



## Evaluation of passive defense strategy on sustainable urban development with emphasis on the prevention of natural hazards (flood) \_ Case Study: Noshahr

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**Abstract.** Today, along with the rapid increase in urban population centers of biological and excessive growth, the death toll from natural disasters and artificial rising. The recent disaster in decades, as crises such as floods, storms, droughts, wars and social crises have appeared, Safety of cities in every part of the world is endangered. Given the interconnectedness and interdependence of urban elements together, including all the factors in a city's urban vulnerability. In other words, disasters affect all parts of the city. Urban systems are affected by the vulnerability of disasters, including floods. Reduce the vulnerability of urban cities at different levels, is one of the main priorities and measures of passive defense. Therefore, this article is trying to take advantage of the views of experts to review the role of Urban Development in passive defense planning with a focus on natural hazards, floods in the city of Noshahr City. The research method is descriptive analysis and population experts are administrative units of Noshahr in 1393. In this study, a questionnaire has been prepared in which 16 specialized research question has been raised in four areas.

**Keywords:** Passive defense, the city of Noshahr, floods, natural hazards, sustainable urban development

### 1. INTRODUCTION

The city as a living organism, constantly evolving and is where ideal features of human experience and has a crucial role in ensuring the health of its residents. Urban chaos, chaos in the city, uncontrolled expansion, and environmental imbalances and etc are all signs of instability city that could endanger the long-term health of the city and gradually destroys the city provides. Three factors of space, human and performance in the form of principles considerations of passive defense is desired. In this context, can be traced goals. First, determine the poles and axes and application centers on the development and provide urban development and second, network design services, infrastructure and communications center can be named. Third, the accumulation of the general population and settlement system and the fourth goal of the city is to design urban systems proportional to the economic and social landscape. The fifth, set target goals in organized sector and the final objective of homogeneous economic and social classifications in each city to organize and follow (paknezhad, 1392:14).

Centuries of human campaign to confront and overcome the destructive forces of nature is passed. The constant confrontation and struggle with it caused more uncontrolled forces of nature creates a disaster every day. The damage from this disaster is not measurable, is true about the poor, rich and developed countries. Although the effects of disasters in the country, the number of accident-prone structure located in the area is increasing. Despite the above-mentioned needs and experiences, unfortunately passive defense research in the field of urban studies has not developed enough. Controlling these threats requires remedies, preventive measures for protection of civilians as human capital and to improve the morale and mental ability. Because of the strategic location of the Noshahr of natural hazards and critical infrastructure, the study is an effort to answer some of the key requirements as much as possible and by providing the standard municipal criteria (eskandari, 1389:23).

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Although the role of people in a lot of unexpected natural disasters is not known, but many natural disasters are directly or indirectly affected by the actions of everyday people around the world is doing. Among the countries in the world, Iran is among 10 countries in terms of disaster accident-prone. More than 30 of the 40 identified unexpected natural disaster, occurs in Iran. Iran, while only one percent of the world's population, accounted for 6 percent of the world's natural disaster losses. Effects of each of the events in different countries, the easiest way to get an answer (bahadori, 1387:21).

## **2. PROBLEM STATEMENT**

Safety and security is one of the most basic principles in order to achieve optimal standards of urban comfort. According to active and passive defense against the threats of natural and human factors is something that has always been considered the beginning of the formation of cities. Passive defense of human life goes on. Early humans to protect against the attack their enemies and also to reduce their concerns had refuge to the caves, the trees and other natural shelter. The development of early civilizations, passive defense as armor and shields to protect the individual and the fort was formed to secure group. At times, the moat around the city and create a strong gates to prevent surprise attacks by the enemy in all parts of the world, was common.

Passive defense are set of measures that can be prevented financial damage to equipment and critical and sensitive military and civilian facilities and human casualties. Or the amount of losses may be reduced to a minimum (Movahedinia, 1388:31). Passive defense measures is fundamental issue that its extent and breadth include all the critical and sensitive infrastructure and facilities such as infrastructure and facilities in urban and rural settlements, airports, bridges, infrastructure such as the key products Refineries, plants Complex of industrial of critical command centers and so on To the extent that national security and economic invincibility significantly associated with planning and organizing in critical issue of passive defense (Yasi, 1383:52).

Looking at the chaotic situation in our country, threatened by natural factors such as past of the country is evident. The preventive measures in order to protect national assets is critical. So preparedness of passive defense is important in the current period. Floods have harmful effects and countless casualties and hard inflicted damage on settlement communities and the lives of citizens in jeopardy. But the reality is that the degree of vulnerability is not the same in all points. Residential buildings in the path of the flood and in particular as a gathering place and accommodation will have varying reactions, due to different parts of the population of day and night. On the other hand, because some parts of the meeting and the gathering of citizens, such as shopping centers and offices, these conditions can be critical.

