

Sustainable Urban Structure and Social Justice (Case Study: City of Bafgh in Iran)

Jinoos Ansari

M.A. in Geography and Urban Planning

ABSTRACT

Urban public services can have an effective role on the spatial displacement of the population and the demographic changes in urban areas and because one of the criteria for sustainable urban development is the balanced distribution of population, therefore, the distribution of public services in urban areas must be in such a way that the social justice is met in the 10-fold areas of the Bafgh. The purpose of this study was to investigate the pattern of urban development on urban service and facilities distribution in Bafgh accordingly, the research method is descriptive- analytical through using SPSS statistical software.

The results of the study showed that among the urban areas of Bafgh, area 3 with the stability number of 0 / 746 was the most sustainable and The area 8 with the stability number of 0/ 557 is the most unstable (unsustainable) region.

Therefore, due to the inequality in receiving the urban facilities and services just resulted in the lack of social justice realization in the distribution of urban public services in this city.

KEYWORDS: urban structure, social justice, service distribution, population density, Bafgh city.

INTRODUCTION

Justice Establishment in the distribution of urban services for different areas of a city can have an effective role in sustainable development of a city. the rapid population growth of the cities which is due to the migration of villagers to the urban areas and the lack of systematic and organized planning in all cities if Iran have led to a series of problem the most important of which are the reduction of per capita for urban utilization and the improper distribution of these utilization. (Askari, 2007) the impartial (Equitable) distribution of the resources and the development outcome among the majority of the population are the most important characteristics of a dynamic and healthy economy.

To fulfill such a purpose, the spatial planners have tried to reduce the inequalities and imbalances by gathering and implementing various programs for removing deprivation and expanding all positive aspects of development. The main step to be taken to realize the given objective is achieving the major goal of "social justice" and identifying the existing situation. Perhaps, lack of proper recognition of the conditions would put an end to all the efforts of those involved in the eradication of poverty and deprivation and social justice realization. (Mahdavi and Karimzade, 2006). The discussion of social justice in urban studies is existed in all pertinent fields. The realization of the social justice in cities will eventually lead to the citizens' satisfaction of their life style and will bring about the political stability and national sovereignty of the country in terms of geographical perspective, the social justice in the city corresponds with the spatial distribution of resources and facilities between different regions of a city and citizens' equal access to these potentialities because the improper distribution of these resources will soon lead to social crisis and complicated spatial problems. On the other hand, having inequality in the life quality will make the disadvantaged and deprived groups attentive of the privileged ones which can be another source of the problem. Therefore, the duty and responsibility of the urban planners and managers is to try to fulfill the idea of providing the same opportunity for all walks of life to have access to the urban services and facilities and eradicating the contrast for preparing the educational, medical and serviceable opportunities (Hataminezhad et.al, 2008). If the distribution of urban services does not go well together with the requirement of each area or the distributed utilizations and the spaces used by the civilians can increase the population density in other areas which will not be neither advantageous for the citizens not will it create an appropriate situation for the fair distribution of the urban services. So, considering the planning for the fair distribution of the urban services not only provides the spatial justice realization for the city but also prevents different areas of a city.(Varesi et.al, 2007)

Moreover, providing urban services is an important issue in the sustainable development planning and the quality of offering such services for efficiently using them is another important factor. Due to the incongruity of the demographic features of the population, having access to the given services is impacted by the way these services are distributed and having access to the fixed facilities of a region is totally dependent on being present in the place they are distributed. (Erikip, 1997)

In order to receive appropriate distribution of urban services in the city and citizens' improved access to the certain services, the structural divisions of the city including the town, region, neighborhood, neighboring units and residential units should be specified. (Hekmatnia and Ghanbari Haftcheshmeh, 2006)

Now, the need for services and infrastructures in urban areas is rapidly increasing while many governments have insufficient financial resources for responding to the needs (Randingi and Kasarda, 2000)

On the one hand, the unequal spatial structure of a city is because of the unequal geometrical structure of power in a society. The impartial (Equitable) distribution of the resources and the development outcome among the majority of the population are the most important characteristics of a dynamic and healthy economy. To fulfill such a purpose, the spatial planners have tried to reduce the inequalities and imbalances by gathering and implementing various programs for removing deprivation and expanding all positive aspects of development. The main step to be taken to realize the given objective is achieving the major goal of "social justice" and identifying the existing situation. Perhaps, lack of proper recognition of the conditions would put an end to all the efforts of those involved in the eradication of poverty and deprivation and social justice realization. (Mahdavi and Karimzade, 2006)

