

# The Survey of Geomorphological Process of Parkan Village

Mahmoudreza Anvari<sup>1</sup>, Mohammad Akram Jamshidzahi<sup>\*2</sup>, Hengameh Salehpour<sup>3</sup>

Department of Geography and urban planning, Zahedan Branch, Islamic Azad University,  
Zahedan, Iran

*\*Correspondence author email:* jamshid8806@gmail.com

**ABSTRACT:** Basically, establishment and appearance of each habitation more than anything is under the environmental conditions and location functions because geomorphological complications effect on form and geographical spaces and also are effected by them. Goal of this research is estimate and study of geomorphological phenomena and processes that are effective on Parkan village. Research method is descriptive and aerial maps have been analyzed by surfer software. Studies show that this village is located on hillsides and mountain region that has been formed by abrupt gradient of hillside in one side and Sarbaz river bed in the other side. It has faced with diverse geomorphological complications. Results of surveys show that there are different geomorphological limitations for further development of Parkan village.

**Key words:** Parkan village, geomorphology, hillside, Sarbaz river bed, limitatio

## INTRODUCTION

One of the important objectives in preparing rural development plans has been the controlled development of villages; and the logical expectation is that in order to select the rural development axes, the geomorphological, geological, climatological conditions and their mutual effects on one another should be studied in physical studies of villages. Towards rural development, in case attention is not paid to the principles and mechanisms of geomorphological, geological and morpho-dynamic processes of the environment, the geomorphological balance in the environment is disrupted and great hazards are brought about; subsequently creating non-compensable damages and losses of lives. With regard to their geographical bases on which they have been built, villages face various geomorphological phenomena for their future development. These phenomena may pave the way for the development of villages or may be discussed as bottlenecks in rural development. Some tectonic phenomena such as Alluvial fan and cones and plains are among rural development factors, but some of them such as landslides, loose lands and the low depth of ground waters impede rural development. In spite of the importance geomorphological studies have in rural development plans, surveys show that planners have not sufficiently dealt with this issue, or that they have simply touched this important issue in their geological studies. Based on this, in this study, Parkan Village is studied from the aspects of geomorphological features, capabilities and limitations this issue has in selecting rural development axes. Parkan Village, located 64 kms away from Sarbaz Town, lies in a limited space so that it is located on the sharp slopes of surrounding mountains in the north and within the limits of Sarbaz River on the other three directions.

## RESEARCH METHOD

This research method is a descriptive study of Parkan village area .So that all information, statistics, maps of Parkan village and all aerial photographs from Google Earth and Auto CAD software are used to identify the processes and phenomena geomorphological factors in the development of the rural Parkan and also to recognize the development obstacles and development levitation.

### *Introduction to the study area*

According to the latest political division of administrative country village Parkan which is a mountain village is belong to Sarbaz city and is located in 64 kilometers southeast of Sarbaz and is located at the geographical coordinates 26 degrees 36 minutes 28 seconds, longitude and latitude 61 degrees, 14 minutes and 18 seconds at an altitude of about 873 meters above sea level.

The climate in Parkan village is hot and dry. Average annual temperature is 24/5 ° C, annual rainfall is 155/6 mm, and the average relative humidity is less than 46/2%, the number of frost days 7/2 days per year. Climate classification scheme was based on the study area is located in the dry climate.

In terms of socio-cultural conditions, Parkan village developments indicate a growing trend, and rising population. According to the latest figures taken from the home health in village in 2012 the population of village was 520 people in terms of 86 household so that the growth rate of the village was with a 1/56 percent from 2006 to 2012.

Based on studies of all 86 families residing in the Parkan village are Dorzadh and their religion is Islam. They are Sunni Muslims and speak the Baluchi language and thus the Parkan village has homogeneous texture, seamless and integrated.

From Economic conditions and perspective 412 out of 520 people in Parkan are older than ten years, which is about 79/23% of the total population of the village. 189 people are active in economic while 258 people are passive in economic.