This study is an attempt to negotiate about the influence the consideration of passive defense on the city at risk time. In this study, the independent variable is passive defense and the dependent variable is urban sustainable development. The question that arises in this study is "How is the situation of Noshahr city in the state of passive defense?"

With regard to the above question, the following hypotheses have been considered:

- Noshahr city in the state of passive defense in the field of natural hazards (with an emphasis on flood) lives in a desired condition.
- There is a significant relationship between passive defense and sustainable urban development in the city of Noshahr.

### 3. MATERIALS AND METHODS

#### 3-1- Research methodology

The research is descriptive analysis that is performed in 1393. In this study, for collecting information is used from the library and the field observations and also the data in organizations such as the municipality, governorship, the Geological Survey, Meteorological Organization, Cartography organization, the Statistical Center of Iran, the crisis management and etc. In the library research is used of books and articles, publications, and Field research was conducted by the researcher to some perceptions and images. In the field research is used of observation techniques, preparation of questionnaires and interviews with the population (including officials, experts and those involved in civil affairs). Based on a questionnaire has been developed and has been given to the experts of executive organizations of Noshahr that The level of knowledge and training in the field of passive defense is assessed as well as the state of Noshahr in this case.

In this study, data from field studies is compiled in the spss software, then, by using descriptive statistics (frequency, mean, etc) and inferential statistics (correlation coefficient of chi square test, etc) the data has been analyzed. Research questions is following the psychology and the researcher is seeking the opinion of the people in relation to the status of passive defense in the field of natural hazards in the city of Noshahr and therefore five choice questions is used from very low to very high range. For this purpose, the chi-square test is used to compare means.

#### 3-2- Research limited area

Limited area in this study is the city of Noshahr that is located in the west of Mazandaran province and 51 degrees 30 minutes east longitude and 36 degrees 39 minutes north latitude. The region is limited from north to the Caspian Sea, from east to the city of Royan, from south to the Alborz Mountains and from West to the city of chalus. Noshahr is located six meters above the Caspian Sea and twenty-four meters below the level of International waters. The climate of Noshahr is temperate and humid and Due to its proximity to the Caspian Sea and the especially state of plains, has high annual rainfall. The average of annual precipitation during the period in Noshahr is 1280.5 mm. autumn is the rainiest season in Noshahr and 585.6 mm of whole annual rainfall that falls down is in this season and Spring has the least amount of rain in a year that is about 144.6 mm (Meteorological Organization of Iran, Noshahr weather station).

#### 3-3- Research population

The population of the study is sixty experts of executive organizations of Noshahr. 20% of respondents are female and 80% of them are male. 18% of them are Diploma, 15% are technician, 62% are Graduate, and 5% of respondents have higher level education. 85% of respondents residing in Noshahr and 15% of them live outside the city of Noshahr. 70% of respondents have been selected flood as the most important natural hazard in area and the choice of 25% of them was earthquake and 5% of them have chosen hurricanes. 67% of respondents damaged from the floods and 33% of respondents have not seen damage from the floods.

### 4. RESULTS AND DISCUSSION

The questionnaire was prepared To determine the role of Urban Development in passive defense with a focus on natural hazards, floods in the city of Noshahr Which, apart from questions of descriptive information of respondents, 16 specialized question was raised in four areas. In Table 1, the statistical parameters of questions are presented.

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**Table 1.** Statistical parameters questionnaire, Source: The field information.

No.	Questions	Average	minimum	maximum	Standard deviation
1	How much do you know the city of Noshahr Hazardous by natural risk?	2/9	1	5	0/71
2	How much is the threats of floods for tourism in Noshahr?	3/06	1	5	1/03
3	How much do you know about the passive defense issues?	2/6	1	5	1/07
4	How much do you know the passive defense Considerations effective to prevention natural hazards?	3/45	1	5	1/09
5	How much does the Organization which you are working in, offer you instructions of passive defense?	1/85	1	3	0/84
6	How much do you know the passive defense Considerations effective for prevention of Flooding in the city of Noshahr?	3/56	2	5	0/92
7	How much do you know the passive defense Considerations effective to Reduce the flood damage?	3/68	2	5	0/87
8	How much has been the passive defense Considerations observed in the city of noshahr to Reduce the risk of flooding?	2/31	1	4	0/99
9	How much have been the issues of passive defend predicted in future urban development of Noshahr to prevent flooding and reduce losses?	2/08	1	4	0/86
10	How much does the Organization which you are working in, use from passive defense strategies in future development plans to prevent damage caused by the flood?	2/05	4	4	0/83
11	How much do you know coordinated the organization related to urban infrastructure in compliance with the strategy of passive defense in noshahr?	2	1	4	0/73
12	How much do the passive defense strategies need the financial resources to prevent flooding and reduce damages?	2/8	1	5	1/10
13	How much do the passive defense strategies need the cooperation of citizens to prevent flooding and reduce damages?	3/5	1	5	1/17
14	How much should changes in the status quo of urban Planning in Noshahr be applied to the implementation of passive defense strategies?	2/8	1	5	1/11
15	How much do you know the passive defense Considerations effective for sustainable urban development?	2/68	1	4	1/3
16	How much do you know the city of Noshahr at The risk of natural hazards?	2/98	1	5	0/74

