

## Optimal positioning - care centers with passive defense approach to the case study method, AHP GIS environment: Birjand

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### Abstract

The main concern is always the safety and security of people. So man always tries to find ways to mitigate the effects of the factors threatening their safety and security. The relationship between human security, space and urban activities are major components of the comfort and security that leads to stabilization and sustainable development. Therefore, such passive defense issues that have been considered in recent years in urban planning. If the location of new urban designs and applying technical knowledge, regulatory environment may occur when unexpected events that prevent further destruction of urban communities. In the construction of our country, engineers are attention passive defense them. - Care centers in the country and certainly in crisis need to obey the law - care centers will be doubled. This study aimed to locate optimal health - passive defense is therapeutic approaches for this purpose geographic information system (GIS) analysis and hierarchical AHP weighting method used. The process of data collection , preparation of data layers , classification and valuation information layer to layer and overlap weighting and prioritizing lands for the creation of Birjand - care centers in disaster and crisis situations dealt with . Information needed for this research through field observations, master plans and detailed study of Birjand is obtained. The terrain of the city into five categories fit perfectly adequate, average Poor, who have absolutely inappropriate classification results are presented in the form of a map. After the match the ground truth map, areas suitable handle, perfectly suited for creation of health centers - Care in crisis conditions were suitable.

**Keywords:** passive defense, Healthy - Care centers, crisis, Geographic Information System (GIS), hierarchical analysis process (AHP).

### Introduction

Now lives in cities, according to the spatial structure - the complex physical , social occasions and activities - economic , extend and deepen social division of labor - increasing demands for economic and cultural , leisure and social citizens, more than in any period of service which is dependent on the fact the facilities and equipment of the urban Lifeline city is considered the basis of all plant life and its deficiency and insufficiency creates many problems for residents (Saeedikhah, 2004:2). However, in any era and the period during which we considered as health officials and policy makers and managers of community and society in general have not been. Suitable site for the construction of health centers - health is very important. With a view to expanding urbanization and development of the city can receive the benefit of the citizens feel safe and secure in the urban structure of the social, economic, political and environmental considerations are becoming increasingly important. A safety and security threat at the earliest principles

to achieve optimum standards of comfort and urban areas, primarily due to passive defense against external threats is something that the inception of cities has been considered. Passive defense, including issues that have been considered in recent years in urban planning. If the location of new urban designs and applying technical knowledge, regulatory environment, there is probably more damage in times of war and crisis urban avoided. It may be desirable to locate the most important passive defense measures to reduce the vulnerability of critical facilities and should be considered sensitive. Since security is one of the basic elements of sustainable human development, increase citizen satisfaction and social capital in urban structure is possible (Bmanin & Mahmodinjad, 2008, 1).

Birjand in South Khorasan province with 400 kilometers of common border with Afghanistan, one of the East border provinces of the country. In recent years, being unstable Afghanistan on the one hand and the presence of U.S. troops in the country, on the other hand, causing concerns about a possible attack from the East country. Regarding the paragraph in Note 20, Section 86 of the Budget Law, the priority projects of passive defense is given to the eastern border. It is essential to passive defense measures, projects and programs needed to be done in this city.

The present research seeks to locate the best health care centers in the city of Birjand passive defense approach. Select a suitable location and secure with respect to all the criteria and parameters needed include adaptive parameters ( fire stations , main streets , police stations , green room ) and incompatible parameters ( facilities include : pumps , gas , and electricity , gas pressure reduction stations , avoid faults and to avoid Uncomtable land uses ) using geographic Information System (GIS) and hierarchical analysis model (AHP) is an efficient tool in location .

### **Hypothesis of Research**

- It appears that the necessary conditions for the establishment of areas - care centers are passive defense approach in Birjand lack of distribution.
- appears to the south and southwest of the city of Birjand in creating a high potential - health centers (hospitals) is.
- appears to be a suitable tool to locate geographic information systems - care centers are in cities.

### **Literature**

On the topic of study in Birjand city full investigation and comprehensive academic, but some research has been done in conjunction with passive defense is as follows:

Viterbi et al (2009) in their study entitled "Evaluation of November 2005 the urban crisis in France", causes and consequences of the crisis have been evaluated in the big cities. Their results show the vulnerability of different land urban crises occur , due to the location and intensity of land uses and densities in areas of turmoil or crisis is different and the streets of city .

