Economic Philosophy of Khewa Gul, an Unknown Tribal Economist of 18th Century

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Abstract

While the 18th Century economics is generally characterized by economic philosophy of Adam's Smith, its effects could not fully reach the tribal region of Pakistan. This region has a centuries old history. Far from the modern world, people living in these tribal areas had their own rules of life, social norms and traditions. They had their own laws of economics. Exchange of goods for services was very convenient for them as the real money did not exist. The economics related to construction engineering was one of their expert areas. Khewa Gul was an elder of the tribal society from Naryab (a mountainous area in the north of Pakistan). He was very wise and genius person. He was born on 13 March 1736 and died in 1793. He could not get formal education as it was non existent in the mountains of tribal region. However, he had the urge to guide people with his economic thoughts and philosophy. At the age of 16, he started telling people where they should construct homes and other building and which places were to be avoided for construction due to economic and technical reasons. He strongly believed that in every endevour of human, economics should be considered. He can truly be called as the unknown economic philosopher of 18th Century. His used to say that selection of promising site for construction is essential since it has strong linkage with service life of the project. He created maps which showed the most suitable sites for construction from economics and technical point of view. Since, no printing and reproduction facility was available at that time; he drew sketches and maps on the trees, lather sheets and stones.

This research is about validation of an economic suitability map created by Khewa Gul in 18th Century to ascertain whether the map produced by him in 18th Century is correct and valid in 21st Century or not. The area represented in the map is located in Naryab, Pakistan. A detailed research methodology was adopted for this validation. First the soil strength was calculated at few selected points of study area, from which a geotechnical suitability map was prepared for the study area. Similarly, basing on tangible factors like cost of material, soil improvement, labour, maintenance requirements and transportation of material to the site, an economic model was developed for economic evaluation of the site. From this evaluation as economic suitability map was prepared for the study area. Surprisingly, there was close similarity between site suitability map produced by Khewa Gul in 18th Century and geotechnical and economic suitability maps produced after research in 21st Century. This research paper truly presents a valuable and interesting study on economic philosophy and vision of the people in 18th Century.

Keywords: Economic, philosophy, site suitability, map, 18th Century, 21st Century, similarities.

1. Economic Philosophy of Khewa Gul

Khew Gul believed in welfare of society. He at neumrous occasions said that human is always acting or reacting to an economic phenomenon. He was expert in selection of economical site for construction. His thoughts were that selection of suitable site for construction is essential since it has influence on service life of the project. He created maps which showed the most suitable sites for constrcution from economics and technical point of view. Strangely, he developed strong relationship between economic and geotechnical suitability of construction sites, though he was not aware of the true meaning of geotechnical suitability. He practically identified economical construction sites in Naryab. He drew sketches and maps on the trees, lether sheets and stones; some of these are still available with inhibitants of Naryab.

2. Characteristics of Khewa Gul's Economic Philosophy

His Philosophy Was Fairly Simple And Straigth Forward. He Believed In Welfare of the human being. He believed that human should be the benificiary of economics and not the victim. He used to call economics as the way of life. His philosophy revolved around the following characteristics:-

- Every action is for economics and every reaction is due to economics.

- Economic considerations should be given priority for undertaking construction as construction on a suitable site will have longer life without maintenance.

- Less expectation is discount and more expectation is interest.

- Economics is a natural phenomenon and is reflected in human behaviour.

- Economics is for the benefit and welfare of the masses.

3. Khewa Gul's Work

Besides, the classical economic thoughts, Khewa Gul's contribution to construction economics is magnanimous. He believed that overall construction suitability of a project site is comprised of geotechnical suitability and economic suitability (though at that moment he was not at all aware of the geotechnical aspects). He used to call geotechnically suitable land as "*Pakha Zmaka*" which means solid and consolidated land. Similarly, he used to assess the economic suitability of land as well. He named economically suitable land as "*Kha Zmaka*" which means beneficial land. Today, in 21st Century we have devised a scientific name for "*Pakha Zmaka*" as geotechnically suitable land and for "*Kha Zmaka*" as economically suitable land. The modern definition of geotechnical suitability is the aptness of a project site based on subsurface geotechnical parameters of soil strata whereas economic suitability is the worthiness of project site in terms of economic considerations. Over the years, we have overlooked to find out a relationship between the two kinds of suitability, but, strangely in 18th Century, an illiterate economist realized that one kind of suitability definitely affects the other.

