

# The Assessment of Physical Criteria of Sustainability in Urban Communities (with Emphasis on the Hot and Dry Climate)<sup>1</sup>

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## ABSTRACT

Population increases in cities, as well as a strong trend towards urbanization that have a variety of reasons, including focusing more services in cities is a phenomenon with which large cities in developing countries are faced. On the other hand, due to the increase in global warming and climate change, thinkers and theorists have sought many different solutions, one of which is the theory of "sustainable development". For years, the theory had further emphasized the economic needs and environmental limitations, but it has played more part in the local and indigenous aspects with the emergence of the slogan "think globally, act locally" in the past decade. On the other hand, each city can be identified by the characteristics of its residential communities, and can meet various economic, social, cultural needs of its citizens if the problems and damages are less at the community level. What can currently be seen are developments in the old urban contexts and their replacement by new contexts in which a large number of problems may be encountered, and then there would be more problems when a comparison is made between the new contexts with older communities? This paper has been explored criteria for structure of sustainable urban communities and tried to prove the hypothesis, which physical characteristics of a community in the hot and dry climate of Iran meets some principles which have led to sustain traditional indigenous communities. To prove the hypothesis, three traditional indigenous communities in Yazd were studied. The physical criteria for sustainable community in both housing and community sectors were studied by distributing questionnaires using importance-satisfaction rate. Finally, the scientific-deductive method confirmed that the traditional indigenous communities have more stability than existing communities in terms of its body.

**KEYWORDS:** sustainable urban communities, body, traditional indigenous communities, criterion.

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## 1. INTRODUCTION

Sustainability is defined in terms of three dimensions: environmental, social, and economic/financial. Examples of environmental sustainability include efforts to conserve and reuse the resources and materials, while examples of social sustainability include efforts to promote equity, diversity, and social justice. And finally, examples of economic sustainability include efforts to eliminate poverty and promote fair trade (Majedi, Habib et al. 2012).

Community plays important role in social life balance in cities as main element of urban space. If life quality changes in communities, it will be rapidly effective on the entire city. In early century 20, attention to residential communities was regarded as the main topic of new urban development theories such that these theories have been welcomed in order to deal with different urban problems (such as problems of management, social relations, hygienic issues, welfare issues and semantic and identity dimensions).

On the other hand, when issues of sustainable development were raised, different scales have been introduced for executing them in city. Although many definitions of sustainable development have been given in large scales, its concept has not been certainly classified in local scale while urban communities have been very important and their strengths and weaknesses can be communicated to the entire city in different dimensions and can affect its efficiency. The question is raised here why the modern communities are not necessarily efficient and life quality has decreased in them though dimensions of the issues are completely evident in urban communities and one can find suitable solution for any deficiency. Many communities could act self sufficiently in the past and fulfill their needs and this does not hold true for the current communities. Discovering characteristics of these older communities will pave the way for paying attention to them and making these spaces more efficient than ever from different perspectives.

### 1- Research Hypothesis

Firstly and by reviewing the available references, some questions were raised in the research:

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- 1- Is there any way for making urban communities sustainable as one of the main constituents of cities?
- 2- Can we expect energy conservation and reduction of pollution in urban communities?
- 3- Is hot and arid climate of Iran has the principles with which one can reach sustainability of communities?
- 4- Can one formulate some criteria and principles in design of urban communities not to endanger biological resources and life quality of the future generations while fulfilling needs of its residents?

Considering the above questions, the research hypothesis is mentioned as follows:

Physical characteristic of community in hot and arid climate of Iran has the principles which led to sustainability of native –traditional communities. By mentioning the hypothesis, the preset research will seek to prove it.

## 2- RESEARCH METHOD

In this research, different references have been studied in order to formulate structural criteria of urban sustainable communities and interpretive approach has been used. In order to prove the hypothesis, the questionnaire was distributed and evaluated using satisfaction –importance analysis method. At the end, conclusions were made from the performed evaluations and the hypothesis was proved.