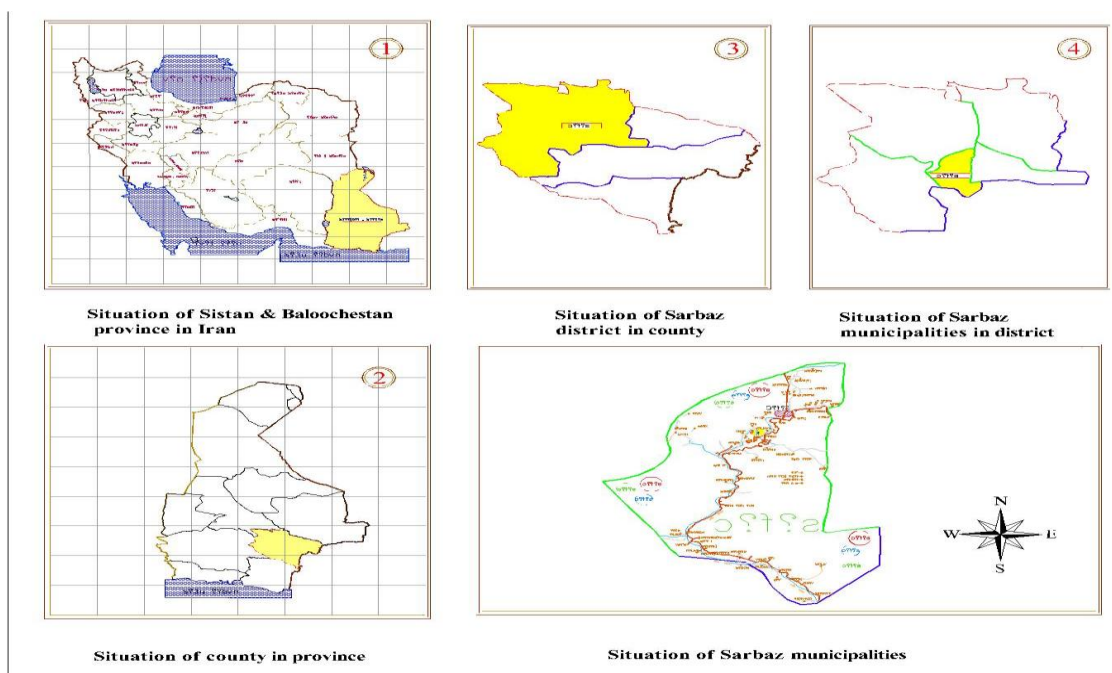


Figure1. Geographical Situation of Parkan village

### ***Village Appellation Parkan***

The reviews and comments from residents regarding the naming of the village in the local dialect means large hole. Accordingly Parkan has been an old big hole which was always full of water. So, a Parkan means a big hole.

### ***Geomorphology***

Due to the rising lava rocks forming this region are broken and damaged. Therefore, according to regional tectonic features as well as structural aspects remnants of lava the nature of the topography of the region, is in the form of river sediment deposits on the face and freshwater lake. Due to temperature changes and strong seasonal winds the gritty wasteland deposits has been formed.

Analysis of the results suggests that the national spatial plan for the area where the village is located in the study area is at moderate risk. Accordingly, measuring the quality of buildings in Parkan village indicate that 42% of the buildings are new and under construction. Meanwhile, 58 percent of the buildings are located in repair and damage buildings category. Therefore, safety principles and building blocks in the construction should be considered in order to reduce the dangers of this earthquake. In addition safety principles must be considered in construction of low durability building blocks and should be renovated. Moreover, measures should be considered to the northern part of village because the risk domain's damage increases in the earthquake time and consequently can cause financial and human loss.

### ***Topographic status of Parkan Village***

Urban and rural settlements are formed in the substrate and follow from the morphology of the location where they were formed and since topography of places are so different they show different aspects. Topographic surveys are usually done using maps and aerial photographs. This part of the study aerial photography and Google Earth software, Surfer and Auto CAD were used to analyses the results of survey. Results indicate the exposure of village Parkan from the North East is in a confined space with the steep slopes of the highlands and from other area is surrounded by Sarbaz River. Topographic maps indicate that village Parkan height is added as long as we go from South to the North. So that there is height difference of 25 meters between the southern part to the northern part which creates a terrace vision for the village is. Steep passages, rocky terrain in parts of Central and Northern part rugged terrain of the region, restrictions harsh conditions of space and earth's climate and its residents have created many problems for the rural development.

**Northern slopes of the Parkan village**

Parkan village is formed in the northern mountainous areas so that is faced with physical development; hence have shaped its development to the northern slopes of the mountain. Due to the steep slopes and tissue movements that occur on them, these movements were in the village. due to rocky and steep northern slopes of tissue loss i domains are considered one of the most dangerous and deadliest incidents routinely every year in different regions of the country and has been considered as the cause of large losses.