Spatial heterogeneity rates have roots in four aspects of non-spatial inequalities including economic, political, social and environmental management is (Marsusi, 2004) and eradicating such injustice needs passing clear public policies of the governments, setting the new social contract and increase the citizens' unity in different regions of a city. (Vaez- e-Mahdavi et.al, 2008). Besides, in order to for the entire citizen to reach their needs, the issue of the social justice will arise. (Khoshroy, 2006)

The problems associated with the disorganized and unrestrained urban development has caused the failure of the efforts made by the urban affairs policy makers and the efficiency of the urban development plans. (Johnsoon, 1998) Inconsistent urban development of cities are usually occurred in unprepared land. (Zhang, 2000)

Urban development expansion which results into the low urban density development will lead to increased energy consumption and destruction of agricultural land while the intensive development along with the high population density is associated with reduced energy consumption and minimized pollution. (Aldous, 1992)

The technology improvement rate has widely had an influence in population growth and the number of cities (Henderson and Wang, 2007)

Generally, in the overall pattern of urban structure growth, the "compact city" and "widespread city" concepts that most cities have followed their pattern claim the sustainable city structure. (Chon, 2006)

Theoretical principles:

The concept and output of social justice is a notion that broke into the geographical literature from the late 1960s and significantly affected the radical and liberal geography than other schools. (Shokuie, 2006) in general, justice fulfillment requires economic efficiency (Bastanifar & Renani, 2008).

Undoubtedly, the concept of social welfare has a direct dependency on social justice; although this concept has always been in the field of ethics and political movement, it was not very active in the field of planning (Mehdizadeh et.al, 2006) as one of the goals of urban planning is the collecting appropriate public services. (Pourmohammadi, 2006). In other words, the quantity and the quality of urban services has an effective role in the displacement of the population and the demographic changes of the population in urban areas. Therefore, the distribution of urban services must be in such a way that it establishes the spatial justice. (Varesi and Ghaed Rahmati; 2007)

Besides, reducing inequalities in the using of the resources, facilities and the achievements in a society is one of the most important criteria in development (Taghvaie and Ghaed Rahmati; 2007). Lack of urban services distribution not only leads to disturbing the balance of population in cities but also sets the urban spaces to be inconsistent with the justice on the social and economic dimensions. (Varesi and Zangi Abadi; 2008).

The idea of development was first proposed by Truman, the president United States, in 1949. (Varesi, et.al; 2008)

The population balance is the most rudimentary criterion of sustainable urban development because the threat to the destruction of non-renewable resources and facilities will be lowered at these conditions and the urban services dispersion or concentration in certain areas will be prevented. (Burgess, R., 2000)

At the national level, the sustainable development is one of the objectives of the economic and social policies and plans which is not only common but also recognized. When the sustainable urban development was proposed, the vulnerability of the "widespread city" concept with the high cost of transportation and infrastructure and housing would be clearer. (Gusdorf & Hallefite, 2007) a development would be considered sustainable if the needs of the generation today are met without jeopardizing the needs of future generations. (Chozen, 2002)

The term "widespread city" refers to the uncontrolled possession of the land, the uniform and homogeneous development and inefficient use of land (Piser, 2006) the compacted urban development will lower the impressionability of the people from the environment (Burro, 2001) whereas, in the "widespread city" concept, most urban spaces are unused and cost-effective ((Brueckner & Largey, 2007). Disproportionate urban development usually occurs in unprepared land. (Zhang, 2000). Extent of urban development causing low

density urban development will lead to increased energy consumption and destruction of agricultural land while the intensive development of high population density has reduced energy consumption and minimized pollution (Aldous, 1992). The technology improvement rate has widely had an influence in population growth and the number of cities (Henderson and Wang, 2007)

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According to the Rohdes (1999) the economic dynamism and educational opportunities and facilities fail to develop, especially for the women in rural areas who have spent an average of about 90 minutes in day for carrying water. Water shortage is another important factor in urban dwelling increase in a way that the farmers cannot drill the new wells and have to join the migrant villagers and in central Asia the most important emphasis of the sustainable development is the irrigation plans (rohdes, 1999) the growing phenomenon which can be observed in dry areas around the world is the mounting and rising growth of the population to over 10 million which cannot guarantee neither the sustainability nor the future generation due to lack of resources. (Alshuwiakhat, 2002).