Azizi (2011) in his dissertation entitled " Optimal process of urban planning in aerial attacks from the perspective of passive defense, a case study of District 11 of Tehran " , has come to the conclusion that the appropriate planning process to reduce the vulnerability of the urban contexts can be four main stages of formulating goals, identifying the status quo, vulnerability analysis, strategy development can be divided. Mahbobi, (2008) in his thesis entitled "The location and design of hospital in Tehran with the approach of passive defense " , the factors affecting the location of the observed hospital specialties such as stratification of the population - far from hospitals, clinics, rapid access to a car , atmosphere green , not to be very busy and very quiet location , airport and train station are considered , the results showed that due to the expansion of a hospital and defensive architectural standards providing a model in this regard

to the complete body of knowledge will lead the ultimate goal of the practice , sustainable development of the country. The hospital must comply with the principles of passive defense designed so that it operates in a vacuum is not created username hospital.

Nabati (2004) book on the basic principles of passive defense, after evaluating the history of passive defense, civil defense strategies, and apply it in other countries Iran has hinted in planning and metropolises. His results show that passive defense principles in urban planning before the crisis can be effective in reducing the damage caused by a disaster.

### **Materials and Methods**

The research method in this study was descriptive - analytical study in terms of the nature of the land uses types - the development is. Data were obtained from the different methods, the integration and combination of data classified according to the survey, and then the descriptive and analytical approach to software Arc GIS data processing and data analysis have been.

### **Theoretical**

#### **Passive defense**

The lexical word passive of the two components pass and fence has been established. Culture and Persian literature pass or pad is a prefix meaning (antithetical -root -rear) and also the concept of offensive words (war, conflict, struggle and antagonism) is (Dehkhoda, 1972: 48-47). Defenses meant to protect people, ensure personal security, the preservation of national sovereignty at all times and in all lands and against any and all conditions are violated. (Ahmar Loei, 13:2010).

Defense is divided into two branches: the defenses that can be used to retaliate against any attack. Americans need the defense is defined as: "to defend against enemies employing weapons, military equipment and techniques to combat Disables enemy war machine and destroy it." Passive defense is one of the fields of crisis management and more emphasis on the management of the crisis is not armed in any action that reduces the vulnerability of personnel, buildings, facilities, equipment, documentation and arteries of the crises of natural factors (droughts, floods, earthquakes, landslides, landslides and storms) and human factors (war, civil uprisings and sanctions) are called passive defense (Movahadinia, 25:2007). Section a passive defense against the general policies of "passive defense is the set of non- military actions that increases deterrence, reducing vulnerability, sustain essential activities, promote national stability and crisis management facilities against the threat of military action, is the enemy."

#### **Passive defense and civil defense**

Civil defense during World War II and the efforts to deal with the strike, and warning civilians took refuge provision arose (Alexander, 2002, 12). Latin sources, the term civil defense concept has two dimensions:

- The first group of civil defense, protection of civilians in conflict situations is presented. And hence is part of the National Defense Foundation facilitated the acquisition of adequate preparation against any possible attack or blackmail of a country.
- In the second group, civil defense disaster emphasizes the protection of citizens against the effects (Zargar & Mesgari, 34:2008).

Strengthening civil defense facilities, provided loopholes risk, improve service, and so is the defense of necessity. Respectively, the probability of being at risk population and wealth of resources is an important objective of land use in the city. Defensive strategies initially oriented solutions such as body building or

facility planning, the construction of a realistic body and provides relief shelters. In this context it is important for facilities and equipment that often constitute the main artery of each city. The transportation system, goods procurement and distribution networks, water and wastewater facilities, power plants, gas and health networks, which are practically the same predictions. (Ayatollahi, 45:2009).

### **The concept of crisis**

Sometimes the process of natural or human interference may disrupt the function of the elements and the natural conditions are out of balance and create the conditions that we both natural and human disaster - know. As a result of these events, condition, complications and leads to the disruption of normal life in the region. (Mahmoodzadah, 5:2005).