In the same context, site suitability map drawn by Khewa Gul for a site (Ali Khankhel Area), roughly 2 kilometers x 2 kilometers located in Naryab was selected to ascertain whether the map

drawn in 18th Century is valid and correct in 21st Century or not. Thus, this research was aimed at finding the validity of economic thought of a tribal economist from the age of enlightenment. In the process we also proved that there is a relationship between the two different discipline; *geotechnical engineering and economics*, while dealing with same project site. A comprehensive research methodology was adopted to achieve the objective of study. Soil properties and strength were obtained through conventional laboratory testing of soil samples from where a geotechnical suitability map was drawn for the selected site. Similarly, basing on tangible economic factors, an economic model was developed for economic evaluation of the site; from which, the economic suitability map was drawn. Surprisingly, there was close similarity between site suitability map drawn by Khewa Gul in 18th Century and the geotechnical and economic suitability maps drawn for the same project site in 21st Century. This was a great validation of the economic expertise of an economist from 18th Century. Indeed it was cherishing.

4. Location of Research Area

Naryab is a village approximately 200 kms West of Islamabad, Pakistan. A photo showing location of study area is shown in Figure 1 while the sketch of Ali Khankhel Area is shown in Figure 2. Naryab has variety of landscape ranging including mountains, plains and water streams. Study area as shown in the Figure 1, is plain and cultivated having two foot tracks.

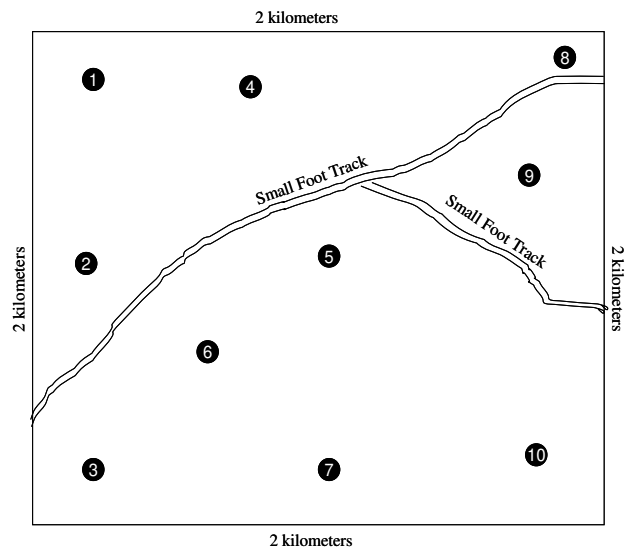Figure 1: Photo showing location of study area in Naryab.

Figure 2: Sketch of Ali Khankhel Area. Black dots with numbers indicate locations from where soil samples were collected.

5. Research Methodology

The methodology evolved for this research comprised following steps:-

- *Step 1*: Detail description of the map drawn by Khewa Gul.

- *Step 2*: Collection soil samples from 10 randomly selected points of the study area (as shown in Figure 2).

- *Step 3*: Laboratory investigations to find out strength of soil.

- *Step 4*: Making of geotechnical suitability map of the study area.

- *Step 5*: Economic evaluation at the same ten selected points of the study area.

- *Step 6*: Making economic suitability map of the study area.

- *Step 7*: Comparison of site suitability map by Khewa Gul with geotechnical and economic suitability maps produced as result of this research.

- *Step 8*: Conclusions.