Hall believes that the high irregular and unconventional growth of the population in dry areas are likely to be more than 2 million by 2025 with a population deprived of basic education and economy who will be affected by poverty too. ((Hall, 2000).

In the process of development in dry regions, four subdivisions of natural resources, urban design, ecological systems and metropolitan government are necessary. It is clear that for a successful implementation of the specified development, all the stages from the latent stage to the final stages should be accomplished, but in a dry area it should be required to implement a mechanism that focuses on rough and harsh areas, dynamic culture and social-economic diversity - is more economical, can be felt. (Hampel, 2000)

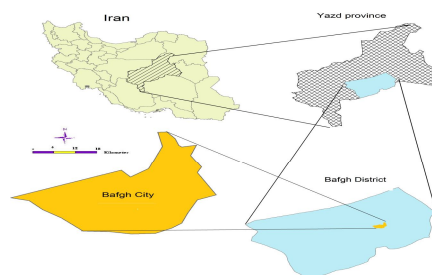
METHODOLOGY

Regarding the nature and objectives of the research, the general approach to the study is "analytical - descriptive" and the type of research is applied and the statistical sample of the study is the 10 regions of the Bafgh based on the structural divisions of the municipality. The data gathering procedure was based on the field data collection and documentation, and for evaluating the physical development of the city, the Shanol entropy for the city structure was used.

Since the economic factors of mining and industry influenced the physical growth, the spatial coefficient of the economic model was used and finally, by using the SPSS software, we reduced the 29 indicators to seven factors by applying factor analysis upon which the contribution of each factor for the development sustainability of the city was evaluated which would provide the optimal model for the sustainable city structure.

Introducing the area of the study:

The city of Bafgh is located in the South East of Yazd province and is the central city of Yazd which has been famous for the its erosion and running sand, this city is between 54 ° degree and 43 minutes to 38 ° degree and 56 minutes of eastern longitude and 31 degree and 7 minutes to 32 degrees and 28 minutes of the northern latitude and is 120 km away from Yazd. the large parts of the North, East and West in Bafgh is surrounded by the swamps, salt marsh and deserts including the fig canyon (Anjir Canyon) located in the North East part of the city. From the borders of the Yazd city to the borderlines of the Bafgh, you can see the barren deserts and sprawl hills which are affected by running sands which cannot be stabilized due to the salt marsh in the northern part of the city. (The army geographical organization; 2002). The city covers an area of about 15,298 square km which ranks the third among other cities of Yazd province for its size (The Management and Planning Organization of Yazd Province; 2006) the neighboring cities from the north, north west, south and east and west parts are Ardakan, the city of Yazd, Kerman province and Mehriz, respectively. Map1: the position of the city of bafgh in yazd province of iran



Source: Author

The time-based analysis of urban development in Bafgh

Like any other cities in the country, Bafgh has experienced rapid urbanization after the land reform (agrarian reform), but such a rapid growth did not lead to a sprawl physical development of the city but rather the discordant development of the city belongs to the second movement which is related to the Islamic revolution. the analysis of the demographic changes of the city shows that the population of the city between 1956 – 2006 had always an ascending order which can be observed especially in 1966-1976 so that the first population and housing census of the city in 1956 showed that only 4,505 people lived in the city and its area was 15,316 square km which resulted to a %2/16 population growth in the year 2006 to 31,046 persons. The highest population growth is related to the decade between 1966-1976 with a population of about 6639 and the annual growth rate of the population was equal to %8/5 which indicates a high figure. We have seen a relatively slower growth rate from 1986 onwards that is the population of about 20,402 in 1986 reached 25,068 in 1996. The incremental growth of % 22/9 and the rate of %2/1 in 1996 compared with those of 1365, that is %71/9 growth to 22/18 and the growth rate of %5/57 to 2/1 revealed a decrease which showed that the population growth was balanced. Table 1 shows the population change, growth, increased number and rate in Bafgh between 1956– 2006.

