

Analysis of administrative centers locating with passive defense approach in city using GIS (Case study: Astaneh Ashrafieh city)

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Abstract: Proper location for the provision of various services in the geographical area of land includes the important issues of the present era that the managers of a society think of necessary arrangement about it to reduce losses. Navigating in framework of urban social justice and providing citizens' welfare are considered as necessities of the growing communities. One of the impressive aspects of urban studies is related to locating the administrative centers of a city, because cities have always been faced with numerous challenges in the field of defense and security and have been trying to increase their defensive power. On the other hand, employing passive defense arrangements in constructing urban spaces as well as public buildings has a long history which leads to take preventive measures before occurring human and economic crises. In this context, this study has prepared aiming to analyze the spatial distribution of administrative centers in Astaneh Ashrafieh located in northern Iran. This study, using GIS techniques has the ability to combine information layers, and hence analyze the spatial distribution of office buildings with passive defense approach in the study area, and finally with respect to the analysis of each of the functional indicators examined the proposed uses in GIS to achieve the objectives of the study.

Key words: *Locating; Administrative centers; Passive defense; GIS; Astaneh Ashrafieh*

1. Introduction

Concurrent with the growth and expansion of cities, issues such as resource constraints, dispersion of areas built on the outskirts of the city, lack of locating service uses in the city and frequent trips in the city have faced urban planners and managers for decision-making and solving the problems of advancing civil society with challenges. Optimal spatial location distribution of these services, due to urban future developments and changes will result in the satisfaction of citizens. One of the major utilities in the path to social justice and equality in society is the easy and regular access of people to the administrative center. Distribution of administrative centers across the city would result in confusion for citizens and on the other hand will contribute to the vulnerability of social and political power and will follow unpleasant consequences.

Passive defense in urban area means to reduce the vulnerability in crisis situations, without the use of military measures and simply by enjoying civilian, technical or management activities of a city. By this definition, its good indicated that the focus of the sensitive administrative centers of a city in the event of armed conflict can reduce enemy

costs and impose irreparable damages to the own front especially in the cities. On the other hand, by extending urban areas, the use of planning techniques to locate the administrative centers became more difficult and one of the key solutions to solve the problem is using the geographic information system.

Geographic Information Systems (GIS) is a quantitative technique in decision-makings, determining procedures and locating which is employed in studies relevant to places and different levels of planning. What distinguishes the Geographic Information System (GIS) from other information systems is the presence of a spatial-analytic function. The functions use spatial data and non-spatial and descriptive information contained in the specified database to answer the questions about the real ancestor (Mohammadi SarinDizaj, 2005). In this study, for locating the administrative centers of Astaneh Ashrafieh located in north of Iran, Index Overlay model is used. In this model, in addition to the information layers weight, units present in each information layer will have a certain weight based on their potential and ultimately the way of spatial distribution of administrative centers in the study area will be analyzed and the proposed use will be presented with regard to passive defense considerations.

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2. Methodology

This research is firstly a descriptive - analytic study based on library and documents studies method. In the second step, to analyze the spatial distribution of office buildings in Astaneh Ashrafieh with passive defense approach, applicable techniques in GIS were used. So that indicators such as accessibility, the distance principle, the proximity principle, the principle of physical development, population, the hierarchy system of centers performance, standards and finally principles associated with passive defense such as coverage, dispersion, fortifications and safe structures were applied to prepare the proposed locating map of desired sites in the study area.

3. The location of the study area

Astaneh Ashrafieh is located in 35 km from the center of the Guilan Province and its distance to Lahijan is 7 km. The city with an area of 426/6 sq. km in the East of Guilan is located in latitude 37°16' and

longitude of 49°56' (37°15'35"N 49°56'40"E) East of prime meridian and its average height is 2 m above sea level. Astaneh Ashrafieh city with a population of 125437 people consists of two divisions: central part with 4 districts (Kurka, Dehshal, Kisom and Chahardeh) and division Kiashahr port with 2 districts (Dehsar, and Dehka). 42 percent of the population of this city is urban and living in two cities of Astaneh Ashrafieh Kiashahr port and 58% are villagers and living in 107 villages. The city consists of two towns, two districts, six sub-districts and 98 villages. An 850-meter-long Bridge has been constructed in the city on Sefidrud which connects it to Rasht. Climate of Astaneh as in other parts of Guilan is temperate Mediterranean climate with a little higher humidity. In some years, if north cold air mass affects the area, perennial discipline and moderation will be disturbed and the severity of cold will increase. Astaneh Ashrafieh for having several rivers called White River, Shemrud, SalarJoob and Heshmatrud around itself is considered as one of the greenest cities of Guilan Province. (Wikipedia)