6. Description of the Map Drawn By Khewa Gul

Map drawn by Khewa Gul is shown in Figure 3. The map was drawn on a hand woven old jute sheet and is still available with present elder of Naryab as historical map in preserved shape. The writing on the map as shown in Figure 3 needs to be understood for complete comprehension of his economic philosophy. The language written on the map is old Tribal Pashto (a native language) of 18th Century. The writing on the map is in own hand of Khewa Gul; using thin bush as pen and pulp of pomegranate as ink, which indicates that he could write Pashto language. Interpretation of the words on map is given in Table 2. The interpretation of the map is interesting and amazing.
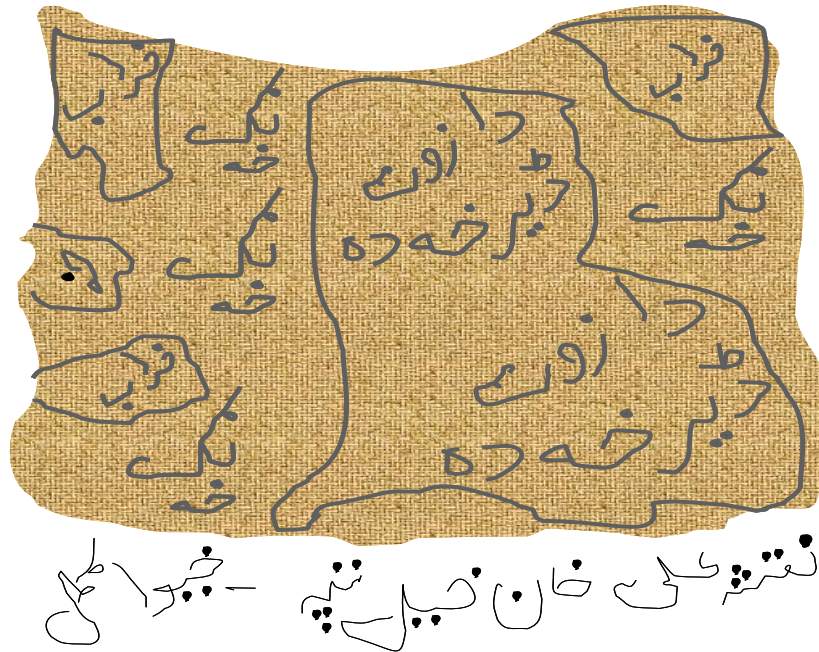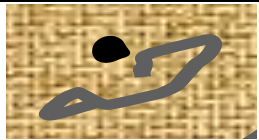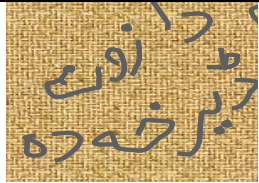

Figure 3: Map drawn by Khewa Gul for Ali Khankhel Area, Naryab, Pakistan.

Table 2: Interpretation of words on map drawn by 18th Century economist Khewa Gul.

Word	Pronounciation	Meaning	Interpretation
	Kharab	Bad	Means it's a bad piece of land, geotechnically as well as economically, and should not be used for construction.
	Kh	Good / useful	Means it's a piece of land which is good from geotechnical and economical poit of view. May be used for construction.
	Lug Kh	Slighly good / Useful	Means it's a piece of land which is slighly good and does not fulfill either geotechnical or economical criteria. Should be avoided for construction.
	Da Zoy Der Kh Dah	This is the best piece of land	Means it's a piece of land which is the best geotechnically as well as economically. Should be preferred for construction over other locations.
	Naqsha	Map	Map drawn by Khewa Gul
	Ali Khankhel Tapa	Ali Khankhel Area	It means that this map was drawn for Ali Khankhel Area in Naryab, Pakistan
	Khewa Gul	Name	It means that this map is drawn by Khewa Gul.

From the above interpretation of Khewa Gul's map, we can say that area in the centre extending towards south east is best for construction; whereas, there are bad pieces of land on the north west, north east and western edge of the study area. Similarly, slightly good and good pieces of land have also been indicated on the map. Validation of all these indications on Khewa Gul's map is the objective of this research.

7. Collection of Soil Samples

Soil samples were collected from ten randomly seelcted locations of the study area (Ali Khankhel, Naryab) to yield an estimate of soil properties and strength. These samples were undisturbed. Undisturbed samples are those which represent natural conditions (Clayton, 1995).

Samples were collected from depth of 1.5 and 3 meters. Total of twenty samples were collected. After collection, these were transported to the laboratory for testing and investigation.

8. Laboratory Investigations

Conventional geotechnical laboratory tests were performed on undisturbed soil samples to infer the subsurface geotechnical properties. Individual samples varied in properties. Most of the samples were classified as fine soil and very few as coarse soils as shown in Table 3. The difference between the coarse and fine soil depends upon whether their particles are visible to naked eye or not (Das, 2004). For example particles of gravel and sand are easily visible, so these are coarse soils, whereas the particles of silts and clays are hardly visible, so these are fine soils. The percentage composition of the soil is reflected in the Figure 3.

Table 3: Interpretation of subsurface soil stratum from laboratory investigation.

