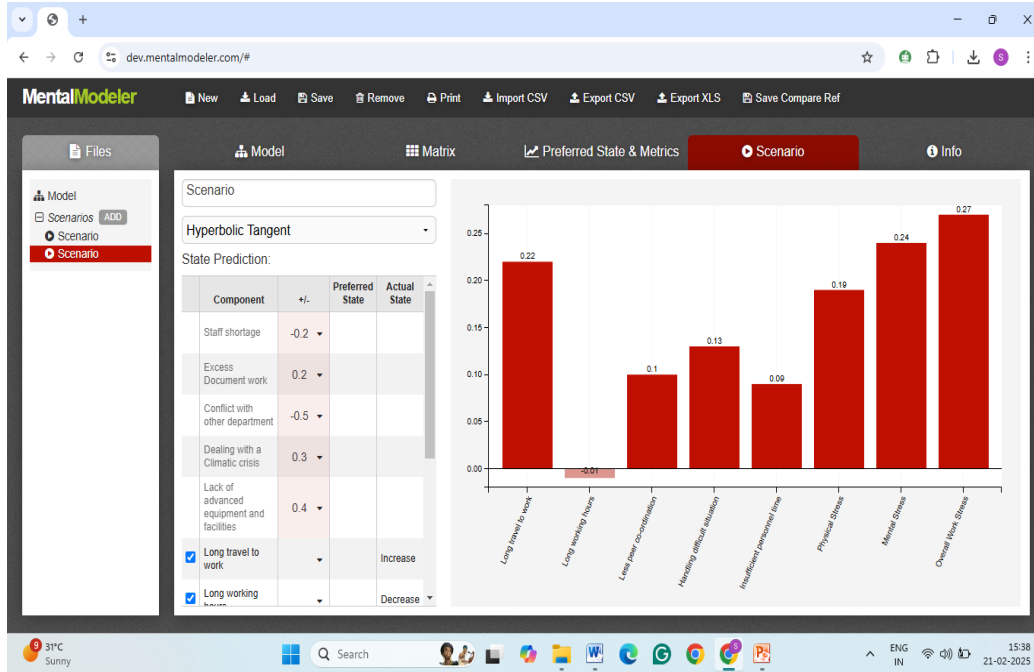


Fig. 5 Scenario interface

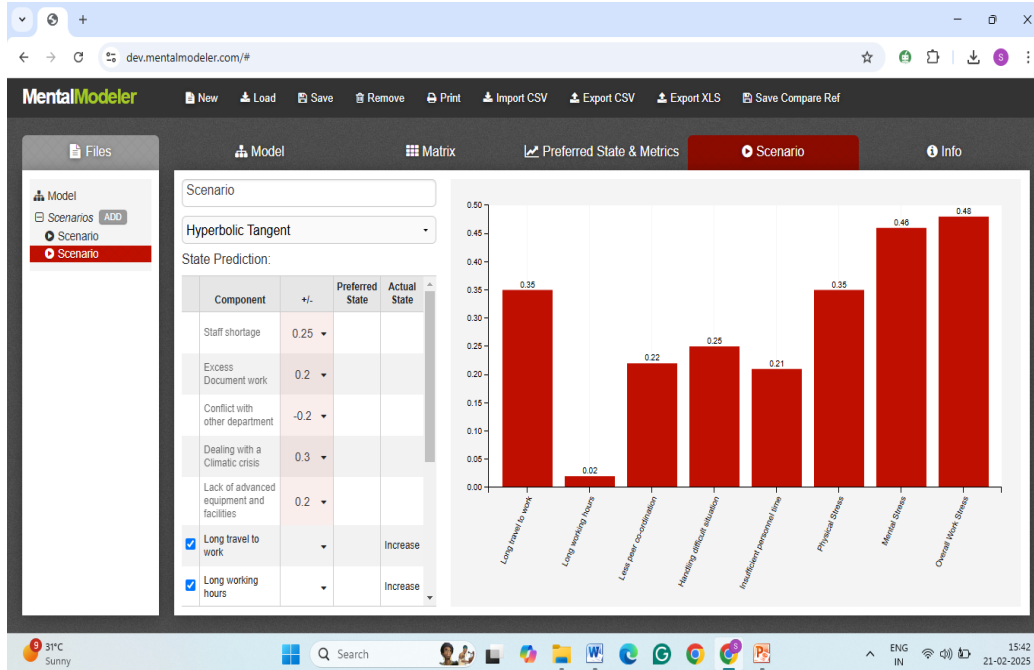


Fig. 6 Scenario interface

4.3. Scenario 10

If the staff shortage is decreased as 0.4, Excess paper work is decreased as 0.2, Conflict with other department is increased as 0.25, Dealing with a climatic crisis is increased

as 0.3 and Advance equipment and facilities decreased as 0.4 and then the Physical stress decreased as 0.27, Mental stress decreased as 0.49 and Overall work stress decreased as 0.44 and is given in the below Figure.