### 3- Community Sustainability Components

The term ‘sustainable community’ has become something of a ‘buzz phrase’ with regards to the built and social environment in recent years. It tends to be applied to communities who promote or seek to promote sustainability in sectors such as water, food, transport, waste and energy and is applicable to either new or existing communities(Rae and Bradley 2012).

Listed below are some of the characteristics and priorities, as defined by Geis and Kutzmark , which are typical of a sustainable community:

- Goals that are rooted in a respect for both the natural environment and human nature and that call for the use of technology in an appropriate way to serve both of these resources
- The placement of high values on quality of life
- Adoption of a systems approach to organization and management
- Supportive of life cycles
- Responsive and proactive(Geis and Kutzmark 1998)

Different thinkers and theorists studied sustainable urban communities. One can extract and classify components relating to each one of the views by studying different texts and conducting researches. What is evident from study of this classification is the similarity which is found in attitudes of different theorists. At the same time, each one of them has pointed to some of its aspects which can result from differences between them in local conditions and principles of their thoughts.

Summary of components relating to sustainability of communities from the viewpoint of theorists is given in table 1.

**Table 1: structural components of sustainable communities from the viewpoint of Theorists**

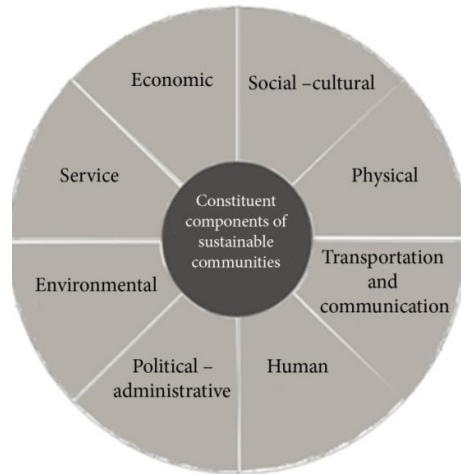
Component Theorists	Social –cultural	Economic	Service	Environmental	Political – administrative	Human	Transportation and	Physical
<b>Anne Power</b>	*	*	*	*	*		*	*
<b>Claire Bonham-Carter</b>	*		*	*	*		*	*
<b>Hugh Barton</b>	*	*		*			*	*
<b>Mark Roseland</b>	*	*		*		*		*
<b>Mike Raco</b>	*	*		*	*			*
<b>Patrick M. Condon</b>		*	*	*			*	*

By studying attitudes of the theorists, it was found that sustainable communities had components through which one can specify criteria for such communities. These components are classified into eight general groups which include:

- 1- Economic components
- 2- Social –cultural components
- 3- Political –administrative components
- 4- Physical components
- 5- Transportation and communication components
- 6- Service components

- 7- Environmental components
- 8- Human

It is necessary to note that these components have no hierarchical relation to each other and some of them may be prioritised considering local conditions.



**Figure 1- constituent components of sustainable communities**

Fig. 1 illustrates the resulting configuration and highlights two of its main features. Firstly, the centre as a set of ‘core strategic policy statements’ on sustainable communities and secondly: the outer ring showing the development issues in question i.e. social, equity, built and natural environmental components of sustainable community development. This also shows the main substantive change the switch from ‘academic to practitioner’ focus produces. This is highlighted in the fact the environment now makes up two contributions: the built and natural components of the model respectively. Or put in slightly different terms one quarter of the entire representation of sustainable community development issues(Deakin 2011; Kalulu, Hoko et al. 2012).

Considering what was mentioned and recognition of constituent components of sustainable communities, one can define sustainable community as follows: The communities in which the present and future people have high life quality have equal opportunities and different options for use of environmental friendly natural resources , produce less wastes , respect for ecosystems in local scale and will guarantee reinforcement and progress of their environment by improving status of the environment through sustainable participation.

