Environmental Consideration in Planning and Managing Emergency Shelter Sites

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Introduction

Analyzing experiences of big disasters in Tehran indicates that considering that must residential structures are not strong enough, people usually move to open spaces and parks outside the city after an earthquake and stay there until the whole danger is totally gone.

Since the department of Disaster Management has been responsible in the past years for allocating and equipping parks and urban green spaces as emergency shelter sites, it is tried in this research to study the effects of sheltering people on the environment.

One of the requirements of choosing parks and urban green spaces as emergency shelter sites is environmental studies and evaluations, in order to utilize them in earthquakes, but not to be a starting point for environmental disasters in destruction of spaces and natural resources.

Since Tehran Municipality (Disaster Mitigation and Management Organization of Tehran) is in charge of sheltering people in Tehran after a disaster occurs, some large parks in Tehran in the 22 district have been assigned. AFRA Park (Shahid Kazemi) is one of them.

Because environmental evaluation of these places for emergency sheltering of the citizens is one of the important steps in planning for utilizing the parks, it is done on AFRA park in this research and some solution are presented.

Case Presentation

Since policy of Tehran municipality (Disaster Mitigation and Management Organization of Tehran) is based on this fact that people are sheltered in green spaces, forest parks and large parks in disastrous situation, it is necessary in the first step to do Environmental Impact Assessment (EIA) on these places.

If no valid feasibility is done before preparation and using these emergency shelter sites, we will face environmental disasters in a near future.

Therefore, first environmental pollution caused by sheltering a big crowd in the sites shall be identified and then some resolutions be presented according to national and international standards and parameters.

Research Method

In this research, first all data gathered by documentation studies (Library study and website searching). The data, about the area being studied, were analyzed by objective evidence of the researcher and filling some check lists were designed to be used in the emergency shelter sites. After studying international standards which have been compiled by international organizations about sheltering refugees, some check lists were provided by the writer of the paper which must be filled after selection of emergency shelter sites and before any planning to use them. Also in case study section after providing, completing and analyzing the evaluation matrix of environmental effects of sheltering people in AFRA park, the screening check list was filled out.

Of course, it must be mentioned that in this paper environmental effects of the AFRA park is only discussed and the results of other researches and studies will be presented in different other papers.

Definitions

1- *Disaster: An incident which occurs unexpectedly because of natural or human reasons and results in harm, damage or serious difficulty in the society and resolving it requires emergency and urgent actions and operations.*
2- *Disaster Management: Planning process and actions by government officials, government executive systems, municipality and the public which try to collaborate effectively in an organized and coordinated manner to prevent disasters by monitoring and analyzing them or make their effort to mitigate the effects of the disaster, make necessary preparation, resistance quick rescue until the conditions return to normal and reconstruction phase.*
3- *Assessment of Effects of Development: Process and procedure of official studies to evaluate previous plans or predict results of actions and functions of a project, plan, schedule, strategy of environment, human health and social*

welfare or in other words systematic identification or evaluation of results, project effects, plans on physical, chemical, biological, cultural, economic and social components of environment.

Assessment of Environmental Effects Before and After Sheltering in AFRA Park

Since any development needs to use natural resources and produces wastage in the nature, a particular attention must be paid to the resources and the method of using them in any development.

When using recyclable resources (such as forest and parks) and no recyclable ones (fossil fuels) it must be noted that recycling the recyclable resources occurs much slower than using them by man and utilizing these resources usually results in wastage production and increase in environmental pollution. Therefore, because currently these resources are being used mostly, any development must be done considering the concept of permanence.

In a permanent development in addition to the present generation's needs, future generations` needs, improvement of level of life, preservation and improvement of the environment are also considered. That is because the environment is an asset in the hand of present generation to be handed to the next generations.
Assessment of effects of development goes after planning for utilizing the land. This means that assessment of effects of development should ideally be done before running the project.

However some cases, in some countries like Iran, where the bore mentioned process has recently been legislated, this process is being done on finished projects in order to decrease the damages to environment.
The following table shows the matrix for assessment of the project of long- term emergency shelter in AFRA Park in which all aspects of environment including physical, biological, economic, social and cultural environment are listed all together. Filling proof or disproof of the project is determined.