Table1: Bafq population growth and volume 1956-2006

1385	1375	1365	1355	1345	1335	Year
31046	25068	20516	11929	5290	4505	Population
2/16	2/02	5/57	8/5	1/62	1	Population growth
5978	4552	8587	6639	785		Volume increase
23/8	22/18	71/9	125/5	17/42		-percentage of population increase

Source: Statistical Center of Iran, Public census of Bafq, 1956-2006

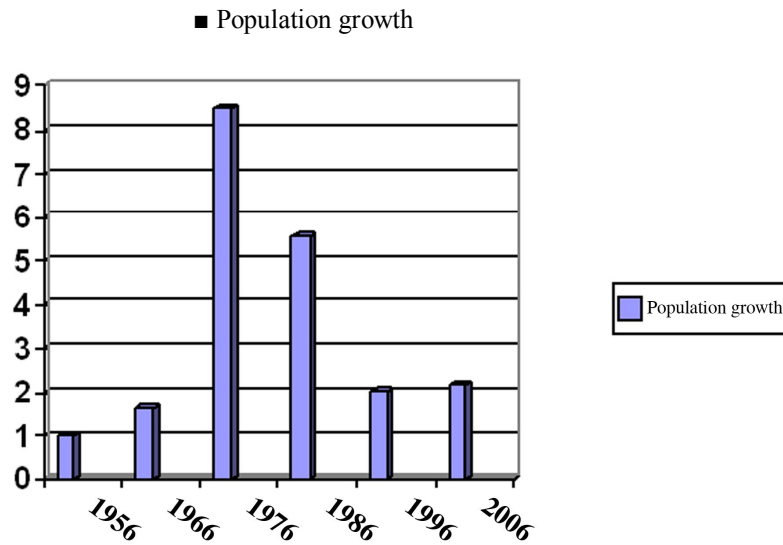


Diagram of changes in population growth rate of Bafq in 1956-2006

The growth pattern of Bafgh

in order to analyze the urban development and the growth pattern of the Bafgh, we used the two indicators of spatial coefficient and Shannon entropy method.

A) The spatial coefficient

The spatial coefficient is one of the methods for regional analysis and the study to evaluate its relation with other areas. (Hekmatnia and Mousavi, 2006)

Considering the fact that the population of the city in 2006 was about 7126 person among whom 395 were working in agricultural section, 3463 persons in industry and mine section and 3202 person in the service sector. The spatial coefficient structure model is as follows: (Blair, 1991)

$$L.Q = \frac{\frac{TN_i}{CN_i}}{\frac{TN_a}{CN_a}}$$

Therefore, the spatial coefficient for the industry and mine section has been calculated for this town:

$$LQ = \frac{\frac{3463}{7126}}{\frac{152254}{20476343}} = 6/5$$

Regarding the calculated number of 6/5, it can be concluded that the LQ value for Bafgh in the mine industry for those employed in 2006 was more than 1 which was equal to 6/5 and it can be revealed that mining was the city's main job which can serve as the main reason for the physical development of the city.

B) The Shannon entropy model

This model is used to analyze and determine the sprawl phenomenon of urban growth. The overall structure of the model is as follows: (Sudhira, et.al, 2003)

$$H = -\sum_{i=1}^n Pi \times Ln(Pi)$$

The entropy value ranges from zero to the value of Ln (n), the Zero value indicates the compact development of the city and the Ln (n) value represents the scattered physical development of the city. When the entropy value is higher than that of the Ln (n) value, the sprawl urban growth occurs. (Hekmatnia and Mousavi, 2006)

Analyzing and considering the physical growth of Bafgh

Based on the analysis and evaluation conducted for Bafgh, 10 regions were specified for the city the size of which based on the statistics of the years 1996 and 2009 are presented in Table (2). In order to analyze and determine the sprawl phenomenon of urban growth rate, the Shannon entropy model is used which has the following structure model (Hekmatnia and Mousavi, 2006)

$$H = -\sum_{i=1}^n Pi \times Ln(Pi)$$

In the above equation,

“H” is the Shannon entropy

“Pi” is the proportion of the built area (overall density of the residential) of region” i” to the total built area of all regions

“ n” is Total area

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Based on the statistics of the years 1996 and 2009 presented in Table (2), the entropy values for the given years are 2/2225 and 2/2347, respectively, whereas the maximum value of Ln (10) is equal to 2/3025.

Close and lower Shannon entropy value to the highest value indicates scattered growth of urban physical development of Bafgh. Studies show that the amount of entropy in 2009 was closer to the highest Shannon entropy value than in 1996, which shows that the physical development growth of Bafgh is dense.