**4- Structural Criteria of Sustainable Communities**

After conducting studies, it is evident that one can mention criteria relating to each one of the components of sustainable urban communities as structural criteria of sustainable communities. Therefore, the criteria which comprise structure of urban sustainable communities are classified into eight groups. What can be mentioned for these criteria is that some of them can be mentioned in more than one general title and relate it to two or three main groups. Considering the mentioned facts, structural criteria of sustainable communities include eight classes of physical, social –cultural, transportation and communication, service, economic, political – administrative, environmental and human criteria.

These criteria can be regarded as the most important and principal criteria in sustainable communities but one can point to other criteria considering local conditions and differences between different communities. In table 2, summary of these criteria is given.

**Table 2- structural criteria of sustainable communities**

	Component	Criterion
Sustainable urban community	Physical	<ul style="list-style-type: none"> <li>• varied architecture</li> <li>• multifunctional buildings with energy efficiency systems</li> <li>• higher building density</li> <li>• mixed land uses</li> <li>• Correct positioning of land uses</li> <li>• tolerable capacity of community</li> <li>• dynamicity and harmony</li> <li>• Proper public spaces</li> </ul>
	Social –cultural	<ul style="list-style-type: none"> <li>• distinguished community identity</li> <li>• clear environment with sense of place</li> <li>• social justice</li> <li>• social reinforcement and cohesion</li> <li>• respect and commitment among the residents</li> <li>• vitality</li> <li>• attractive environments with high life quality</li> <li>• low levels of crime and non-social behaviours</li> <li>• access to house for all social groups</li> </ul>
	Transportation and communication	<ul style="list-style-type: none"> <li>• integrated communication network and continuous design</li> <li>• transportation systems by producing low carbon</li> <li>• motor priority over passengers and bicycling</li> <li>• easy access and easy maintenance of networks and roads</li> <li>• visual control in local roads</li> <li>• lighter , greener , cheaper and smarter infrastructures</li> </ul>
	Service	<ul style="list-style-type: none"> <li>• easy and equal access of residents to local services</li> <li>• self sufficiency of community</li> <li>• responsive servicing</li> </ul>
	Economic	<ul style="list-style-type: none"> <li>• maximum use of potentials in community</li> <li>• creating different job opportunities from suitable local services</li> <li>• welfare and economic profitability</li> <li>• long-term and fixed economic commitments</li> <li>• establishing offices and local sites, house activities and communication centres</li> </ul>
	Political – administrative	<ul style="list-style-type: none"> <li>• correct and efficient management</li> <li>• collective management</li> <li>• accountable and responsible management</li> </ul>
Sustainable urban community	Environmental	<ul style="list-style-type: none"> <li>• energy efficiency and use of recyclable energies</li> <li>• design sensitive to water resources , air quality and recycle of soil</li> <li>• use of surface waters and local wastewater and recycle of groundwater</li> <li>• use of local and recyclable resources and materials</li> <li>• use of barren and useless lands</li> <li>• biodiversity and protection of life and communication corridors of organisms</li> </ul>
	Human	<ul style="list-style-type: none"> <li>1- public utilities</li> <li>2- science and knowledge</li> <li>3- skill</li> <li>4-Health of people</li> </ul> <p style="text-align: right;">} high level of human capital</p>

**5. Selection of City and the Desired Communities in it**

Yazd province especially Yazd city is very important among cities of Iran due to its architectural and traditional values of desert - fringe cities and since a set of ancient monuments and historical buildings. In fact, Yazd can be regarded as symbol of desert cities of Iran (Kalantari and Hataminezhad 2006) based on archaeological researches which has been conducted in the region. Yazd province is one of the important prehistoric civilisation centres and some of its villages and cities date back 5000 years (SeyyedHosseini 2002).

Considering that the subject of this research is to pay attention to hot and arid climate in Iran and based on the above remarks, Yazd city has been selected as the case sample in order to prove the hypothesis of Yazd province. Historical space of Yazd includes 9 main communities and 49 sub communities among which Fahadan, Sheikhdad and Gondbad Sabz communities have been selected for studying and proving the hypothesis.