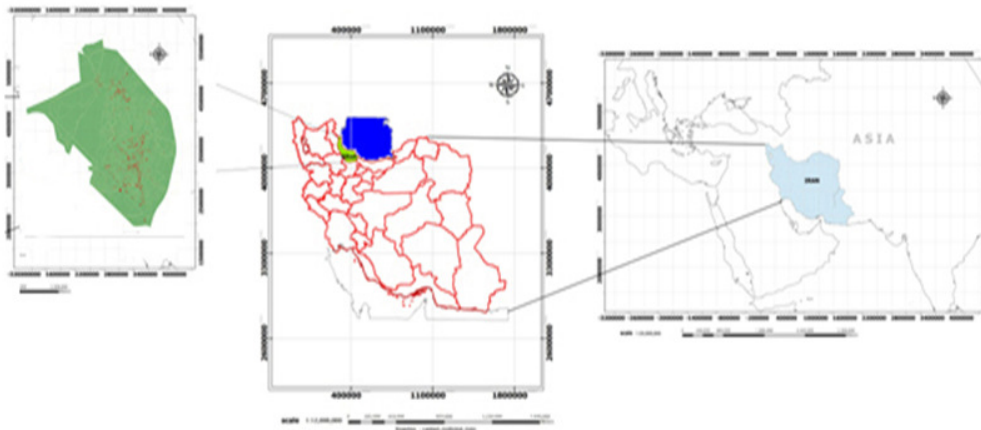


Fig.1: Map of Astaneh Ashrafieh location in Iran and Guilan province

4. Definition and importance of locating

Selecting a suitable location for the establishment of an application is a research to find a place that can be synchronized with the user's particular needs. Establishment of different uses in suitable place is done with regard to the selection or locating criteria. The process of finding and selecting a use location according to the criteria is called locating. After determining the location criteria, the first step in the process is collecting data and information after determining the location criteria. The capability of a place will vary depending what action is taken into consideration, so depending on the desired application, criteria and indicators should be defined to examine the location capabilities according to them. These indices and criteria are different depending on use, but they are aligned in selecting proper position. Factors such as economics, quantity and quality, environmental

impacts, communication networks, geographic and network access, type and level of urban services and infrastructure facilities and other factors determined depending on the type of uses by locating are among effective parameters. In fact, comprehensive reference and the detailed program planning is a systemic vision (Shahabian, 1997). In the process of decision-making about a location, political, economic, natural and security priorities may be considered. Locating is the process of decision-making in long term, since many indicators should be tested and decisions results may be evaluated (Parhizkar, 1997). If the locating of multiple uses is concerned, after determining the location and evaluation codes, compatibility, suitability, capacity and measuring all proximate uses the best location for optimal applications will be provided. (Shahabian, 1997)

5. GIS and its role in locating

Geographic Information System (GIS) consists of a set of hardware, software, location data, algorithm and human resources, network which is used for entering, managing, analysis and displaying geographic data. In other words, GIS is a decision-making supporting system widely used in optimizing activities and various processes. Since in GIS four elements of organization, specialized manpower, location data and descriptive data are combined and integrated, using these four elements facilitates internal and external relations and internal of the real world phenomena and makes man to have an integrated view in investigation of phenomena. Dynamism of this science depends on parallel progress in spatial data processing system including cartography, surveying, photogrammetry, electronics etc. The locating process is in relation with two basic arguments:

- A) Discussion related to location
- B) Discussion related to characteristics and Features

Since the GIS with an integrated view examines all the factors and forces affecting and affected in the process of locating by applying spatial and temporal locating rules, it could be useful in this context. In fact, GIS provides a new understanding in dealing with today's problems of urban systems by establishing a logical relation between spatial and descriptive information. The definition of geographic information systems often focus on two aspects which is proposed in the form of technology-based approach and problem-solving approach. In technology-based approach, GIS is defined as a set of tools that is applied for entering, storage, recovering, processing and analyzing spatial data and ultimately outputting these data. The problem-solving approach includes an integrated and coordinated set of data proposing in spatial dimensions. The method in which data enter GIS environment and are stored and analyzed should be coincided with the process in which data are used for a specific task or a task related to decision-making. It is better instead of considering GIS as mere a software or hardware consider it as a process that includes a set of method and instructions through which and to support the activities based on decision-making, we can make facilities in process of entering, storing, processing and analysis, and finally outputting the data (Parhizkar, Ghaffari, 2006).