**Geomorphological effects on physical space of Parkan Village**

Major rivers and affective streams is Sarbaz river which is located in south, southeast and south-west village Parkan. Since all gardens and agricultural villages are located in the river bed, the river water is used for agricultural purposes. One of the general characteristics of Sarbaz region is very low rainfall and irregular rainfall and in many cases, due to the high volume of rainfall in some seasons in a short time and due to lack of suitable vegetation in the region, floods are shaped. And given that the southern part of the fabric of rural residential and agricultural fields, orchards, as well as all the apparatus on the highway entrance of the village is located on the river bed, every year floods cause enormous damage to the fabric and infrastructure of the region and the most important highways connecting villages cut off and isolate be it.

**The overall shape of Parkan street network**

Now the general shape and layout of the street network in village is influenced by Fyzyvgnvmy conditions of place. Topographical conditions governing rural caused due to high gradients and textures stepped village street network with very little width, is virtually causing problems for traveling motor vehicles.

**Topography of the village and rural settlement**

The major goal of this study is its slope according to the Village Zoning, Practices as a basis for land use planning is of particular importance. Usually Zoning is done by CAD drawings and aerial images. Parkan village is surrounded between Sarbaz River and on the other side the limited space between the two major geomorphological is located. Parkan village passed three stages its development and the research indicates that it is closely related to the development of the geomorphological phenomena.

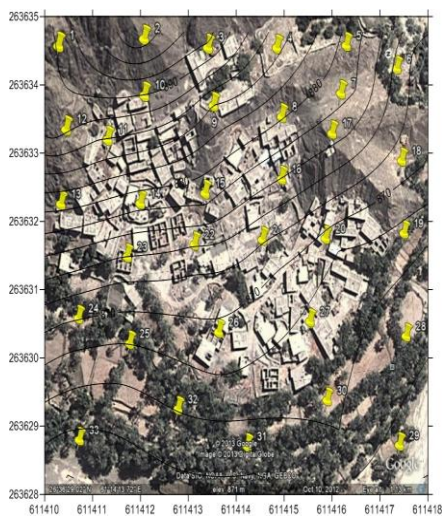


Figure2. three-dimensional map of village

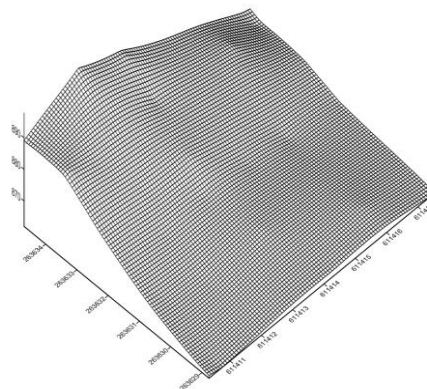


Figure3. Topographical map of the study area



**Village of the study is to expand the following characteristics**

Studies and discussions with elders in village indicate that the basic core of the extreme expansion is in the West and Southwest village, where the amount was less steep than in other areas and is estimated about 11 percent and 21 families of 130 people. Total area of users are equal to 6762 square meter which its 902 square meter consist of street network and the rest are residential and 30/5 percent of whole village lands has been made. Since the Sarbaz river is floodwater, many limitations have been accrued in this area. So, after the rural developed stage, eastern rural residents have inhabited in this area.

First stage of rural development has been taking placed in eastern parts near the heights with gradient about 33 percent up to 35 percent by 33 families and 244 people. The area of built lands is equal to 9331 which consist of 98 square meters religious buildings, 575 square meter street network and the rest are residential that include 42/5 percent of rural built lands.

Parkan area faces with geomorphological limitations that consist of motions range such as loss, debris, and flowing water during the rainfall periods, so they move to resident houses and damage them. According to importance of this part as main core genesis, all damaged houses that need to be renewed and rebuild.

The second stage of rural development has occurred in middle areas of village where its gradient is about 15 percent up to 16 percent with 24 families by 146 people from 520 total village populations. Whole built lands is equal to 5951 square meter which include 268 square meter religious , 76 square meter commercial, 1113 square meter street network, and the rest parts are residential.