**6-Hypothesis Proof**

In order to prove the hypothesis, attitudes of the residents in historical communities of Yazd (three Fahadan, Sheikhdad and Gondbad Sabz communities) have been evaluated. For this purpose, 100 questionnaires were distributed among the community residents. In this questionnaire, sustainable physical criteria were

classified into two groups of house and community in addition to some general questions and some answers from very high to very low for each question were included. The residents select one of the options considering status of the question relating to the community. The answers given to the questions were analysed with importance –satisfaction analysis method. Generally, there are two important subjects for decision-making in the city or community:

- 1- Studying the services which are the most important for citizens.
- 2- Studying the services which are the least satisfactory for the citizens.

Satisfaction –importance rate is the unique instrument which allows the deciders to consider two factors of satisfaction and importance for making decision about each one of the services. The mentioned rate is based on this concept that cities improve and promote the issues which are the most important and the least satisfactory for citizens.

Satisfaction and importance rate is calculated based on responses of the residents:

$$IS = I(1-S) \quad 0 \leq IS \leq 1$$

In this formula, I is percent of importance and S is percent of satisfaction. Percent of importance is calculated by adding responses of very high and high (when the responses are in five intervals of very low to very high) and percent of satisfaction is obtained by adding responses of high and very high. Desirable state is obtained when satisfaction and importance percent is equal to zero and it means that all residents are fully satisfied with the subject matter. When Satisfaction and importance rate is equal to 1, the result is that the related subject should be considered as priority from the viewpoint of all residents. Using this rate, analysis of all services is based on the following conditions:

- 1- If  $IS \geq 0.2$ , the emphasis will certainly increase.
- 2- If  $IS \geq 0.1$ , the current emphasis will increase.
- 3- If  $IS < 0.1$ , the current emphasis will be stabilised (Maleki and Habibi 2011).

**6-1- Satisfaction and importance rate analysis in Fahadan community**

After distributing the questionnaire in Fahadan community and specifying views of the community residents, results of the evaluations are given in two tables which have separately studied criteria relating to house and community. Based on table 3, there is need for improvement of conditions and increasing emphasis on them regarding criteria of the number and size of rooms, the presence of parking lot in houses, size and area of units, strength of building. Therefore, it should be prioritised for decision making and intervention. Regarding criteria of use of heating and cooling systems in units, green space, vent and pool house and underground in houses, houses of the community should be partially improved and emphasis on them should be increased. Regarding other criteria, there are suitable conditions in the community and these conditions should be stabilised.

**Table 3- criteria of physical sustainability in house in Fahadan community**

Criteria of house	Rank IS	Rate IS	Importance rank	Importance percent	Satisfaction rank	Satisfaction percent
Strength of building	1	0/7020	1	78	12	10
The number and size of rooms	2	0/3360	2	42	9	20
Parking lot	3	0/2392	3	26	13	8
Size and area of unit	4	0/2112	4	24	11	12
Green space	5	0/1827	5	21	10	13
Heating and cooling systems	6	0/1360	6	20	6	32
The presence of vent and pool house	7	0/1296	7	18	7	28
Wall and ceiling thermal insulator	8	0/0990	7	18	4	45
Location of rooms	9	0/0988	9	13	8	24
Paint of facade	10	0/0784	8	14	5	44
Material of facade	11	0/0605	10	11	4	45
Light of rooms	12	0/0602	8	14	3	57
Noise Pollution	13	0/0442	9	13	2	66
Proximity and privacy	14	0/0216	11	8	10	73

Evaluation of criteria relating to community is given in table 4. Considering table 4, there is need for improvement of conditions and increase of emphasis on them regarding criteria of the presence of community parks, recreation places and green space in community and they should be prioritised for decision making and intervention. Regarding criteria of the play space for children, wind blow and storm in passageways and undesirable condition for the community residents, sunshine on passageways in winter and finally suitable width

of alleys and streets of the community, there is need for partial improvement and emphasis on them should be increased to some extent. Regarding other criteria in community, there are suitable conditions and these conditions should be stabilised.