Table 1- Screening Check List
Project: Emergency Shelter in AFRA Park

No.	***Question***	***Importance Intensity*** (***0*** ***1*** ***2*** ***3***)	***Score***
1	*Will the project result in increasing air pollution or increasing in any poisonous objects and substances in the air?*	*2*	*5*
2	*Will the project result in noise, motion, light, heat and radiation pollution?*	*2*	*5*
3	*Will the project result in increasing surface and underground water pollution?*	*2*	*5*
4	*Will the project cause any use, saving, transportation or production of harmful substances for human being and environment or will it increase potential and actual risk for human health?*	*1*	*1*
5	*Is the project located in a dense- populated area and is it likely to create disturbance like noise and air pollution or any motion or stink?*	*3*	*10*
6	*Will the project produce any extra solid substances during construction, exploitation and after that?*	*3*	*10*
7	*Is there a place in the area of the project or in the vicinity which is a part of ecological regions based on national, international or regional laws and may be affected by the project?*	*2*	*5*
8	*Is there a place in the area of the project or in the vicinity which has important or substantial, preserved animal or plant species (Like laying eggs, nesting, and migration) which may be affected by the project?*	*3*	*10*
9	*Is there a place in the area of the project or in the vicinity which is already under serious environmental pollution or damage and may deteriorate?*	*1*	*1*
10	*Is there a street or highway in the vicinity of the project which is susceptible to suffer more traffic or other environmental problems due to the project?*	*3*	*10*
11	*Is it probable that an incident will occur during construction, exploitation and afterworld which can affect human health or environment?*	*3*	*10*
12	*Will the project potentially have negative environmental effects with development plan or other projects now and in the future?*	*3*	*10*
13	*Will the project need to use natural resources (Like water, land, substance and energy) or non-recyclable resources during construction, exploitation and afterworld?*	*3*	*10*
14	*Is there a place in the area of the project or in the vicinity with a crucial function (School, Hospital) which can be affected by the project?*	*2*	*5*
15	*Will the project physically make any changes in the area during construction, exploitation and after word?*	*3*	*10*
16	*Is there a place or structure with high aesthetic value or a great view in the vicinity which may be affected by the project?*	*3*	*10*
17	*Total Score*		***117***

By answering the questions in the screening check list and scoring, the total score was obtained (117) which indicate that according to the executive regulation of studies of justification for environment of plans and civil projects, logistic and infrastructure on Tehran municipality, running this project requires studies of justification for environment.

le has been created by writer of the paper in order to assess the environmental effects before and after sheltering in AFRA Park

