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# Network passages directions and prevail wind blow direction in urban areas (case study: Shirvan City)

Mohammad Motamedi, Mehdi Vatanparast and Vahid Doltabadi

*Department of Geography, shirvan Branch, Islamic Azad University, Shirvan, Iran.*

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ABSTRACT

Climate is one of the important factors in human life and the important climatic elements are weather temperature, pressure, humidity. these kinds of climatic elements are effected by some others factors as: sun rays angle, winds, air masses and …. So it is necessary to pay attention to these parameters in cities establishment because it has a direct influence on urban areas. In this research we attend to study the passages directions concern prevail wind in Shirvan city. Shirvans has lied in 37degree and 23 minute N and 57 degree 54 minute E and its climate is cold semi-arid. Based on this research it was known just 40.27% of network passages in Shirvan city are completely suitable with prevail wind.



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## INTRODUCTION

Climate conditions can affect all of the human activities. For example the food that we eat, the home that we need, the clothes that we wear and the water that we drink and all of ours daily activities are impressed by climate factors so our health is depended on it. Among the climate factors prevail wind direction is studied in this research.

Many years ago people try to use the favorite of prevail wind energy for chilling their settlements and network passages in urban areas, for example they used some architect methods for getting a lot of prevail wind energy in the areas with warm climate and vice versa in the areas with cold climate architects try to use some designs that could prevent more than enough wind energy in to the settlements or passages.

Nowadays urban planners prefer to determine passages direction by more pay attention to prevail wind direction because if they don't it, a lot of energy can be lost in cold urban areas especially in winter and a lot of energy is needed for chilling warm urban areas especially in summer.

- Farajzadeh and et al (farajzadeh.2008) at a research on climate and architect in Sanandaj city showed that the climate conditions arn't good for human comfort across the year so that more than 6 months citizens should use of stoves for warming their settlements based on the conclusion of this study about 50% of settlements have not good climatic conditions.
- One of researcher found that the street that are extend toward prevail winds, the wind speed are increase because of channelization and the streets that are extended with a perpendicular angle than prevail wind has a slowdown speed. (farajzadeh.2008)

*Statement of Problem:*

Urban planners have determined streets directions with prevail wind direction in urban areas in past periods but nowadays they don't pay attention to it because citizens consume a lot of fossil fuel for getting warm energy for warming their settlements however it cause a lot of air pollution in urban areas atmosphere. If human don't pay attention to the mention problem should pay its coast which is so much disaster. As it was mentioned the important consequence is air pollution in urban areas which can cause dangerous diseases for human.

Shirvan city is lay in 37 degrees, 23minutes and 54 seconds N and 57 degrees, 54 minutes E and its climate is cold semi -arid so and it may occur freezing at least more than 6 months across the year this phenomena can cause to consume a great amount of fossil fuel by citizen in cold months if urban planners don't focus on coordinating passages network direction with prevail wind direction, certainly people should suffer diseases due of air pollution.

**Corresponding Author:** Mohammad Motamedi, Department of Geography, shirvan Branch, Islamic Azad University, Shirvan, Iran.
E-mail: motamedi45@gmail.com

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The main question is:

Is there any coordinating between network passages directions and prevail wind blow direction?

*The hypothesis:*

It seems the network of passages direction in Shirvan comprehensive plan isn't fit with prevailing wind direction.

*Range of research:*

The study area is the city of Shirvan;

Shirvan city lays in 37 23 30 N and 57 54 30 E (Moghimi - 1370-18) and it has limited by Turkmenistan, Bojnourd city from west and Quchan from east (SAP, 1387, 14).

The area around the city is 3,789 kilometers (SeadatTalab, 1380, 26).

*Wind direction:*

The wind direction has a major role on its function; Winds that pass from the wet surfaces carry large amounts of moisture with itself.

The moisture has a major role in mild of temperature across the passing area. Vice versa winds pass across hot and dry area, caused phenomena such as the Phone .So the area the wind blows and the phenomenon that is located on the wind route has influence on wind effect. (Asghari Moghaddam - Rajabi, 1383, 19)

The meaning of prevailing wind is the wind blows most of the time across the year (Kasmaei, 1385, 142).

*Canalization:*

When a collection of buildings that will open doorway lay beside each other can form canalization so that the wind direction and wind speed is affected by it. (Figure 1) (N. Gandr and a. Gyv, 1373, 114).