Table2: Calculating Shannon entropy for years 1996 and 2009 of Bafq statistical regions

2009				1996				Region
P _i ×Ln(P _i)	Ln(P _i)	P _i	Built Area (Hectare)	P _i ×Ln(P _i)	Ln(P _i)	P _i	Built Area (Hectare)	
-0/2399	-2/2284	0/1077	36	-0/2259	-2/3361	0/0967	24	1
-0/1986	-2/5536	0/0778	26	-0/1621	-2/8752	0/0564	14	2
-0/2164	-2/4101	0/0898	30	-0/1967	-2/5691	0/0766	19	3
-0/2206	-2/3773	0/0928	31	-0/2148	-2/4224	0/0887	22	4
-0/2471	-2/1741	0/1137	38	-0/2763	-1/9582	0/1411	35	5
-0/3125	-1/6841	0/1856	62	-0/3252	-1/5818	0/2056	51	6
-0/2787	-1/9400	0/1437	48	-0/2462	-2/1812	0/1129	28	7
-0/1684	-2/8167	0/0598	20	-0/2029	-2/5182	0/0806	20	8
-0/1841	-2/6765	0/0688	3	-0/1767	-2/7410	0/0645	16	9
-0/1684	-2/8167	0/0598	20	-1/1957	-2/5561	0/0766	19	10
-2/2347	-	1	334	-2/2225	-	1	248	Total
H₂₀₀₉ = 2/2347				H₁₉₉₆ = 2/2225				

Source: Author

Ranking of the ten areas of Bafgh in indexing combination

The ten regions of the Bafgh, based on the municipality divisions, were divided into 5 sections of sustainable development (ideal development) with the value of 0/9 -1, strongly sustainable (positive) with the value of 0/8-0/9, semi-sustainable with the value of 0/5-0/8, weak sustainability with the value of 0/25- 0/5 and unsustainable with the value of 0-0/25. Based on the results of the study, the region 3 is considered to be most sustainable and the area 8 is regarded as the most unsustainable region of the city.

Table3: Sustainability rate of Bafq regions according consolidated indexes

Sustainability Rank	Sustainability	HDI	Region
2	Strongly sustainable (positive)	0/702	1
3	Semi-sustainable	0/686	2
1	Strongly sustainable (positive)	0/746	3
5	Semi-sustainable	0/68	4
4	Semi-sustainable	0/684	5
9	Weakly sustainable (negative)	0/563	6
6	Semi-sustainable	0/645	7
10	Weakly sustainable (negative)	0/557	8
8	Semi-sustainable	0/62	9
7	Semi-sustainable	0/621	10

Source: Author

The region 3 is the only sustainable region of the city which has a traditional and a modern part and the traditional part is consisted of some neighborhoods like Ghale (fort), sar estakhr, Mozafarieh and Lordghebe and the modern part encompasses the residential areas built by the railroad organization, and the area 8 as a new area with the smallest and most dense area built in the city has the highest gross density and building density which is considered the most unstable (unsustainable).

Table4: number and percentage of Bafq 10 regions in urban sustainability level according to consolidated indexes

Total	Unsustainable		Weakly sustainable		Semi- sustainable		Strongly sustainable		Sustainable	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
10	0	0	20	2	60	6	20	2	0	0

Source: Author

The combination indexes, it is determined that none of the regions have a perfect sustainability or ideal development and in fact all the regions are in a semi-sustainable condition and that's why we used strong and weak sustainability to refer to the regions. It can be said that regions 6 and 8 are in a more severe condition than the rest and areas 1 and 3 have more desirable conditions but they are not completely sustainable.

The comparison of regional differences in the combination indices shows that dispersion (variation) coefficient (C, V) was 8 per cent.