	Exploitation Phase					Construction Phase										
ct / mental / ors	Preparing Land (Cutting Roots)	Cutting trees	Uprooting bush	Excavation-Leveling	Construction (Concreting- Metal work- Foundation- Welding)	Road Construction-	Transportation of Equipment and Materials	Water Supply-Refinement-Irrigation	Fuel Supply-Fueling	Energy & Electricity Supply	Man Force Employment	Accidents-Incident- Fire	Sewage Works-Waste Substance-Sewage	Sheltering	Number of Values	Number of Positive Values
	-4	-2	-2	-3	-4	-4	-3	-1	-1	-1	-1	-1	-2	-2	14	0
ny				-4	-3	-2		-2	-1				-2		6	0
y				-2	-1			-4					-1		4	0
esources				-3				-5				-1		-1	4	0
nation				-2	-2	-1		-1			-1	-1	-2	-2	8	0
water s								-2					-1		2	0
	-4	-4	-4	-4	-4	-4	-1	-1	-1	-1		-2	-2		12	0
cal ion						-4			-1			-1	-1	-2	5	0
	-4	-4	-4	-5	-5	-5	-2	-1	-1	-1	-1		-1	-2	13	0
	-3	-3	-3	-4	-4	-3		-1	-1				-1		8	0
ion	-3	-4		-4	-4	-3	-2	-1	-1		-3		-1	-4	11	0
nce	-2	-2	-2	-3	-2	-2	-2	-1	-1	-1		-2	-1	-3	13	0
								-1				-2	-1	-3	4	0
es	-3	-3	-3	-2	-3	-2	-1	-1	-1	-1	-1	-2	-1	-4	14	0
species	-5	-4	-5	-3	-3	-3	-2	-1	-1	-1	-2	-3	-2	-5	14	0
itive ecies	-4	-4	-4	-3	-3	-3	-1	-1	-1	-1	-2	-3	-2	-4	14	0
exposed	-4	-4	-4	-3	-3	-3	-2	-1	-1	-1	-1	-2	-1	-4	14	0
pecies nger																
ies	-4	-4	-3	-3	-3	-2	-2	-1	-1	-1	-1	-1	-1	-2	14	0
f aqua s	-2	-2	-2	-2	-2	-2	-1	-2					-2	-2	10	0
r course	-3	-3	-3	-2	-2	-2	-1	-1	-1	-1	-1	-1		-2	13	0
bitats	-1	-1	-1	-2	-3	-3	-2	-1	-1			-3	-1	-3	12	0
national l values	-4	-4	-4	-4	-4	-4	-2				-1	-1	-1	-2	11	0
nal and values		-2		-1	-2	-2	-3					-1		-2	7	0
ational l values	-1		-1	-2	-2	-2	-2				-1	-1		-2	9	0
nal and values						-1		-1					-2	-2	4	0
nt and ies	-4	-4	-4	-4	-4	-4	-3				-3	-2	-2	-4	11	0
gion				-4	-3	-2	-2				-1			-2	6	0
ook	-1	-1	-1	-4	-4	-3		-1	-1	-1	-1	-1	-1	-3	13	0
and t				-2	-2	-3					-1	-1		-2	6	0
th of	-1	-1	-1	-3	-3	-3	-1					-1		-2	9	0
stem				-2	-2	-2	-2	-2			-1		-1	-2	8	0
mal n	-2	-2	-2	-3	-3	-3	-1				-1	-2	-1	-3	11	0
n					+2	+1		+1	+1	+1	+4		+1	5	8	8
s and are	+1	+1	+1	+2	+3	+3	+1	+1	+1	+1	+4		1+	3+	13	13
ty					+2	+2	+2	+2	+2	+2			+2	3+	8	8
ues						+5								4+	2	2
ivities																
re						+1	+1				+2			1+	4	4
	-2	-2	-2	-2	-2	-2	-2							-2	8	0
ices																
e	-1	-1	-1											-2	4	0
and rties																
ement																
itage														1+	1	1
ions																
n	-4	-4	-4	-5	-5	-5	-1					-1		-4	9	0
alues	23	24	23	31	32	35	26	25	19	14	21	23	28	36		

Table3- Rating Average of Effect/ Result

Negative Effects/ Result		***Positive Effect/ Result***	
Rating Average Range	***Type of Effect/ Result***	***Rating Average Range***	***Type of Effect/ Result***
-5 until -4.1	*Huge Destruction*	*+4.1 until +5*	*Excellent Benefit*
-4 until -3.1	*Big Destruction*	*+3.1 until +4*	*Good Benefit*
-3 until -2.1	*Fair Destruction*	*+2.1 until +3*	*Fair Benefit*
-2 until -1.1	*Small Destruction*	*+1.1 until +2*	*Poor Benefit*
-1 until 0	*Very Small Destruction*	*0 until +1*	*Very Poor Benefit*

Table 4- List of Beneficial Results Before and After Sheltering in AFRA Park

Accessibility	***Excellent Benefit***
None	*Good Benefit*
Social Services and Public Welfare	*Fair Benefit*
Economic, Social Activities- Occupation	*Poor Benefit*
Public Involvement	*Very Poor Benefit*

Table 5- List of Destruction Results Before and After Sheltering in AFRA Park

None	*Huge Destruction Results*
Prominent plant and animal species- land functions	*Big Destruction Results*
Trend of animal population-security of region- mammals with national and international value- native species- national species exposed to danger- sensitive ecological population- sensitive plant species- noise pollution- deposit- erosion soil- surface water resource- water contamination- hydrology	*Fair Destruction Results*
Valuable services of ecosystem- agriculture- fluvial ecosystem- ecological path of animal- immigration and movement- territory's look- fishes with national and international values- Reptiles with national and international values- birds with national and international value- important habitats- valley and water course species- plant species of aqua ecosystem- plant species- sewage- waste substance- soil chemical pollution- underground water resources- water contamination- hydrology	*Small Destruction Results*
None	*Very Small Destruction Results*