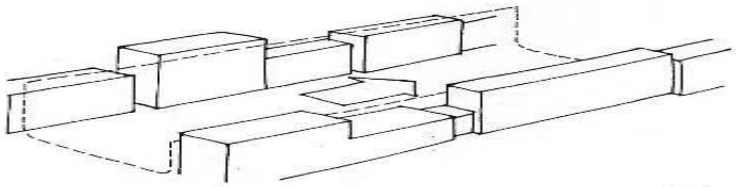

**Fig. 1:** Canalization
Source: (n. Gandr and A.. Gyv, 1373, 115)

If the prevail wind across streets with a 45degree angle until perpendicular angle it is necessary pay attention to effect of blocks with 45degree angle on changing of wind direction.

According to a research insight about comfort, it can be concluded that the best the streets are made with 45to 90degree angle relative to wind direction

Indeed the effect should be given with a 45degree angle (Figure 2) (n. Gandr and a. Gyv 1373, 118).

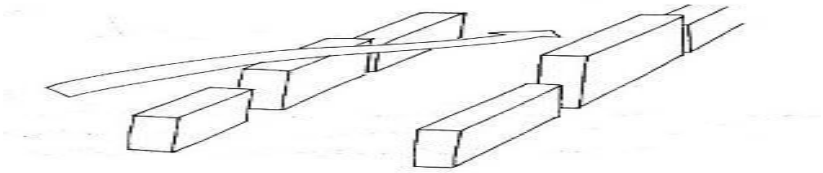

**Fig. 2:** contact the wind with an angle between 45 to 90 degrees
Source: (n. Gandr and a. Gyv 1373, 118)

Based on the mention contents the beneath figure show the direction of prevail wind concern passages network direction.

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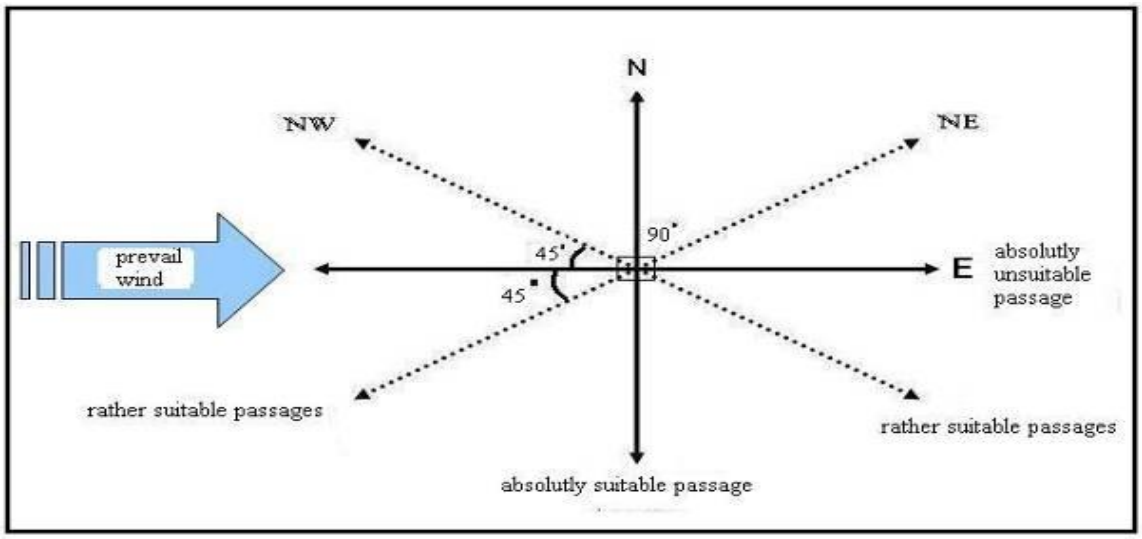


**Fig. 1:** The dominant wind direction relative to the streets
Source: Author

Surveys of seasonal and annual Studied in the range of wind flow also shows that which generally Overcome is with western winds.,

**Table 1:** Average of wind direction between the years 1377 to 1387

| Average | 1387 | 1386 | 1385 | 1384 | 1383 | 1382 | 1381 | 1380 | 1379 | 1378 | 1377 | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 266/36 | 270 | 270 | 270 | 280 | 280 | 280 | 280 | 280 | 270 | 280 | 270 | Wind direction |

Source: North Khorasan Meteorological 1387 legend

*Surveys for the Shirvan city streets with the prevailing wind direction:*

In This review should be noted that Passages with the four directions (North - South, North West - South East, South West - North East, West - East) to The breakdown is shown on the map And on each of these maps you can see the dominant wind direction.