As can be seen, most of the questions have an average of less than three and indicates that most respondents chose the option of low or very low. In a classification of items of research can be classified into four sections that are to be described in the following.

**4-2- Classification of research parameters according to the questionnaire**

**4-2-1- Evaluation of questions related to the incidence of natural hazards, especially flooding in the city of Noshahr (questions 1, 2 and 16)**

According to respondent’s opinions, natural hazards, especially flooding are in moderate to high in the city of Noshahr. In fact, we can say that people believe that the risk of flooding is medium to high in this city.

**4-2-2- Evaluation of questions related to amount of knowledge and performance of passive defense in the city of Noshahr (questions 3, 4 and 7)**

Respondents have chosen the choice of intermediate to high questions related to this item. So the role of passive defense in preventing natural hazards is noteworthy.

**4-2-3- Evaluation of questions related to the use of passive defense in urban management organizations (questions 5, 8, 9, 10 and 11)**

Evaluation of respondent s opinions in this item indicates that they did not believe to role of passive defense in Urban Planning and management. In fact, they have chosen "low" and "very low" and "moderate” between the five options and this shows the weakness of urban management in use of passive defense.

**4-2-4- Evaluation of questions about the effectiveness of the use and application of passive defense in the prevention of hazards (questions 6, 12, 13, 14 and 15)**

Most of respondents have elected “many” and “moderate” in the next stage. They agree with the nature of passive defense and severely confirm its role in the prevention of disasters, particularly floods.

**4-3- Statistical analysis of data to prove the hypothesis**

**4-3-1- Evaluation of the first hypothesis**

**4-3-1-1- Amount of occurrence of natural disasters, especially floods in the city of Noshahr**

**Table 2.** The statistical data related to incidence of natural hazards, especially flooding in the city of Noshahr, Source: The the field information

Descriptive Statistics			
maximum	minimum	Standard deviation	Average
5	1	0/74	2/98

**Table 3.** The results of the Abundance with the chi-square test for the occurrence of natural hazards, especially flooding in Noshahr, Source: The field information

	Remaining	Abundance
low	-10	2
Very low	-3	9
partly	27	39
many	-4	8
Much many	-10	2

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**Table 4.** Evaluate the results according to the chi-square test, Source: The field information

Sig.	d f	Chi-Square
0/00	4	79/500

Results of Table shows that the majority of respondents believe that the incidence of natural hazards, especially flooding in Noshahr is in moderate. The reason for this is the mean value with the number 2.98 and “Partly” option is also the most common (Table 2). And significant test should be used to determine the significance. Because significantly level of the test is less than 0.05, the difference in the answers of the respondents is confirmed. (Table 3)

**4-3-1-2- Performance of passive defense in the city of Noshahr**

**Table 5.** Statistical data related to knowledge of people and performance of passive defense in the city of Noshahr, Source: The field information.

Descriptive Statistics			
maximum	minimum	Standard deviation	Average
5	1	1/12	3/41

**Table 6.** The results of the Abundance with the chi-square test for knowledge of people and performance of passive defense in the city of Noshahr, Source: The field information

	Remaining	Abundance
low	-7	5
Very low	-5	7
partly	2	14
many	14	26
Much many	-4	8

**Table 7.** Evaluate the results according to the chi-square test, Source: The field information

Sig.	d f	Chi-Square
0/00	4	24/16

Mean 3.41 and the percentage of respondents rating reflects positive performance of passive defense is in the city of Noshahr and also shows effective role of the use of passive defense is in the city of Noshahr. (Tables 6, 7) Since the significance level of test (sig = 0/00) is less than 0.05, indicates meaningfulness of differences opinions of respondents in relation to the performance of passive defense is in the city of Noshahr.

**4-3-1-3- The usage of passive defense in urban management organizations**

**Table 8.** Statistical data related to the usage of passive defense in urban management organizations, Source: The field information.