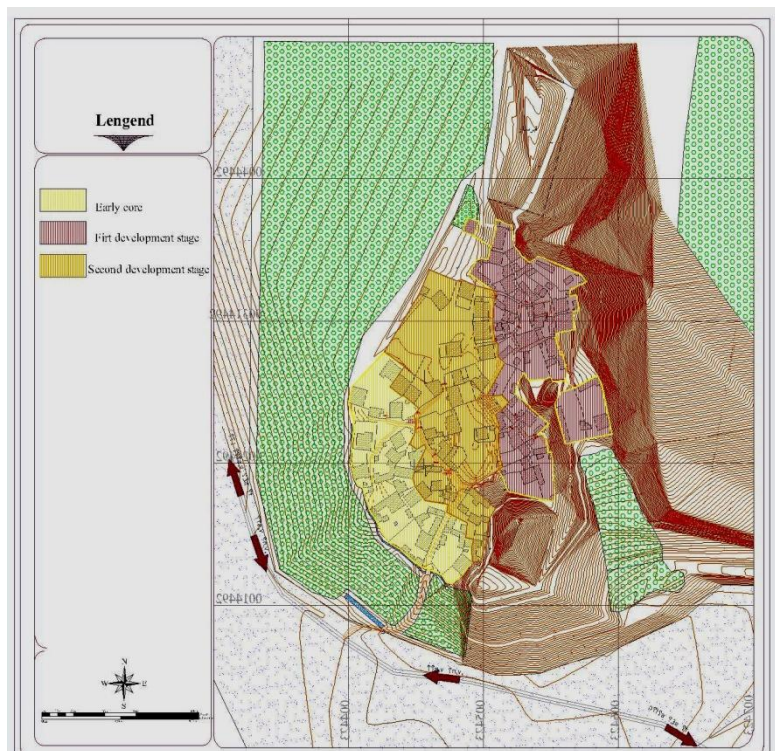


Figure 4. Categorization of Parkan village slop

In general, it can be estimated in order to residential use, none of above gradients is suitable. However, according to location of village, middle part is the most proper for residential use.

Table 1. Stages body shaping of Parkan village

| Part:                       | Gradient            | Family | Population | Total built lands | Percent of built lands |
|-----------------------------|---------------------|--------|------------|-------------------|------------------------|
| First core                  | 11 percent          | 21     | 130 people | 6762 square meter | 30.5 percent           |
| First stage of development  | 33 up to 35percent  | 33     | 244 people | 9331 square meter | 42.5 percent           |
| Second stage of development | 15 up to 16 percent | 24     | 146 people | 5951 square meter | 27 percent             |

**Quality of Parkan building and its relation with geomorphological limitation**

According to field studies of Parkan village, it is clearly determined that the quality of Parkan village has direct relation with its limitations. The author has classified the village into following groups;

Protectable and repairable 2 - Dilapidated 3 -Renovated 4 - Under construction

Most of the protectable and repairable buildings which need to amend are placed in south western and east parts near the heights. River flooding is main reason of buildings exhaustion that has occurred in south western part during the last years. However, exhaustion causes range of motion such as loss and debris in eastern parts where the houses has been placed in gradient of 33 up to 35 percent in hillsides near the heights. Total of these lands are equal to 9478 square meter that include 49 percent of built lands of village.5138 square meter of total area (26 percent of built lands) have placed in hillside by high gradients in eastern parts.4340 square meter that is equal to 23 percent of built lands that consist of west and south western parts of the village and has many geomorphological limitations.

Dilapidated lands of Parkan village are equal to 1854 square meter and 9 percent of built lands and have been placed on border of eastern hillsides with high gradient, so there are some geomorphological limitations such as rainfall that damages to houses.Renovated and under construction building include of 8113 square meter of village (equal to 42 percent of built lands) are located in middle parts of village that has been formed in the second stage of rural development and shows less limitation rather than east, south and south eastern parts.