To prevent the outbreak or natural disaster mitigation and management of damaged areas, all communities have crisis management (Garkiz & Associates, 689:2004).

Theoretical concepts and practical aspects of crisis management measures when planning for disaster before and after the accident. The so -called disaster management and the consequences explored. It consists of three major steps of crisis management. These are the three stages of crisis preparedness, relief and response in the event of crisis and post-crisis recovery.

### **The study area**

#### **Birjand**

Birjand in South Khorasan province , which is at a distance of 480 km south of Mashhad and 480 km north of Zahedan . The geographical position of 59 degrees 13 minutes latitude and 32 degrees 53 minutes latitude, and located at an altitude of 1470 meters above sea level. Birjand, Iran is the city of Birjand, Water Supply and Water Board is recognized as the first organization of water supply. The city is also the second largest city in Iran before Tehran in 1302, was received from municipal water pipes. Shokatiye School, the cities third new -style schools, the academy and Rushdie Tabriz. Due to the political and strategic situation in Birjand, the third largest airport in the country in 1312 after the bird and Bushehr castle, this city was built before the Second World War, both the British and Russian consulates in Birjand were doing. In 1385 , over 157,848 people, has a population of 0.4 There are two hospitals in Birjand University of Medical Sciences Hospital , a military hospital and a hospital affiliated with the Social Security ( South Khorasan , 2011 : 14 and 46 ) .

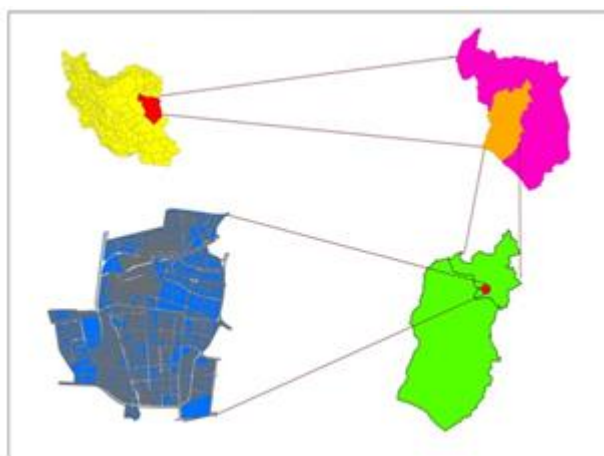


Figure 1: Location of the city of Birjand, the authors, 2013.

### **Status quo - care centers in the city of Birjand**

Public health and health promotion to meet the physical, medical, social, community activities and operations are set systematic. In 1390 , the city of Birjand four medical institutions ( including hospitals, hospitals ) and 16 health centers - medical (including clinic , polyclinic or health center ) has been active . Like most cities in Birjand, Iran is faced with an imbalance in the distribution of different functions. - Care centers do not possess all the necessary distribution of Birjand. The two main hospitals of Birjand Imam Reza Taleghani Avenue and Vali Ghaffari Avenue which are older hospital and public use and the public are admitted to the hospital. Although the downtown area Masvmieah and the lack of coordination between hospitals, long way we had to cross that represents the spatial distribution of Birjand. Therefore, it is necessary to locate medical centers. Figure 2 Distribution of - care centers shows.



Figure 2: Distribution of medical centers, Source: research results, 2013.

### **Preparation layers**

The preparation process of locating the required layers, the first step is to research practical steps that effective measures in place to determine the issue, the information layer, each of the criteria derived from the base map and be ready for next steps GIS databases are. This step involves digitization, the layers are geo referenced. Rate Interval mapping of urban land use data layers and convert vector maps in raster format this step is done. This research maps the existing standards are used for extraction of Birjand User (Map 3).



Figure 3: Map of land use in Birjand, Source: research results, 2013.

### Internal valuation data layer

At this stage all the layers of re- classification and valuation of each of the classes. Classification and valuation classes to combine all the layers of re- operation was necessary during the operation, all the layers are measured by a common scale. This paper maps from each of the five classes, and given the importance of each class classification value between 1 (the worst) to 9 (best value) they were given. For compatibility layers ( fire stations , major networks , green spaces ) Within the more points are awarded points belong to the contrary, whatever the distance is greater for incompatible layers ( apart from the military , moving away from the fault, far from Uncomtable land uses, avoiding municipal utilities including gas pumps , gas pressure reduction stations , gas and electricity ), the opposite case is true , the more points and a decrease with increasing distance between points on has been considered.