Table 4- criteria of physical sustainability in Fahadan community

Criteria of community	Rank IS	Rate IS	Importance rank	Importance percent	Satisfaction rank	Satisfaction percent
community parks	1	0/3290	1	35	11	6
recreation places	2	0/2880	2	32	8	10
green space	3	0/2184	3	24	9	9
Play space for children	4	0/1840	4	20	10	8
Parking lot	5	0/1824	5	19	12	4
Wind blow and storm in passageways	6	0/1178	5	19	5	38
Sunshine on passageways in winter	7	0/1134	6	18	6	37
Suitable width of alleys and streets	8	0/1105	7	17	7	35
Suitable services	9	0/0910	8	14	7	35
Suitable space for walking	10	0/0901	7	17	4	47
Human scale and environment	11	0/0492	9	12	3	59
Shading in the passageways	12	0/0420	9	12	1	65
The presence of archway in passageways	13	0/0360	10	10	2	64

## 6-2- Satisfaction –Importance Analysis in Gonbad Sabz Community

After distributing questionnaire in Gonbad Sabz community and evaluating questionnaires regarding criteria of house, table 5 is given. Based on table 5, there is need for improvement of conditions and increasing emphasis on them regarding criteria of the number and size of rooms, strength of building, the presence of vent and pool house and size and area of units. Therefore, it should be prioritised for decision making and intervention. Regarding criteria of green space, use of heating and cooling systems in houses, the presence of parking lot, material and paint of facade, and location of rooms in houses and these conditions should be stabilised.

Table 5- criteria of physical sustainability of house in Gonbad Sabz community

Criteria of house	Rank IS	Rate IS	Importance rank	Importance percent	Satisfaction rank	Satisfaction percent
number and size of rooms	1	0/3276	2	42	9	22
strength of building	2	0/3105	1	45	7	31
the presence of vent and pool house	3	0/2225	5	25	13	11
the number and size of rooms	4	0/2001	3	29	7	31
Green space	5	0/1782	6	22	12	19
heating and cooling systems	6	0/1680	7	21	11	20
Parking lot	7	0/1638	4	26	5	37
Material of facade	8	0/1343	9	17	10	21
Paint of facade	9	0/1200	10	16	8	25
Location of rooms	10	0/1121	8	19	4	41
Wall and ceiling thermal insulator	11	0/0871	12	13	6	33
Light of rooms	12	0/0658	11	14	3	53
Proximity and privacy	13	0/0341	13	11	1	69
Noise Pollution	14	0/0315	14	9	2	65

Evaluation of criteria relating to community is given in table 6.

Table 6- criteria of physical sustainability in Gonbad Sabz community

Criteria of community	Rank IS	Rate IS	Importance rank	Importance percent	Satisfaction rank	Satisfaction percent
green space	1	0/2790	1	30	11	7
recreation places	2	0/2436	2	28	9	13
community parks	3	0/2088	4	24	9	13
Suitable space for walking	4	0/1794	3	26	7	31
Play space for children	5	0/1691	6	19	10	11
Shading in the passageways	6	0/1638	3	26	4	37
Sunshine on passageways in winter	7	0/1224	7	18	6	32
Parking lot	8	0/1190	8	14	8	15
The presence of archway in passageways	9	0/1152	7	18	5	36
Wind blow and storm in passageways	10	0/0884	9	13	6	32
Suitable width of alleys and streets	11	0/0868	8	14	3	38
Suitable services	12	0/0780	5	20	1	61
Human scale and enclosure	13	0/0462	10	11	2	58



Considering table 6, there is need for improvement of conditions and increase of emphasis on them regarding criteria of the presence of green space in community, recreation places, the presence of community parks and they should be prioritised for decision making and intervention. Regarding criteria of suitable space for walking, the play space for children, shading in the passageways, sunshine on passageways in winter and the presence of archway in the passageway, there is need for partial improvement and emphasis on them should be increased to some extent. Regarding other criteria in community, there are suitable conditions and these conditions should be stabilised.