6. Rules and standards of employing official spaces in Iran

In the implementation of Article 39 of Iranian Civil Service Management Code, criteria and standards of employing spaces, office equipment and supplies are imparted as follows.

Table 1: Main office space required for political managers and par posts

Main office space required by Minister (including workroom and special meetings space)	80 m ²
Main standard office space required (including workroom and special meetings space)	70 m ²
Main office space required by deputy minister, deputy governor and par posts	40 m ²

6.1. Concepts and definitions:

Main office spaces: spaces where main office task is directly done there including management, technicians (single or multiplayer), office affairs space, and current archive (in direct contact with the office work), and...

Related spaces: spaces predicted for facilitating and serving of performing work and are formed next to main spaces. Such as auditorium, library, classes, meetings rooms.

Support spaces: spaces predicted for staff welfare and supporting activities and administrative services in the building such as server rooms, praying room, printing and reproduction, pantry, facilities and requirements storage, health services.

Space required for the client: spaces specified for client tribute to receive specific services.

Circulation spaces: spaces predicted for connecting the main, related and support spaces such as hallways, stairs.

Dedicated spaces: spaces established based on the missions of administration specifically including laboratory in the Governor organization and Industrial Research, Treasurer in banks, Museum of cultural heritage.

Net infrastructure: sum of main administrative, affiliate, support and client spaces.

Administrative equipment: furniture and supplies that the executive staff need in accordance with their organizational position, job requirements and office space to perform their duties and missions to achieve organizational objectives.

Acceptable level of infrastructure of main administrative, related, support and client to their sum (net infrastructure) of this standard is as follows:

Main administrative space: 60% = the ratio of the main spaces infrastructure to net underlying

Related administrative spaces: 20% = the ratio of related space infrastructure to net underlying

Support and client spaces: 20% = the ratio of support and client spaces infrastructure to the net underlying

Observance of above ratios in using, purchase and lease of public buildings is binding.

Main office space required by political managers and par posts (ministers, deputy ministers, governors and par posts) are determined according to Table 1, main office space required by professional managers, experts and staff at headquarters and provincial levels according to Table 2 and main administrative space required by professional managers, experts and staff in the city according to Table 3.

Table 2: Main office space required by professional managers, experts and staff at headquarters and provincial levels

Main office space required by general managers and par posts (including workrooms and meeting space)	30 m ²
Main office space required by ministers advisors	15 m ²
Main office space required by deputy ministers and governors	15 m ²
Main office space required by deputy director general and par posts	15 m ²
Main office space required by Head of Department and par post	10 m ²
Main office space required by staff (employees of expert positions and other organizational posts)	6 m ²
Main office space required by Head office and clientele	15 m ²
Main office space required by secretary and clientele	12 m ²
Main office space required by in charge of Office and space for clientele	10m ²
Main office space required by Typist	6m ²

Table 3: Main Office space required by professional managers, experts and staff at city level

Main office space required by governors (including work room and meeting space)	60 m ²
Main office space required by deputy governor(including groom and meeting space)	40 m ²
Main office space required by managers or heads of departments in the city	20m ²
Main office space required by Staff (expert practitioners and other organizational posts)	6 m ²
Main office space required by Charge of Office and space for clients	8 m ²
Main office space required by Typist	6 m ²

7. Passive defense and enforcement actions

Passive defense or civil defense includes applying plans and operations that reduce the vulnerability of infrastructures and country manpower against the external threats and possible attacks and increase national power. The word is against active defense means using military weapons in defense of the security and honor of the country. In other words, any unarmed action that reduces the vulnerability of the country against enemy acts of hostility and destructive operation is called passive defense. The passive defense is actually the measures, actions and initiatives that takes place self-reliance using the instruments, conditions, and without the need to rely on manpower as possible. Such measures on the one hand increase the defense power in times of crisis and on the other hand reduced the consequences of the crisis and provide the possibility of reconstructing the affected areas with the lowest costs. In fact, passive defense plans are prepared and implemented before performing invasive procedures and in peacetime. Given the opportunity provided in time of peace to prepare such plans, it is necessary to consider such arrangements in designing. Applying passive defense measures and considerations, in addition to high cost reduction, plans defense efficiency increases the objectives and projects during the invasion of enemy, of course, and active defense is always used as the first tools to oppose the invasion in wars. But adopting passive defense tactics in vital installations and systems before the invasion reduces the vulnerability greatly. At the

same time active and passive defense act as supplement in the time of war. For example, a vital system although do all passive defense components consisting of concealment, camouflage, deception, dispersion, parallelism is supported by a passive defense.