### Facilities

Facilities, including power plants, gas and petrol pumps are distributed. Critical facilities are among the facilities. Electric utilities in cities including electric power plant, electrical power distribution network of centers of pressure reduction. Among the targets that have been hit in the early hours of the war. Gas installations and gas, including gas pressure reduction stations, gas pumps and distribution of petrol pumps is that the establishment of a high vulnerability due to the risk of explosion and its aftermath, it has. The damage they can cause serious damage to urban systems. Therefore a threatening factor for - care centers are to be placed in these areas is far away from the damage caused by such facilities. The damage they can cause serious damage to urban systems. Therefore a threatening factor for - care centers are to be placed in these areas is far away from the damage caused by such facilities. Privacy cover classification based on the covering limited area has floor to 5. As in Figure 4 is shown. As is indicated by the distance from the center is greater than the more points are awarded. Conversely, whatever the distance is less than the distance increased and more points are awarded points by reducing the distance between points is taken into account.

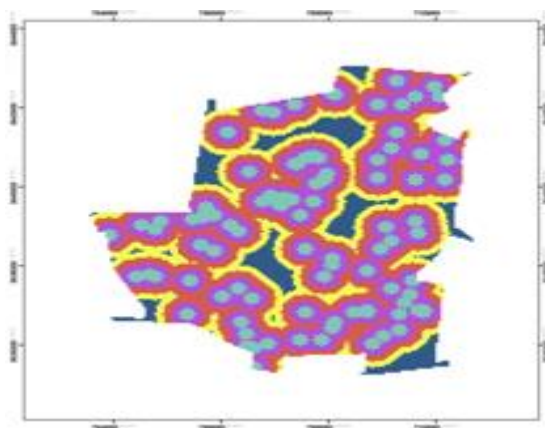


Figure 4: Map distance from the value of a public facility, source: research results,2013

### Fault

As previously mentioned, a passive defense of the natural factors (drought, flood and earthquake) is emphasized. Earthquake effects can be serious damage to the city. So - care centers should be located away from these areas. Covers 5 floors Privacy fault classification is shown in Figure (5) is shown. As is indicated by the distance from the center is greater than the more points are awarded. Conversely, what is



far less than is awarded. Decrease with increasing distance away from the more points and the points are taken into consideration.

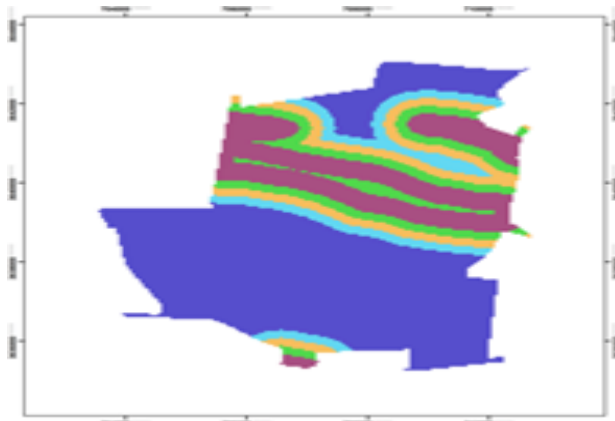


Figure 5: Valuation distance from the fault, source: research results, 2013.

### Fire stations

Risk of accidents due to fire following the explosion of urban facilities and equipments are very high. Therefore, neighborhood and proximity to fire stations can be effective in reducing the damages in the event of war. Privacy is important in Birjand 5 fire station fire station is a 5 -class classification in the form of (6) is shown. As is shown, the more points awarded will be less than the distance from the fire department and, conversely, what is the distance the more points awarded.