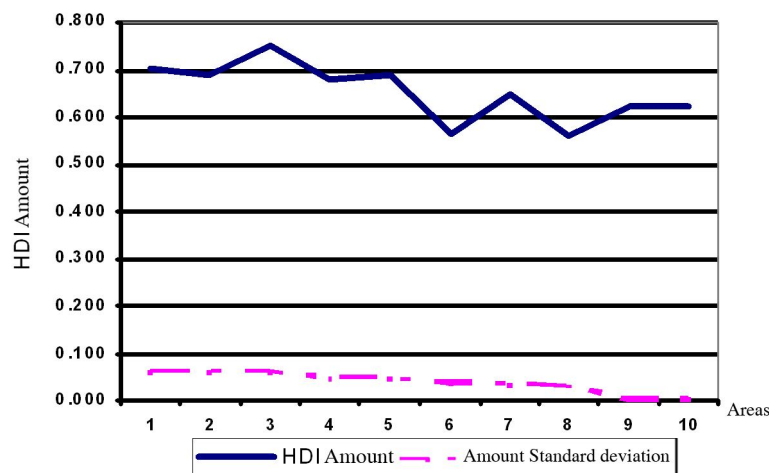
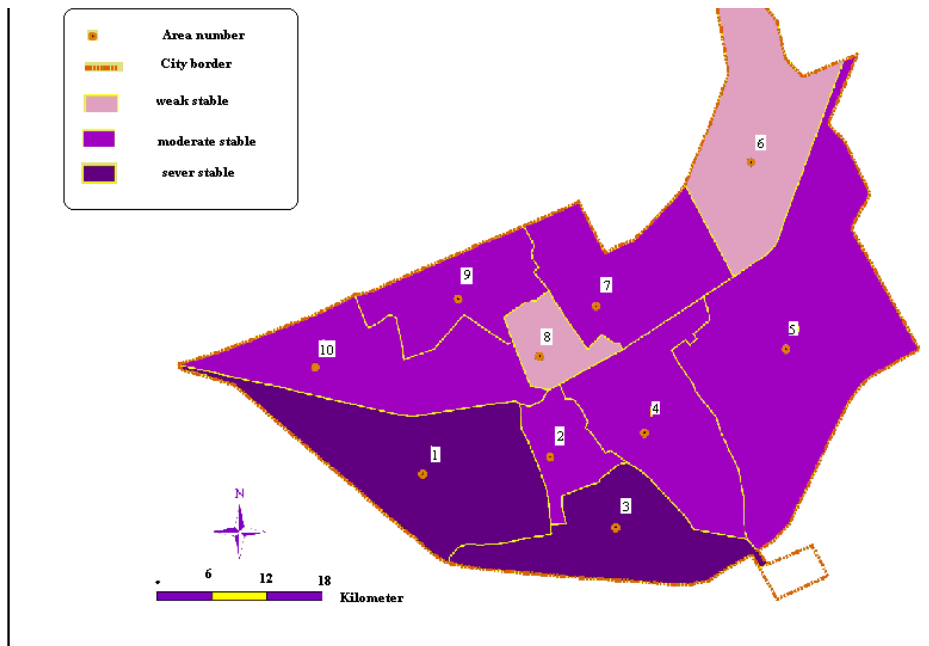


Diagram of lineal equations of Bafq 10 regions in consolidated indexes

Source: Author



Map2: sustainability condition of Bafq urban regions according consolidated indexes.
Source: Author

This figure indicates that the inequality among the different regions of Bafgh is great based on sustainable development indicators so that the. Congruity and convergence among regions is very little.

Conclusion

The growth and urban development pattern in the case of "widespread city" and "compact city" as the sample of the study for achieving the sustainable urban structure was evaluated in the study which is based on social justice.

Based on the studies conducted on the same issue, it can be argued that the urban development pattern will lead to a sustainable city structure if the justice is achieved. Therefore, in order to reach the optimal pattern of urban development, we can prioritize the Bafgh regions urban development based on the factor analysis values by using SPSS software and multi-variable regression model. The sustainability of the region is evaluated based on the results of the study and it becomes evident that none of the regions perfect sustainability or ideal development and in fact all the regions are in a semi-sustainable condition. It can be said that regions 6 and 8 are in a more severe condition than the rest and areas 1 and 3 have more desirable conditions but they are not completely sustainable.

Suggestions

Regarding the result of the study, some strategies for the sustainable physical development for the Bafgh are given below:

- Allocating a portion of the revenues from the exploitation of mines to the city development
- Giving priority to local people working in the mines instead of non-native people
- Applying the population control policies
- Increasing the awareness of citizens in implementing policies to control population
- Implementing studies and improving of physical structure and determining the suitable utilization adaptable to the needs of the residents in the form of the short and medium term plans
- preventing the horizontal spread of the city
- Expanding the facilities and installations that cause migration and displacement of populations in unsustainable suburban areas of the city and resulted in a disharmonious (sprawl) growth and expansion of the city.
- Designing the building and predicting the service facilities to serve the traditional and historic structure of the city for the preservation and restoration of existing spaces

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