**6.3. Satisfaction and importance rate analysis in Sheikhdad community**

After distributing the questionnaire in Sheikhdad community and evaluating the questionnaires regarding criteria of house, table 7 is obtained.

**Table 7- criteria of physical sustainability of house in Sheikhdad community**

Criteria of house	Rank IS	Rate IS	Importance rank	Importance percent	Satisfaction rank	Satisfaction percent
Heating and cooling systems	1	0/2573	1	31	12	17
Strength of building	2	0/1932	2	28	9	31
Parking lot	3	0/1633	3	23	10	29
Vent and pool house	4	0/1463	4	19	11	23
Number and size of rooms	5	0/1197	4	19	7	37
Size and area of units	6	0/1152	5	18	8	36
Green space	7	0/1037	6	17	6	39
Location of rooms	8	0/1020	6	17	5	40
Wall and ceiling thermal insulator	9	0/0793	7	13	6	39
Material of facade	10	0/0561	8	11	4	49
Light of rooms	11	0/0380	9	10	2	62
Paint of facade	12	0/0329	11	7	3	53
Noise pollution	13	0/0304	10	8	2	62
Proximity and privacy	14	0/0192	12	6	1	68

Considering table 7, there is need for improvement of conditions and increase of emphasis on them regarding criteria of the heating and cooling systems and they should be prioritised for decision making and intervention. Regarding criteria of strength of building, parking lot, vent and pool house, the number and area of unit, green space and location of rooms, there is need for partial improvement and emphasis on them should be increased to some extent. Regarding other criteria in community, there are suitable conditions and these conditions should be stabilised. But evaluation of the criteria relating to community is given in table 8. Considering the table regarding criteria of recreation places, the presence of community parks and the presence of play space for children, there is need for improvement of conditions and increase of emphasis on them and they should be prioritised for decision making and intervention. Regarding other criteria in community, there are suitable conditions and these conditions should be stabilised.

**Table 8: - criteria of physical sustainability of community in Gonbad Sabz community**

Criteria of community	IS Rank	IS Rate	Importance rank	Importance percent	Satisfaction rank	Satisfaction percent
recreation places	1	0/3510	1	39	11	10
community parks	2	0/2640	2	30	10	12
Play space for children	3	0/2324	3	28	9	17
Parking lot	4	0/0915	4	15	7	39
Green space	5	0/0871	6	13	8	33
Suitable width of alleys and streets	6	0/0854	5	14	7	39
Suitable space for walking	7	0/0627	7	11	6	43
Suitable services	8	0/0546	6	13	4	58
Sunshine on passageways in winter	9	0/0517	7	11	5	53
Wind blow and storm in passageways	10	0/0420	8	10	4	58
Shading in the passageways	11	0/0315	9	9	2	65
The presence of archway in passageways	12	0/024	10	6	3	60
Human scale and enclosure	13	0/0186	10	6	1	69

**7- Analysis of Questionnaire and Study of Sustainability in Communities**

After distributing the questionnaires in three communities and evaluating them, the following results are obtained:

- 1- Fahadan community in house has sustainable criteria regarding suitable proximity and privacy, suitable noise pollution, suitable light condition of rooms, suitable material of houses and paint of facade and suitable location of rooms in houses. But this community is highly sustainable and desirable in terms of criteria such as the presence of archway in passageways and its positive climatic effects for the community residents, suitable shading on passageways in summers and thermal comfort, human scale and suitable enclosure in passageways of the community, the presence of suitable space for walking for the distinct residents and finally the presence of suitable services at day and night in the community and fulfilling needs of the

residents. Sustainability in Fahadan community is given in table 9 based on community sustainability criteria in two sections of house and community. ( very high sustainability =1 and very low sustainability =5)