Table 6- List of Beneficial Effects Before and After Sheltering in AFRA Park

None	*Excellent Benefit*
None	*Good Benefit*
None	*Fair Benefit*
None	*Poor Benefit*
None	*Very Poor Benefit*

Table 7- List of Destruction Effects Before and After Sheltering in AFRA Park

None	*Huge Destruction Effects*
None	*Big Destruction Effects*
cutting trees- uprooting bush- excavation and leveling- building platform- construction- Preparing Land (cutting roots)	*Fair Destruction Effects*
road construction and asphalt- transportation of equipment and materials- s and waste substance disposal- sheltering- accident and incidents, fire	*Small Destruction Effects*
Water supply, refinement- fuel supply, fueling- energy and electricity supply- man force employment	*Very Small Destruction Effects*

The Conclusion of the study above shows that the rating average in less than 50% of cases and only in raw is less than -3.1, therefore:

The Project is approved with reformation plans. It is approved according to the fourth state of Iranian matrix.

Conclusion

One of the most important effective factors in planning emergency shelter in addition to providing refugees with a minimum amenity is to product good environmental conditions during sheltering and departure. In large cities, local- regional planning has considerably prepared conditions for a temporary life along with comfort and relative security and a possibility for a quicker exit out of the disastrous situation, in order to find suitable places for emergency shelter, preparation of these places and choosing correct procedures to settle the injures.

In urban planning, physical preparation is one of the important activities for decision makers in emergency shelter. These activities which make up a great share of the whole process include as follows:

Leaving and relevant construction, choosing the site and building logistic warehouses, designing required facilities and building them like tanks and fresh water distribution systems and sewage works, electricity supply system, fuel supply system and refuse collection and disposal system.

To provide minimum life needs in emergency shelter sites, it usually depends on many factors like social-cultural conditions of the people, religious and native issues, and prevalent diseases many the crowds…

However, the common point of all these actions is the change in the environment of the shelter sites.

In general design and building shelters, insulation, running heating system and cooking equipment, soil displacement, building health and sanitary services, storing and using fuel, providing waste substance out of sewage, refuse disposal, ... cause trespassing the territory of animals and change the environmental characterize of the shelter site.

If before exploitation of the emergency shelter site, a comprehensive planning is done and required facilities are prepared beforehand, desirable environmental conditions for a good stay will be possible.

Contrary to expectation, what must be considered in planning a place for emergency shelter is not only stabilizing a suitable environment for sheltering refugees, but ads considering the temporary situation and limited time of life in the site. Special characteristics of emergency shelter sites (Parks), applications and their ecological conditions indicate that as the length of sheltering time become more, the environment of the parks will be exposed to inevitable disaster.

Choosing parks and urban green spaces as emergency shelter sites makes sense, because of enough space for erecting temporary shelters and cheerful atmosphere, although experiences have shown that in case of not having a plan to use these places properly, injured people move to these places willingly. This can destroy the environment, permanent and recycles and can create an inappropriate place for life.

On the other hand, building facilities and structures and changing the natural of the sites as well as impose serious damage on the region's environment. Furthermore, after sheltering is over, the buildings and facilities will eliminate the natural and environmental face of the place and this will remain permanently.

This problem will be bigger specially in large forest parks, because the plant structure of these parks is long-lasting and in case of destruction, reforestation will take a long time.

It also must be noted that large forest parks have a limited open space (without trees) and erecting shelters needs leveling, preparation and building concrete platforms. In addition to support the refugees, it is necessary to build sanitary services, bathrooms, water supply, fuel and emergency logistic warehouses which all in all transform the environmental identity of these places.

Therefore, if disaster management's officials and city planners have considered, in their policy, forest parks for sheltering the citizens after disaster and have no comprehensive plan in the course of permanent development, it will result destruction of the landscape and natural characteristics of the green spaces and forest parks.