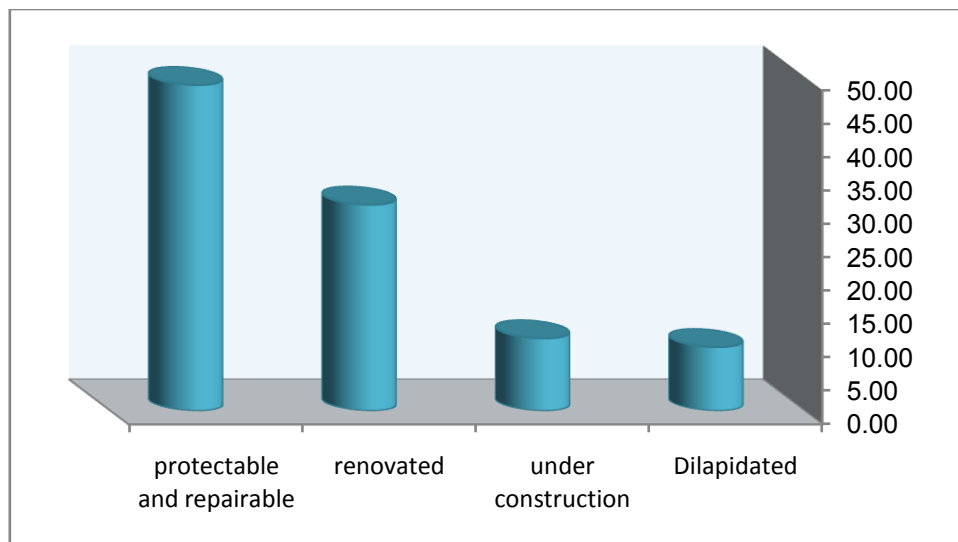


Figure 5. quality of Parkan buildings (Percent)

**CONCLUSION**

Creation and development of urban and rural settlements used to take special views into consideration in the past, and called for special viewpoints. In the location of urban centers, human and social studies used to suffice; however, nowadays negligence of studies such as morphology, geology and hydrology will bring great damages to cities and villages, which we frequently become aware of through mass media and news. In studying the above village, the following conclusions can be drawn:

A: Location of the village in a limited space of a winding river with sharp slopes of surrounding heights and within the limits of the riverbed has created a terrace view for the village.

B: Low irregular and sudden rainfalls in the region have led to floods and inundation of the river in some seasons, which have destroyed the southern parts (the initial core of the village) and the main road of the village, which has made the region isolated.

C: With regard to the topographic conditions governing the village base, the village thoroughfare network has many windings, short width and under the terrace texture of the village. This has caused the transportation by motor vehicles to face serious problems is a large part of the village texture.

D: The results of studying Parkan Village, with regard to its slope area, indicate that the farthest parts in the west and south west of the village has a slope of approximately 11% and a population of 130 people; the middle part has a slope of 15 to 16% and a population of 146 people, and in the adjacent eastern parts close to the heights, the slope is approximately 33 to 35% with a population of 244 people forming the whole population of the village that is 520 people.

E: Location of the village in the skirts of a mountain with sharp slopes and rocky, uneven and difficult to pass lands, climatic conditions and space and land limitations have created many problems for the development of the village.

F: With regard to the National Iranian Plan studies, the village under study is located on an earthquake area with medium danger.

### **Suggestions**

With regard to the results and geomorphological limitations of Parkan Village, the following suggestions can be presented:

The location and base of the village in the skirts of a mountain limited to the heights in the north, potentially increases the danger of landslides in the village. Based on this, the displacement of residential units, which are in danger of landslides, seems to be essential.

Location of the village on the northern banks of Sarbaz River and its location in the river area has caused the southern parts of the village texture to be in danger of floods and overflow of the river; hence, the required arrangements should be made in this regard.

Parkan Village is located in the area with medium earthquake danger. This necessitates the observation of technical principles and earthquake by-law 2800 in rural constructions more than ever before.

Mending, widening, construction and asphaltting rural thoroughfare networks in order to solve the problems and unsuitable state of rural thoroughfare networks and construction of gutters in the margins of thoroughfares in order to collect and conduct surface waters and household wastewaters, particularly during rainfalls, is essential.

A system for collecting surface waters under related expert' supervision in order to conduct surface waters and household wastewaters in the village is vital with regard to the slopes of thoroughfares.

### **REFERENCES**

- Housing foundation of Sistan & Baloochestan province (2012); Rural plan of Parkan village  
Negaresh.2003. "Use of geomorphology in urban location", Geography & development journal  
Shayan, et al.2008." Analysis of geomorphological facilities and limitations in selection of urban development outlines" Modares journal, N#3  
Zomorodian M.1998. "Use of natural geography in urban and rural planning", Payam Noor press