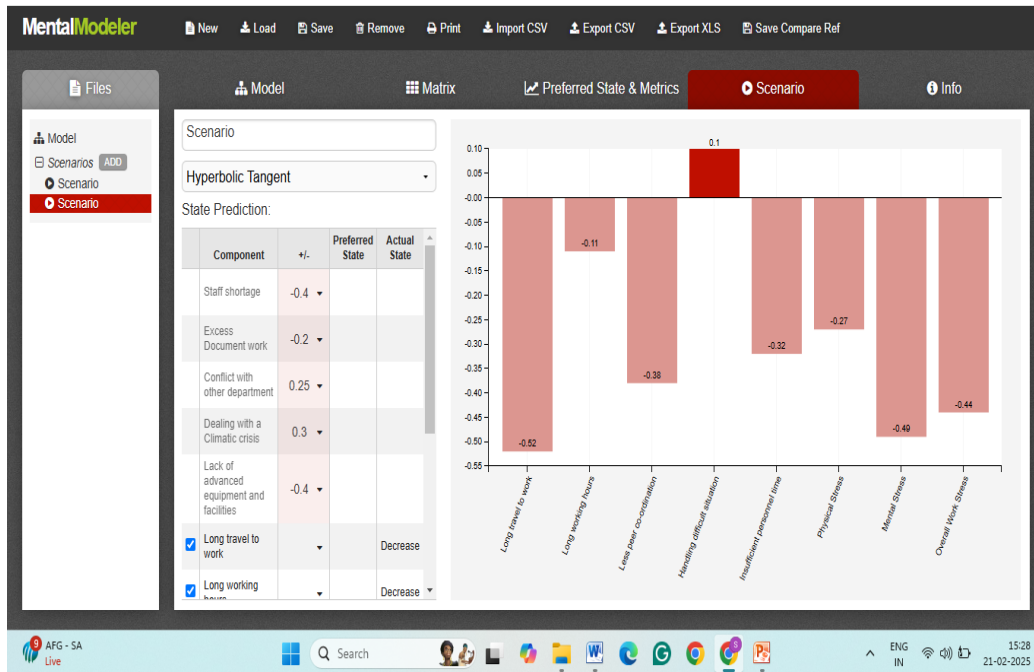


Fig. 7 Scenario interface

4.4. Scenario 14

If the staff shortage is decreased as 0.6, Excess paper work is increased as 0.5, Conflict with other department is increased as 0.4, Dealing with a climatic crisis is increased as

0.3 and Advance equipment and facilities decreased as 0.4 and then the Physical stress increased as 0.16, Mental stress decreased as 0.15 and Overall work stress decreased as 0.02 and is given in the below Figure.