Depth (m)	Strata				Total
	ML	CL	CL – ML	SM	
1.5	5	2	3	-	10
3	1	-	5	4	10
Total	6	2	8	4	20

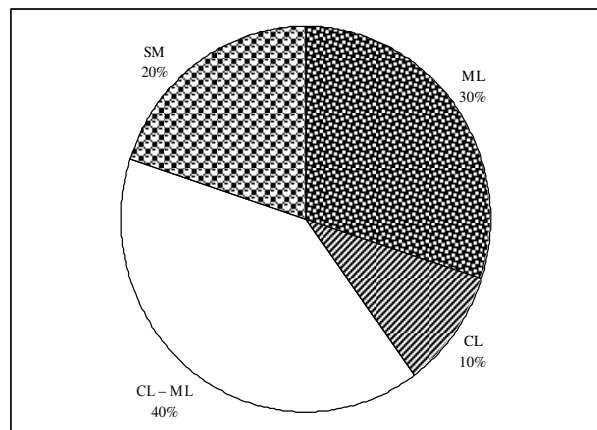Note: ML is silt, CL is clay, CL-ML is sandy silty clay and SM is silty sand.

Figure 4: Percentage composition of subsurface strata

Strength of soil was calculated for each depth level. The calculated values indicated variation of soil strength across the study area. Graphically this variation can be seen in Figure 5. If we read this figure in conjunction with Figure 2, we will see that points selected in the centre of the project site are having more strength.
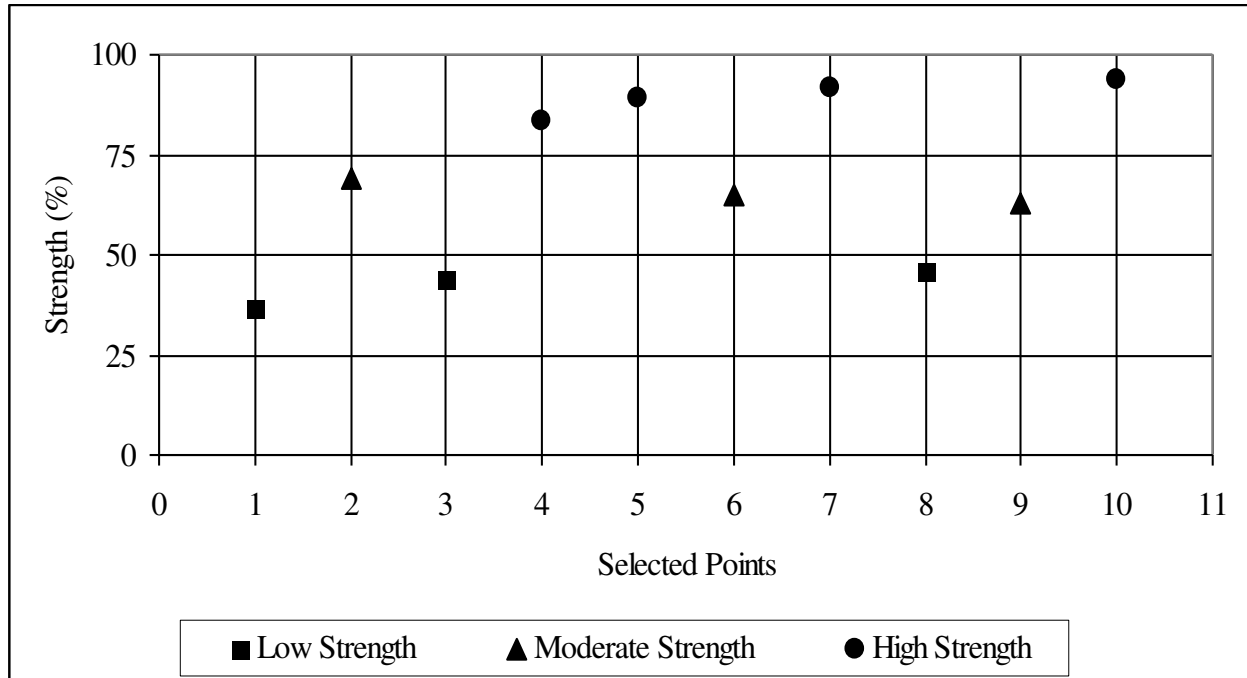
Figure 5: Strength of soil determined at ten selected locations.

9. Geotechnical Suitability Map

Geotechnical suitability map is an important outcome of the whole process of site investigation. This is the map which shows the suitability of a project site from geotechnical point of view. Using the calculated values of soil strength, SURFER Mapping Software was used to create geotechnical suitability map. Such map for the study area is given in Figure 6. SURFER is versatile mapping software which can create variety of maps and models for different purposes (www.rockware.com).