8. Collecting basic data and combining layers to create final map

Information or data is one of the basic components of GIS and without providing the appropriate information with accuracy, precision, or interpretation scale appropriate for desired projects, organization GIS system will fail. Database is one of the main parts of the GIS and usually allocates between 60 to 80 percent of the cost of implementing a GIS system to itself. Creating a database is one of the most expensive, time consuming and complex steps. In this study, the descriptive information are collected as report and research and experience from libraries and organizations, then spatial information with relevant standards are obtained from national and province bodies and organizations. After preparing maps and basic statistics, data quality control are done and are prepared for entry into the geographic database and then appropriate data layer for each parameter are prepared and produced. Thus, a geographic database consisting of information layers in the study area are obtained. Then using maps and primary layers, various stages of preparing package depending on the status of the data including scanning, geo-referencing, vector sing, editing vector layer, and

entering relevant descriptive information, production of new information layer, processing and extracting data layers related to each of these factors in GIS environment. With regard to current debate, initially current spatial distribution of the

administrative centers of Astaneh Ashrafieh is rationalized in Map No. 2 and then the proposed uses have been presented in Map No.3 to build the administrative centers.

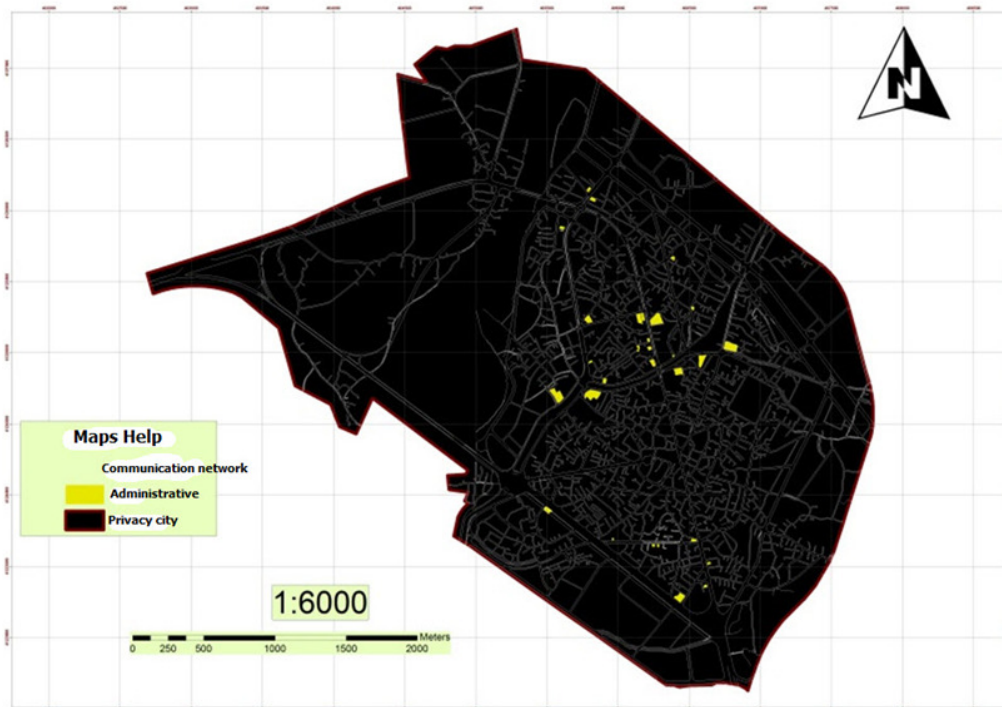


Fig.2: Current map of the spatial distribution of the administrative centers of Astaneh Ashrafieh