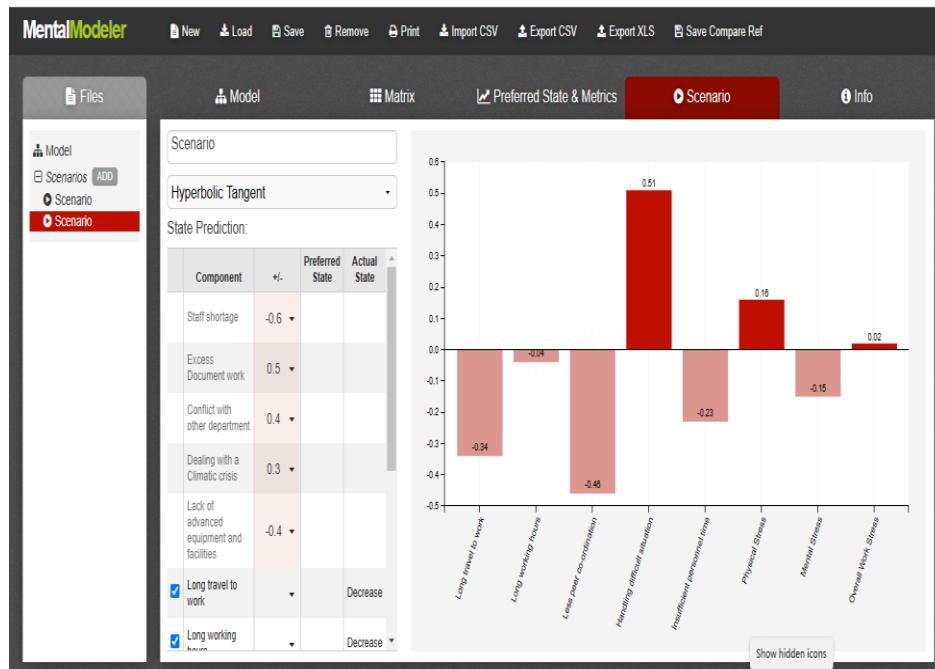


Fig. 8 Scenario interface

4.5. Scenario 15

If the staff shortage is decreased as 0.7, Excess paper work is increased as 0.3, Conflict with other department is increased as 0.4, Dealing with a climatic crisis is increased as

0.3 and Advance equipment and facilities decreased as 0.2 and then the Physical stress decreased as 0.22, Mental stress decreased as 0.09 and Overall work stress increased as 0.1 and is given in the below Figure.



Fig. 9 Scenario interface

Table 2. Comparison of scenario analysis of Police personnel work stress in the work environment

Factor		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Driving Factor	Staff shortage	-0.2	-0.2	0.25	0.4	-0.5	-0.6	-0.7
	Excess paperwork	0.2	0.2	0.2	0.3	-0.2	0.5	0.3
	Conflict with the other department	0.25	-0.5	-0.2	0.4	0.2	0.4	0.4
	Dealing with a Climate crisis	-0.3	0.3	0.3	0.3	0.2	0.3	0.3
	Need advanced equipment and facilities	-0.4	0.4	0.2	0.3	-0.7	-0.4	-0.2
Intermediate Factor	Physical stress	-0.4	0.19	0.35	0.75	-0.58	0.16	-0.22
	Mental stress	0.56	0.24	0.46	0.81	-0.75	-0.15	-0.09
Receiver Factor	Overall work stress	-0.52	0.27	0.48	0.77	-0.7	0.02	0.1

The following table shows the different output values. Several scenarios were considered as cases, giving different values in driving factors that resulted in the receiving factor. While changing the driving factor values, such as staff shortages, excessive paperwork, conflicts with other departments, dealing with a climatic crisis, and improving advanced equipment and facilities, we can get the corresponding result in the receiving factor, which gives the final output. It shows the result of the overall work stress of the Tamil Nadu police personnel in their workplace. From the analysed scenario, to find the factors that play a vital role and how they should be improved or considered important to the particular factor by the Tamil Nadu government.

5. Conclusion

Based on expert opinions, several factors affecting work-related stress have been identified and analyzed using a fuzzy cognitive map model. This model was constructed using existing information that includes both driving factors and receiving factors. In our approach, we made minor adjustments to the driving factors, which influence

intermediate factors that, in turn, lead to changes in the receiving factors. In our analysis, the driving factors identified were: staff shortages, excessive paperwork, conflicts with other departments, challenges posed by climatic crises, and the need for advanced equipment and facilities. These driving factors impact intermediate factors, ultimately affecting the overall work stress within the work environment. This study aims to reduce work-related stress experienced by police personnel in Tamil Nadu. Our analysis has pinpointed two critical factors contributing to this stress: a significant shortage of police staff and an urgent need for improved technology within the department. Addressing these issues is essential to alleviate the excessive stress caused by burdensome documentation, difficult climatic conditions, and inter-departmental conflicts. We strongly recommend that the Tamil Nadu government take decisive action to strengthen the police workforce and enhance technological resources. By doing so, personnel will be able to work more comfortably and flexibly in their roles. FCM is the best model for investigating various and complex factors very swiftly. This method is easy to understand and to develop a solution to this type of problem.