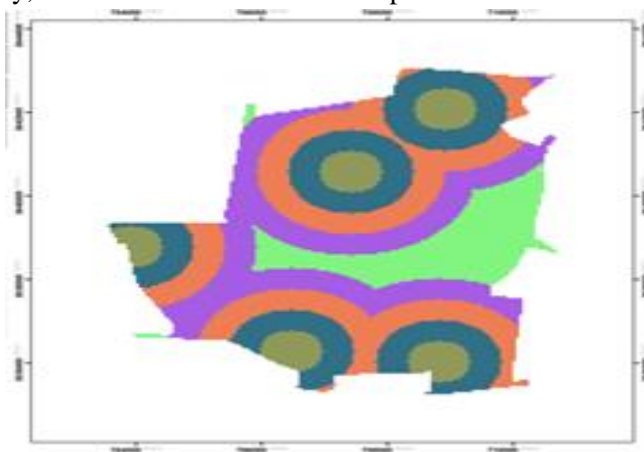


Figure 6: Valuation Map distance from fire station, source: research results, 2013.

### Main Network

The most important criteria for access location - care centers are required and are subject to the post-crisis. Early access to treatment centers is among the basic needs of families. Because the timely delivery of patients to these centers is vital. In this case, high risk patients reduced casualties. Otherwise, the patient may be damaged. Accordingly close proximity to the access class is the best choice (Azizi, 133:1383). Under normal conditions, the availability of the increased level of appropriateness and quality of life. In critical condition after accident maintaining access and traffic flow on urban streets and continuity of human life is saved. So - care centers should be located in close proximity to major

thoroughfares. Figure (7) zone classification is a 5-storey main thoroughfare. As is shown in the lower passages far more points are awarded more points belong to the contrary, whatever the distance.

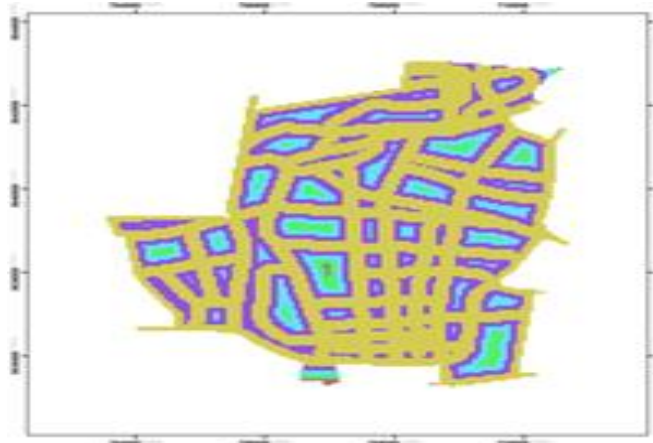


Figure 7: Map distance from the value network, source: research results, 2013.

### Disciplinary centers

Place - care centers in the vicinity of police stations causes directly related to these two are together. And as the two arms of the executive management and maintaining security during the crisis and then failed to act in the form of (8) is shown. As is shown in police stations is greater than the more points are awarded to the contrary, the more points awarded will be less

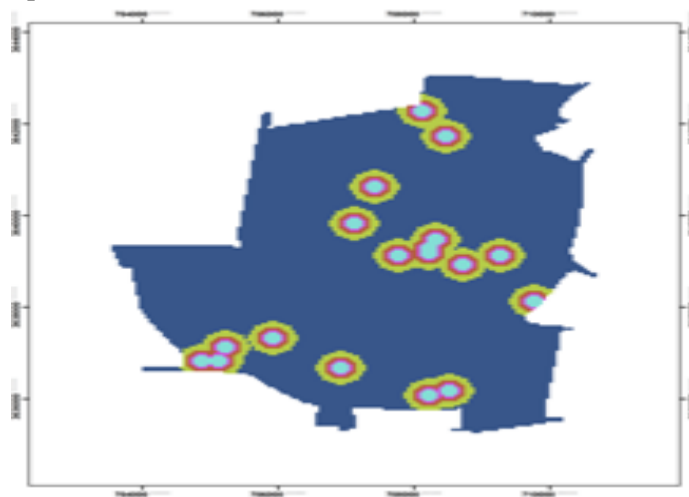


Figure 8: Map of valuation between police stations, Source: research results, 2013.