**Table 9- sustainability matrix in Fahadan community**

Section	Sustainability criteria	Sustainability rate				
		1	2	3	4	5
House	1- Size and area of rooms					
	2- Parking lot					
	3- Size and area of unit					
	4- Location of rooms					
	5- Heating and cooling systems					
	6- Noise pollution					
	7- Wall and ceiling thermal insulator					
	8- Proximity and privacy					
	9- Light of the rooms					
	10- Strength of building					
	11- Green space					
	12- Vent and pool house					
	13- Material of facade					
	14- Paint of facade					
Community	1- Suitable width of alleys and streets					
	2- Green space					
	3- Suitable space for walking					
	4- Play space for children					
	5- Community parks					
	6- Recreation places					
	7- Parking lot					
	8- Suitable services					
	9- Shading on passageways in summer					
	10- Sunshine on passageways in winter					
	11- Human scale and enclosure					
	12- the presence of archway in passageways					
	13- wind blow and storm in passageways					

2- Gonbad Sabz community in house has sustainable criteria regarding suitable noise pollution, suitable proximity and privacy, suitable light condition of rooms in houses of community, suitable thermal insulator in wall and ceiling of houses in the community. This community is sustainable in terms of community criteria such as human scale and suitable enclosure in passageways, the presence of suitable services at day and night in the community for fulfilling needs of the residents, the presence of archway in passageways, suitable width of alleys and streets and preventing discomfort of the residents at time of wind blow and storm on the passageways. Sustainability in Gonbad Sabz community is given in table 10 based on community sustainability criteria in two sections of house and community. ( very high sustainability =1 and very low sustainability =5)

**Table 10- sustainability matrix in Gonbad Sabz community**

Section	Sustainability criteria	Sustainability rate				
		1	2	3	4	5
House	1- Size and area of rooms					
	2- Parking lot					
	3- Size and area of unit					
	4- Location of rooms					
	5- Heating and cooling systems					
	6- Noise pollution					
	7- Wall and ceiling thermal insulator					
	8- Proximity and privacy					
	9- Light of the rooms					
	10- Strength of building					
	11- Green space					
	12- Vent and pool house					
	13- Material of facade					
	14- Paint of facade					
Community	1- Suitable width of alleys and streets					
	2- Green space					
	3- Suitable space for walking					
	4- Play space for children					
	5- Community parks					
	6- Recreation places					
	7- Parking lot					
	8- Suitable services					
	9- Shading on passageways in summer					
	10- Sunshine on passageways in winter					
	11- Human scale and enclosure					
	12- the presence of archway in passageways					
	13- wind blow and storm in passageways					



3- Sheikhdad community in house has sustainable criteria regarding suitable proximity and privacy in houses, suitable noise pollution in houses, paint and material of facade, suitable light condition of rooms in houses of community and suitable thermal insulator in wall and ceiling of houses. This community is sustainable in terms of community criteria such as desirable human scale and suitable limit of enclosure on passageways in summer days, preventing discomfort of the residents at time of wind blow and storm on the passageways, suitable sunshine on the passageways in winters, the presence of suitable services at day and night in the community for fulfilling needs of the residents and the presence of suitable space for walking in the community. Sustainability in Gonbad Sabz community is given in table 11 based on community sustainability criteria in two sections of house and community. (Very high sustainability =1 and very low sustainability =5)