Experience from previous disaster has shown that if the government provided the citizens with suitable services in emergency cases, their motivations for rebuilding and reconstruction of their previous resident will decrease and usually in such a case, emergency shelter phase will last long. On the other hand, bitter experience of horrible earthquakes in our country shows that one of the problems of thee incidents is that immigrants and suburbanites will rush to the area and settle in the sites which have been assigned for injured people in the disaster.

In this case, in addition to the problems in search and rescue, existence of a homeless crowd and unwilling to leave in places which have been assigned for emergency shelter and illegal construction by them will upset the balance of the combination of the environment and space of the site and will result in permanent transformation in environment.

So, it seems that in order to plan for emergency shelter of citizens, when policies are based on building structures and construction, taking advantage of barren lands which can be secured, military garrisons and special bases are priority, mean while it is suggested that using parks and green spaces be based on minimum changes and construction.

It must be note that in using place and region for emergency sheltering in urban planning and specific local- regional circumstances and facts must be evaluated.

Field observation of AFRA park to study the area shows that although it has a long distance from other areas in

Tehran, there is a residential area with buildings next to it which are not very storing, so it is predicted that in case of disaster in Tehran, this park would receive the neighbors first rather than people from other districts. Therefore, it is possible to plan this park to be utilized as a regional site for emergency shelter, and it is suggested that it be used as a local site.

Also, with regard to this point that forest parks and green spaces are assigned for emergency shelter, it is recommended that first the matrix of Assessment of Environmental Effects of sheltering in the park be completed before any construction and building platforms in the park. If the conclusion of the matrix indicates that it is feasible to use the park as an emergency shelter site, it is better to fill out the check lists and forms concerning international standards for sheltering.

In recent years, environment and permanent development headquarter of Tehran municipality designed the screening check list of projects and notified it to different subdivisions of municipality that the check list should be filled out before any structured, logistics and infrastructural projects.

In the end it is hoped that with observing rushes, standards and regulations of environment in our country by urban planners, decision makers and managers we will be able to prevent any environmental disaster in the country.

Suggestions

Since AFRA Park has been selected by officials of disaster management for sheltering people in Tehran in emergency conditions and action in order to prepare the park for utilizing in disasters are being taken, the following solutions for preparing and using the Park are suggested:

- *Cutting trees and uprooting bush for construction and other actions like building platform, excavation, leveling, road construction and equipment and materials transportation shall be done when needed.*
- *Rubbish dump shall be located outside the park.*
- *Required water shall be supplied from other surface water resources inside the park.*
- *Machines of making concrete for construction, building platform and making asphalt shall be located outside the park.*
- *Slope of paths in park shall be designed so that making a drainage system is possible.*
- *Operation of making asphalt shall be by new methods of recycling. (porous asphalt and insolated porous asphalt for reducing noise pollution due to cars are suggested).*
- *Trafficking big cars & trucks through the park for equipment and materials transportation shall be under special regulations and within a limited number of times during the day.*
- *Correct and standard distance from platforms of rescue tents and shelters to the place of planting special species of plants and paths for animals shall be taken in to consideration.*
- *Uprooting trees and bush shall only be done inside the limits of sheltering area and construction of paths.*
- *During construction work, environmental experts` ideas and recommendations shall be welcome in order to prevent environmental pollution.*
- *During construction work, topography of the area shall be paid enough attention.*
- *When selecting a suitable place for facilities, residential place, logistic space ... exploitation model of the land shall be paid enough attention. (Soil erosion, slope of the ground)*
- *During cutting trees and building platform, special plant species, endangered species, important ecological population and crucial habitats shall be paid enough attention.*
- *Before any decision is made for utilizing the park, the territory's face shall be evaluated and the ground shall be studied.*
- *Systematic environmental management through proper actions for permanent development shall be carried out.*
- *Ecological and reasonable policies in utilizing the land (forest park) shall be observed.*
- *Executive instructions and environmental studies of construction, logistic and infrastructural plans of municipality shall be observed.*
- *Executive criteria and factors of environment and permanent development headquarter of Tehran municipality shall be observed.*
- *Instructions, rules and regulation of the environment of Iran shall be observed.*

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