References

- [1] Zaki Akhtar, Animesh Naithany, "Burnout and Occupational Stress among Police Personnel," *The International Journal of Indian Psychology*, vol. 11, no. 4, 2023. [[Google Scholar](#)] [[Publisher Link](#)]
- [2] Rachma Yuniar Wijayanti, and Hanandita Belva Fauzi, "Factors Affecting the Work Stress of Police Officers: A Systematic Review," *Psycho Idea*, vol. 18, no. 2, pp. 112-123, 2020. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [3] Shyam L. Kaushal, and Stuti Jalan, "Occupational stress in Himachal Pradesh Police Constabulary," *Journal of Management & Public Policy*, vol. 11, no. 2, pp. 28-37, 2020. [[Google Scholar](#)] [[Publisher Link](#)]
- [4] Iván Sarmiento et al., "Fuzzy Cognitive Mapping in Participatory Research and Decision Making: A Practice Review," *Archives of Public Health*, vol. 82, no. 76, pp. 1-15, 2024. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [5] Pinki, Sandeep Panchal, and Shakti Pal, "Occupational Stress and Work-Family Conflict among Police Constables," *The International Journal of Indian Psychology*, vol. 8, no. 4, pp. 327-335, 2020. [[Google Scholar](#)] [[Publisher Link](#)]
- [6] Rajamanikandan Savarimalai et al., "Stress and Coping among Police Personnel in South India," *Industrial Psychiatry Journal*, vol. 32, no. 2, pp. 247-254, 2023. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [7] C.N. Kavya, and E. Chandrashekar, "A Sociological Study on Occupational Stress and Health Problems among Female Police Constables in Karnataka," *International Journal of Applied Research*, vol. 2, no. 5, pp. 487-491, 2016. [[Google Scholar](#)] [[Publisher Link](#)]
- [8] M. Shunmuga Sundaram, and M. Jeya Kumaran, "A Study on Frequency of Stress among Female Police Constables Reference to Tamilnadu Police Department, India," *International Research Journal of Social Sciences*, vol. 1, no. 3, pp. 15-20, 2012. [[Google Scholar](#)] [[Publisher Link](#)]
- [9] R.S. Suresh et al., "Sources of Job Stress in Police Working in a Developing Country," *International Journal of Business & Management*, vol. 8, no. 13, pp. 1-9, 2013. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [10] J. Pavithra, K.R. Gangadhar, and Devi Nanjappan, "A Study to Assess the Stress and Coping Strategies among Police Constables at Selected Urban Police Stations in Bengaluru with a View to Develop an Information Guide Sheet on Stress Reduction," *International Journal of Advanced Psychiatric Nursing*, vol. 5, no. 2, pp.1-9, 2023. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [11] E. Shanmugapriya, and R. Malini, "Stress Management Techniques of the Police Officers in Tamil Nadu," *Indian Journal of Research*, vol. 6, no. 8, pp. 550-551, 2017. [[Publisher Link](#)]
- [12] Arjun Loganathan, Perumal Kandasamy Govindarajan, and John William Felix, "Identifying the Dimensions of Occupational Stress by Factor Analysis Among Policemen in Tamilnadu," *International Journal of Community Medicine and Public Health*, vol. 6, no. 10, pp. 4505-4509, 2019. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [13] Nathan A. Bowling et al., "Meta-Analytic Examination of the Potential Correlates and Consequences of Workload," *Work Stress: An International Journal of Work, Health & Organisations*, vol. 29, no. 2, pp. 95-113, 2015. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [14] Ganesh Kumar Saya, and Naresh Annepu Gnana Venkata, "An Assessment of Perceived Stress Among Police Personnel in Puducherry," *International Journal of Advanced Medical and Health Research*, vol. 1, no. 2, pp. 61-65, 2014. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [15] A. Subburaj, Stressed in the Line of Duty: Police Officers in Tamil Nadu Say Occupation Takes Mental and Emotional Toll on Their Lives, *The Times of India*, 2023. [Online]. Available: <https://timesofindia.indiatimes.com/city/chennai/stressed-in-the-line-of-duty-police-officers-in-tamil-nadu-say-occupation-takes-mental-and-emotional-toll-on-their-lives/articleshow/101851609.cms>
- [16] Overload of Work of Police Officials in India, *Legal Wellbeing*, 2025. [Online]. Available: <https://legalwellbeing.in/overload-of-work-of-police-officials-in-india/>