### Green spaces

Because medical centers must be away from the danger resulting from the collapse of buildings , and also has ample space for landing helicopters and other equipment necessary for extensive is the best place to locate these centers open spaces in urban centers ( such as urban parks ) is. If the area is high in these areas to a safe place, so can also be used for emergency evacuation. Figure (9) limits the ROE they cover classification has five floors. As is shown, the more points awarded will be less green space and more points belong to the contrary, whatever the distance.



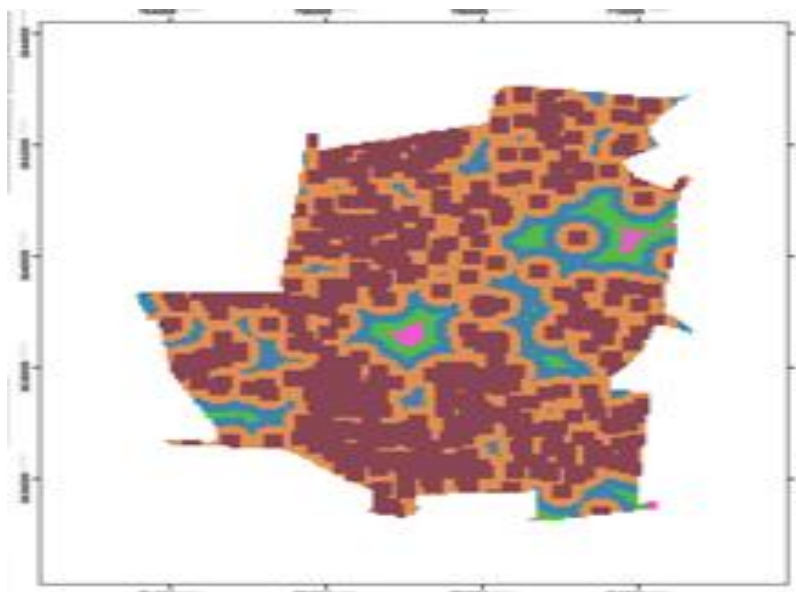


Figure 9: Map distance from the value of green spaces, Source: research results, 2013.

### Uncomtable land uses

In terms of urban planning, land uses that influence each other are considered to be compatible and consistent with each other to coordinate activities. Causing a nuisance and not to interfere with the proper functioning of each other. In fact, many land uses of silence regarding treatment centers should be located away from the pollution and noise pollution. Sort of like training centers, kindergartens, schools, sub- grid residential, cemeteries, children's park and industrial workshops. Privacy cover classification based on the ROE has floor to 5. As shown in Figure (10) is shown the distance from the center is greater than the higher score is awarded. Conversely, what is far less than is awarded the higher score and decreased with increasing distance between points is taken into account.



Figure 10: Map distance from the value of green space Uncomtable land uses

Table (1); weights assigned to the different layers of information

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Percent importance	Priority group	Criteria for locating
0.36	Installation	
0.22	Fault	
0.15	Center fire	
0.11	Passages	
0.08	Military center	
0.05	Green Space	
0.03	Uncomtable land uses	
Total value criteria = 100		

Source: research results, 2013

### Combined and integrated layers

After determining the location of criteria and weighting them according to the order of importance of these criteria to the data layers are integrated together using an appropriate method. Integration and combination of different spatial layers from different sources together unique feature is its main purpose GIS projects in order to describe and analyze interactions and analyzed to provide decision support. In this study, the combination of **AHP Extension** in **ARC GIS** layers together using Extension, spatial analysis (**Spatial Analys**) to determine the situations in which these conditions are true. Weights of its operations have been integrated together and with final map overlay index - care centers have been identified. After modeling (figure) is provided which results in the output layer (11) and (12) demonstrated that the 5 region of Birjand valuation is shown in Table (2).