For more understand we study by case:

1. North - South Streets (with the prevailing wind)

Passages with the direction (north - south) perpendicular to the prevailing wind (which blows from the West) are This process also makes the prevailing wind does not penetrate into the streets, Because buildings act as a barrier. Map No. 1

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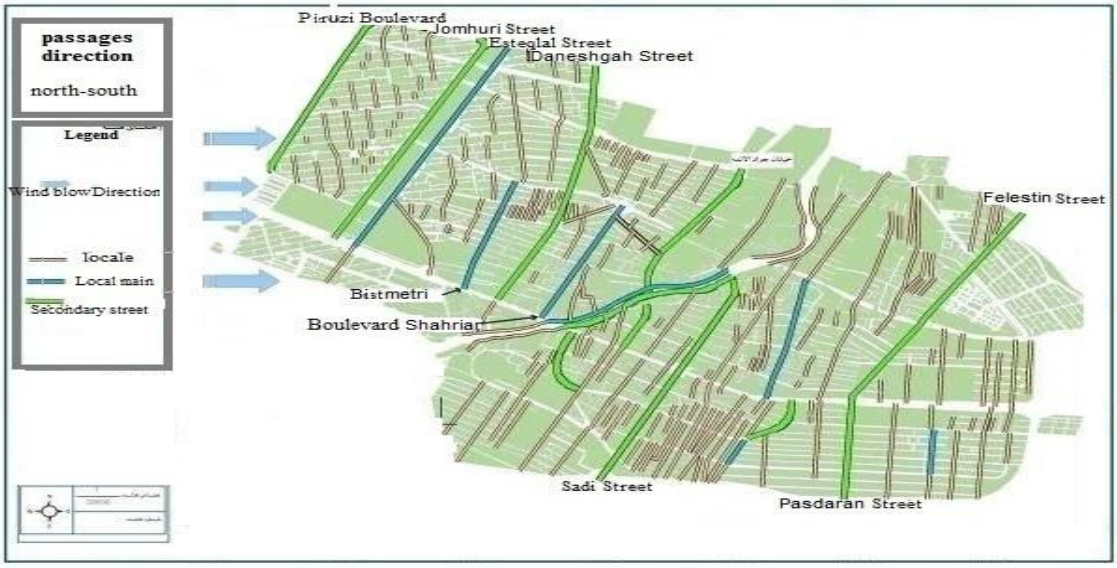


**Map 1:** North Street - South (with the prevailing wind)
Source: author, 201

2. Street West - East (with the prevailing wind)

These passages are in favor of wind direction and the wind that flows easily adds that on the cold streets, Therefore in these passages automobiles move quite slowly.


**Map 2:** West - East Street (with the prevailing wind)
Source: author, 2012

3. Street of North West - South East (with the prevailing wind)

These passages have established form a 45degree angle relative to the prevailing wind, so wind passages to passages in the east - western lower flows.

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**Map 3:** Roads in the North West - South East (with the prevailing wind)
Source: author, 201

4. South-west, North East Street (with the prevailing wind)

Flowing wind direction with an angle of 45degrees also makes these passages, so wind flowing in the passages with the wind in the streets of the East - West flows.


**Map 4:** South-west - North East (with the prevailing wind)
Source: author, 2012

**Table 2:** the streets with the direction of the (m and% )

| Percent | The passages | The passages |
|---|---|---|
| 40/27 | 74575 | North - South |
| 36/47 | 67535 | North West - South East |
| 9/26 | 17137 | North West - South East |
| 14 | 25951 | West - East |
| 100 | 185202 | Total |

Source: Author, 2012

As can be seen in the above table Most of the passages with the 27/40percent belong to the streets with a north - south, then west streets with a north - south of East 36/47percent, also The streets of with the East - West with 14percent, and finally with the south-west - North East 9/26 of all the ingredients are Shirvan city streets.

In Figure 1 can be easily used and length of the passages (in percent) compared with each other.