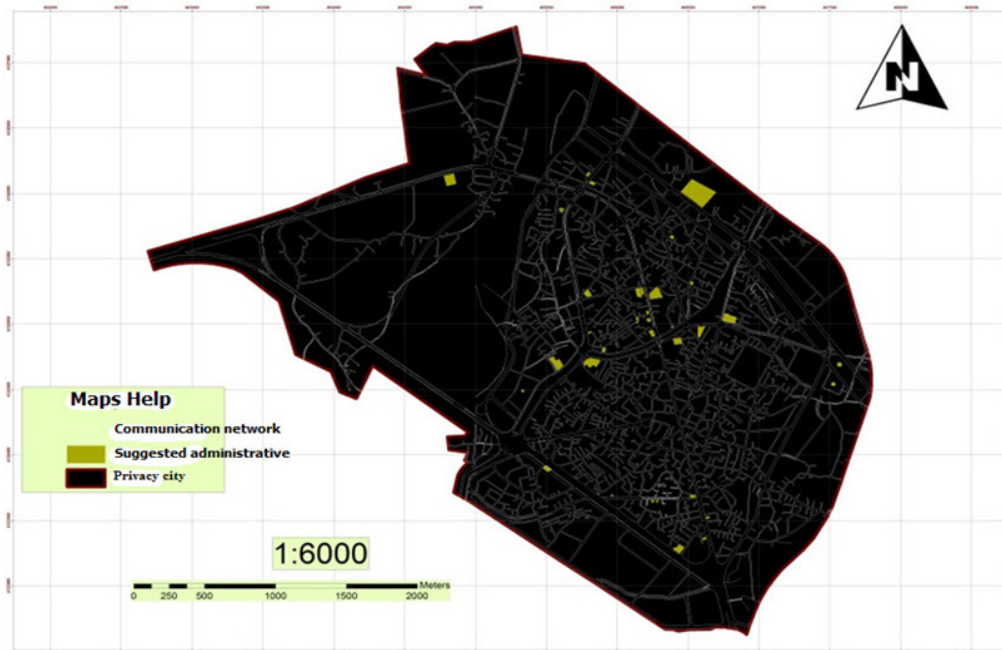


Fig.3: Proposed map of spatial distribution of the administrative centers of Astaneh Ashrafieh

9. Discussion and Conclusions

The process of selecting administrative centers, due to the type of citizens 'reference and social and political governance should meet the demands of

everyday life of society in establishing regional balance. Various criteria can be considered effective in locating administrative centers, especially with the passive defense approach, factors such as accessibility, the distance principle, the proximity principle, the principle of physical development,

population, centers performance hierarchy system, standards, and finally the principles associated with passive defense such as coverage, dispersion, fortifications and safe structures are essential in preparing the map of locating desired places etc. in final decision making. Meanwhile, managers and decision-makers in the country, according to the preparation views and urban management development strategies try to maximize interactions and welfare of the citizens by preserving the national and regional authority parameters. In this study to select the best places to establish the administrative centers with passive defense relevant parameters were used and in the end, all indicators were combined in various layers in GIS environment and then by weighting and prioritizing, the proposed location of office buildings in the study area were identified. The results indicate that favorable sites for establishment of administrative centers, primarily are proposed in the northern parts and then according to the type of activity of each of the administrative centers, it has the ability for spatial analysis in the rest of the city of Astaneh Ashrafieh. To complete this research process another research can be offered that by considering other criteria and using the ANP model in GIS achieve more complete findings according to the study volume.

References

- "Criteria and standards of employing administrative spaces in Iran", Directive No. 5236/90/200 dated 28.May.2011, Vice president of Human Capital and Management Development of President
- Collection of active and passive defense measures for people and civilian facilities (Asghar Jaddi, 2004)
- Eskandari, Hamid, land use planning from the perspective of passive defense, passive defense issues, Volume 5, Boustan Hamid Press.
- Hajati Ziabari, Nima, (2014), "Analysis of locating health centers with passive defense approach in environment preparation using GIS (Case study: Astaneh Ashrafieh)", MS Thesis, Islamic Azad University of Semnan
- Mohammadi Sarin Dizaj, Mahdi, (2005), "Analysis of the distribution and location of urban parks using GIS, case study: Zahedan District 2", MS Thesis, University of Sistan and Baluchestan.
- Parhizkar, Akbar, and Ata Ghaffari Gilandeh, (2006), "GIS and multi-criteria decision analysis", SAMT publication, Tehran.
- Shahabian, Shahram, (1997), "Spatial location of fire stations using GIS, Case study: Shahr area", Journal of Shahrnegar, No. 3, Pp. 20-26.
- Wikipedia, the free virtual encyclopedia.