Descriptive Statistics			
maximum	minimum	Standard deviation	Average
5	1	0/83	2/05

**Table 9.** The results of the Abundance with the chi-square test for the usage of passive defense in urban management organizations, Source: The field information

	Remaining	Abundance
low	2	17
Very low	10	25
partly	1	16
many	-13	2
Much many	-	0

**Table 10.** Evaluate the results according to the chi-square test, Source: The field information

Sig.	d f	Chi-Square
0/00	3	18/26

According to the chi-square test people strongly believe the lake of the use of passive defense in urban management organizations in Noshahr and because of low and very low options have the highest frequency. (Table 8) The average score of respondents 2.05 also strongly confirms this. Tests also confirmed the significant level of 0.00, showing relationship and significant differences between respondents opinions in this case. (Table 9)

**4-3-1-4- The effectiveness of the usage and application of passive defense in the prevention of hazards**

**Table 11.** Statistical data related to the usage of passive defense in the prevention of hazards, Source: The field information.

Descriptive Statistics			
maximum	minimum	Standard deviation	Average
5	1	1/18	3/01

**Table 12.** The results of the Abundance with the chi-square test for the usage of passive defense in the prevention of hazards, Source: The field information

	Remaining	Abundance
low	-4	8
Very low	1	13
partly	1	13
many	10	22
Much many	-8	4

**Table 13.** Evaluate the results according to the chi-square test, Source: The field information

Sig.	d f	Chi-Square
0/004	4	15/16

In this case, the most of respondents have chosen the "high" option and then a range of "average" is located. So people believe in the the effectiveness of deployment and application of passive defense in preventing natural hazards. Significant level of test is 0.004 and indicates that the test is quite significant and the use and application of passive defense has very important role in the prevention of natural hazards.

By examining the first hypothesis, it can be concluded that the respondents confirmed the efficiency of use of passive defense in the comprehensive development of the city while they are not satisfied from the current situation in this city. What can be concluded from the results of the chi-square test is the first hypothesis that the city of Noshahr in terms of passive defense in the

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field of natural hazards (with an emphasis on flood) is in an appropriate condition "to be confirmed".

#### 4-3-2- Evaluation of the second hypothesis

##### 4-3-2-1- Pearson correlation between passive defense and sustainable urban development

**Table 14.** Examining the Pearson correlation between passive defense and sustainable urban development, Source: The field information.

Significant (sig)	Pearson coefficient	Passive defense
0/62	0/00	Sustainable Development

The results of Table (14) show that there is a significant relationship between the passive defense and sustainable urban development at 95%. And results of Pearson correlation test show that significant amount is less than 0.05. At the other hand, Pearson coefficient is equal to 0.62, which represents a positive unilateral and direct relationship between these variables. Therefore, the second hypothesis of our study is approved based on the performed analysis. In other words, there is a significant relationship between passive defense and sustainable urban development in the city of Noshahr.

## 5. CONCLUSION

According to the results based on the results of surveys carried out, 45 of respondents have chosen flood and storm as the most serious threat in Noshahr. The majority of respondents have considered passive defense's hints as the most important factor in crisis management. Unfortunately, according to the vast majority of respondents passive defense's points has been observed slightly to reduce the damage caused by floods in the city of Noshahr that are needed Further efforts in this field. Experts also believe that they discussed slightly about the passive defense issues in future urban planning of Noshahr and also cooperation and coordination with other Executive organizations, is not a priority in the city. Perhaps the lack of required funds and financial resources to develop needed research in the field of passive defense is the reason for this laxity and lack of respect to passive defense issues in Noshahr that will require financial resources and also the cooperation of discerning citizens of Noshahr.

## 6. RECOMMENDATIONS

The definition of passive defense is presented in Article of 121 of the Fourth Development Plan of country as follows:

“Unarmed measures that reduce the vulnerability of human resources, buildings, facilities and equipment against the hostile and destructive operations of enemies or reduction the risks of abnormal accidents, is called passive defense”. Considering the geographical and topographical conditions of Noshahr and also its hydrology, some of the principles of passive defense as the main criteria in reaching to solutions in urban landscape design and architecture are expressed as follows:

- The necessity of strengthening of the fortifications and Immunization of vital structures. (Considering that the city of Noshahr is prone to flooding in all areas.)
- Determine the optimal scale of the population establishment and different urban activities.
- Scattering in function's distribution in proportion to the threats and the geography of the city.
- Production and the creation of dual-use structures (barriers) for security

- Concealment of buildings and resources with use of natural complications in the city
- Exposure to horrible waves of flooding by using sandbags.
- Strategies in relation to the distribution of important areas.

It is advisable that it must first be identified and classified the accident-prone areas of Noshahr and be classified to three dangerous, very dangerous and fear points. Then, be examined to flood barriers or distortion of the flooding according to the level of threat, direction of intimidation and the results of the threat. The third step is creation a council of trained young people to consult with the authorities in risk times and rescue accident victims in the region and finally the development of regional research and development funds allocated to control the crisis in the region, which its results will be effective in the prevention of accidents caused by the floods in the region in the long term.

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