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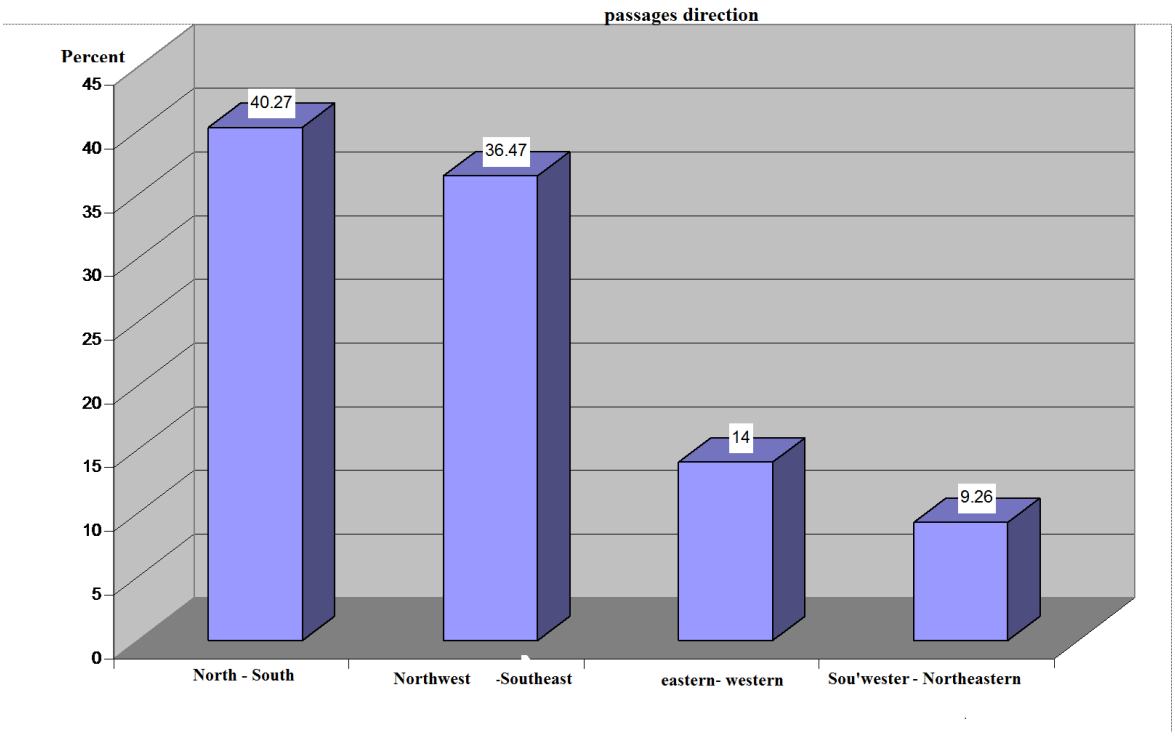


**Fig. 1:** The length of the passages (in percent) for the determination
Source: Author, 2012

*Discussion:*

It seems the network of passages direction in Shirvan comprehensive plan isn't fit with prevailing wind direction.

Map No. 1 in North Street - was south

The 27/40 of passages should be included and the streets are perpendicular to the prevailing wind direction.

Map No. 2 passages in the East - West saw that includes 14percent of total roads and these passages are in favor of the dominant wind direction.

Map No. 3 we see passages in the northwest - southeast, and we saw that 47/36 are included percent of the passages And the passages to the dominant wind direction was willing to make a 45degree angle.

Map No. 4passages see in the southwest - northeast, that 26/9percent of the passages are composite ,These passages were also compared to the dominant wind direction and want to make a 45degree angle.

Since only 14percent of the streets parallel with the Wind (West – East)

But other passages are opposed to wind direction,

The lowest percentage of the parallel passages are included, therefore, this hypothesis can be rejected.

*Conclusion:*

In the city of Shirvan Prevailing wind is from the West Passages that are agreed are 14 percent and about 45/73percent of streets make an angle of 45degrees with wind direction And about 40/27percent of the passages are perfectly perpendicular to the wind direction, In total, wind flows with a less speed therefore it can provide convenience of the citizens. So the best passages is in Shirvan passages with the North - West And passages like (North West - South East, South West - East) make a 45degree angle with the dominant wind direction, Are relatively suitable. Street of east - west, are absolutely unsuitable.

*Proposes:*

1- It is necessary to create windbreak at the western entrance to West - East Street for reducing the speed of prevail wind and reduce of intensive cold winter.

2- If it possible, most streets with a north - south streets should create in order to prevent entry the wind into the streets.

3- Creating a green space in order to prevent the summer sun rays at the edge of North Street - South.

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