**Table 11- sustainability matrix in Sheikhdad community**

Section	Sustainability criteria	Sustainability rate				
		1	2	3	4	5
House	1- Size and area of rooms				///	
	2- Parking lot		///			
	3- Size and area of unit			///		
	4- Location of rooms		///			
	5- Heating and cooling systems		///			
	6- Noise pollution	///				
	7- Wall and ceiling thermal insulator	///				
	8- Proximity and privacy	///				
	9- Light of the rooms	///				
	10- Strength of building				///	
	11- Green space		///			
	12- Vent and pool house			///		
	13- Material of facade		///			
	14- Paint of facade		///			
Community	1- Suitable width of alleys and streets	///				
	2- Green space				///	
	3- Suitable space for walking		///			
	4- Play space for children		///			
	5- Community parks			///		
	6- Recreation places			///		
	7- Parking lot		///			
	8- Suitable services	///				
	9- Shading on passageways in summer		///			
	10- Sunshine on passageways in winter		///			
	11- Human scale and enclosure	///				
	12- the presence of archway in passageways		///			
	13- wind blow and storm in passageways	///				

**9- Conclusion**

After formation of sustainability paradigm following energy crisis in 70s AD, environmental productivity and consequently man-made environments were considered to use resources and reserves in nature optimally and minimise pollution rate. Today, sustainable urban development which is regarded as one of the theories in recent periods has been studied in major part of urban development literature but this theory has not been explained in local scale and can be studied as subject of different researches. This research compiled structural criteria of urban sustainable communities and then studied physical criteria of sustainability in hot and arid climate of Iran. In order to prove the hypothesis, scientific –deductive method was used and three communities were selected in historical space of Yazd city as case sample. After careful scientific calculation, the number of the required questionnaires was estimated in order to create actual results and 100 questionnaires were separately distributed in each one of the communities among residents. After collecting questionnaires, each one of the criteria of house and community which had been included in questionnaire was evaluated and analyzed using scientific method for determining satisfaction –importance. At the end, a matrix was formed for each community and sustainability of each criterion had been clearly specified. What was obtained from estimation of these matrices showed that criteria of using thermal insulator in wall and ceiling, noise pollution, proximity and privacy of the buildings and light of the rooms were completely sustainable and the presence of suitable services in communities and human scale and desirable enclosure in passageways have created completely sustainable conditions in communities .

It was specified from the conducted studies that traditional communities of Iran which were located in hot and arid climate enjoy sustainable physical criteria and their physical problems are fewer than the problems in which many contemporary buildings and communities are involved . By proving the hypothesis, it is found that traditional communities have some physical principles which have directed them to higher sustainability. Here,

it is proved that one can learn abundant facts from the past and reduce problems of the contemporary communities by applying principles of constructing traditional communities.

#### REFERENCES

- Deakin, M. 2011. "Meeting the challenge of learning from what works in the development of sustainable communities." *Sustainable Cities and Society* 1(4): 244-251.
- Geis, D. and T. Kutzmark, 1998. "Developing Sustainable Communities: The Future is Now." from <http://www.freshstart.ncat.org/articles/future.htm>.
- Kalantari, H. and H. Hataminezhad, 2006. *Planning for the restoration of the historical context of Yazd*. Tehran, Navid Tehran.
- Kalulu, K., Z. Hoko, et al. 2012. "Sustainability Of Community Based Water Management In Mulanje District, Malawi." *Journal of Basic and Applied Scientific Research* 2(3): 2481-2488.
- Majedi, H., F. Habib, et al. 2012. "An Analysis to Challenges of Sustainable Urban Transport in Metropolitan Areas." *Journal of Basic and Applied Scientific Research* 2(10): 10523-10527.
- Maleki, L. and M. Habibi, 2011. "Environmental quality Assessment in urban communities, A case study: Chizar community." *Quarterly Journal of Architecture and Urbanism* 2(7).
- Rae, C. and F. Bradley, 2012. "Energy autonomy in sustainable communities—A review of key issues." *Renewable and Sustainable Energy Reviews* 16(9): 6497-6506.
- SeyyedHosseini, M. 2002. *Yazd Province Travel Guide Yazd*, Publication of Yazd province's Iran Travel, Tourism and Touring Organization.