Table 2: Birjand land valuation for health centers

Type Class	Area (M)	Area (Percent)
Completely unsuitable	1958406.16	5.4
inappropriate	5113980.15	14.23
Average	11159831.38	31.05
suitable	9320500.46	25.93
Completely suitable	8,381,985.15	23.32

Source: research results, 2013

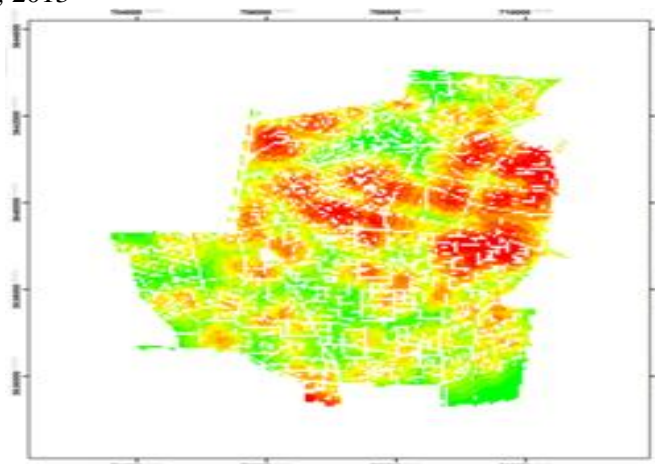


Figure 11: Map of the location of the final optimum health land use, Source: research results, 2013

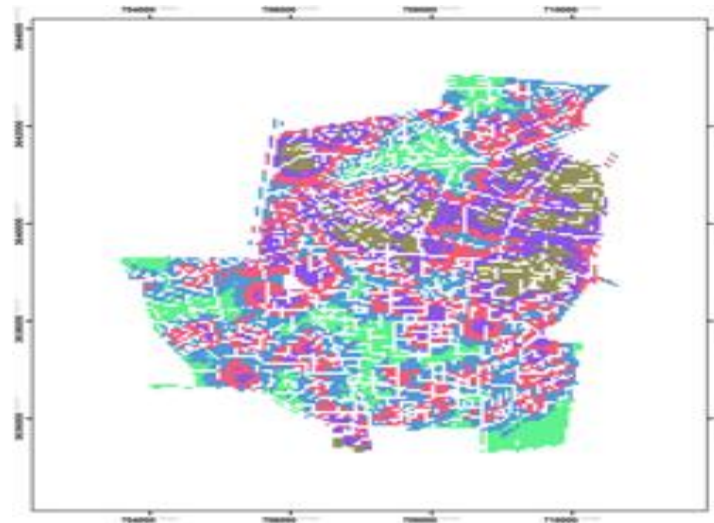


Figure 12: Prioritization of land health centers passive defense approach, Source: research results, 2013

### Conclusions and recommendations

**First hypothesis:** Areas seems to be a prerequisite for the construction of medical centers in Birjand they do not have the required distribution.

With regard to the matters mentioned in the analysis. Then listed the factors influencing consistent and inconsistent optimal location - care centers and integrated approach to the final form of passive defense and space mapping (4.9), respectively. The map indicates that areas in the South West and North of Birjand scattered more efficiently. And parts of East and South East regions have less optimal, so areas do not have the required optimum distribution and the hypothesis is confirmed.

**Second hypothesis:** It seems that in the south and southwest of the city of Birjand in creating a high potential - health centers (hospitals) will have.

According to the existing map (Figure 3), as seen in the southern part of the city there is a need to establish a hospital. However, the development of Birjand and towards the south and south-West, and the avoidance of Uncomtable land uses can be a good place to build a new hospital.

**Third hypothesis:** Appears to be a suitable tool to locate geographic information systems - care centers are in cities.

Suitable site for the construction of medical centers with passive defense approach is very important in terms of vulnerability. And to select the best location, a lot of information is required. The enormous volume of data in the proper places evaluated data for the construction of health centers - the medical necessity of the use of electronic aids and methods highlights.

### Suggestions

- Use the map of proposed urban management and urban health services according to the principles of justice.
- Development of the town and attention to the development of new therapeutic areas and thus maintain the desired land use to suit the needs of the future, with emphasis on the proposed map.
- Create a database of information for health centers and other municipal services to assist in the location decisions in accordance with a specific plan based on science and technology.

According to compatible land use such as fire stations centers, main streets, police centers, green space, and the location - care centers in Birjand.

- It is necessary to prepare a comprehensive city plan in greater oversight of the principles of passive defense.
- The ability to identify high- utility such as electricity and water distribution substations above, it is suggested that efforts should be made to the concealment or camouflage the facility.

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