As evident from the key given with the map, area in the middle extending towards south eastern corner is the best and most suitable for construction from geotechnical point of view. The areas with bad, slightly good and good suitability depending on the soil strength have also been indicated on the map.
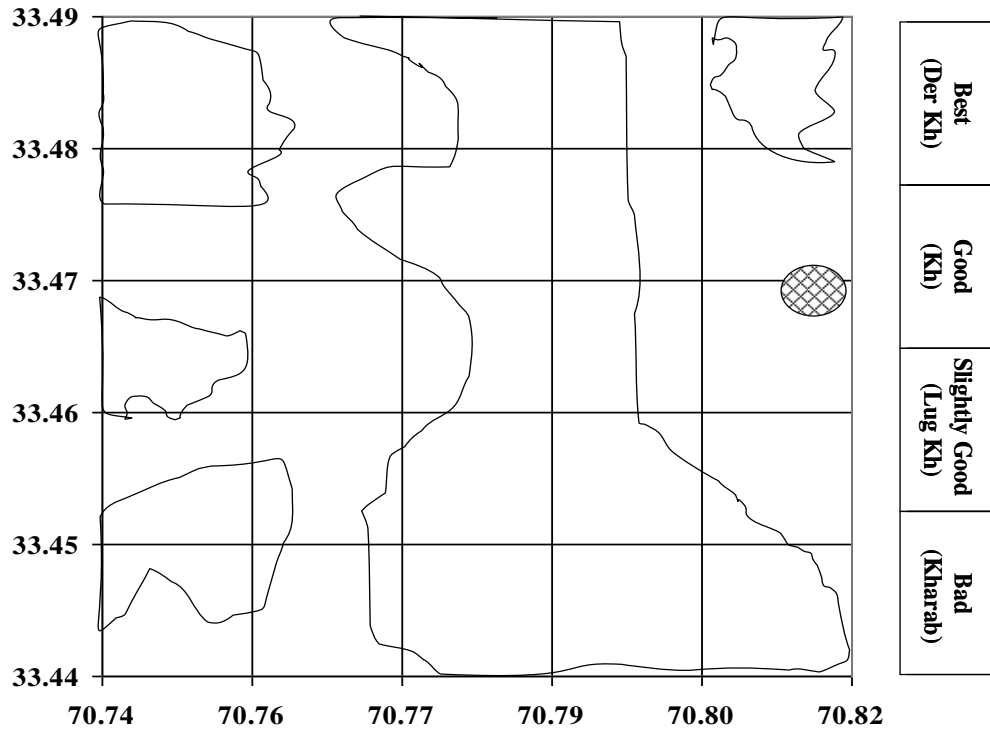
Figure 6: Geotechnical suitability map for the study area.

10. Economic Evaluation Process

Economic evaluation of a project site is a process through which we assess the feasibility of that project site from economic point of view (Zeleny, 1982). It is done by thorough analysis of selected economic factors. Economic factors directly affect the coat and quality of projects (Raffia, 1997). For economic construction and long performance of projects, economic evaluation is important process (Thausen and Fabrycky, 2002) and this aspect was significantly realized by Khewa Gul in 18th Century. He believed that building should be constructed at the place which is economically suitable.

Map drawn by Khewa Gul was validated from economic point of view. Same ten spots (as shown in Figure 2) were selected for this evaluation. Five simple but very important factors were considered. These factors included cost of material (if not available locally), soil treatment required to improve the site, haulage of material, lobour charges and maintenance requirement of the construction facilities in the future. Each factor was given specific marking from 0 to 10 depending upon its prevalence or validity. These factors were applied to each selected point and analysis was carried out. Trend was deduced for the complete study area in the shape of an economic suitability map.

Based on above narrated modus operandi, an *economic evaluation matrix* was developed which is given in Table 4. Since cost of material and labour charges remains the same for entire study area, these factors have been given equal marks for all ten spots.

Table 4: Economic evaluation matrix.

Point	Cost of Material	Soil Treatment	Transportation of Material	Labour	Maintenance	Average Score
1	6	9	8	5	8.5	7.3
2	6	4.5	3	5	2	4.1
3	6	8	6.5	5	9	6.9
4	6	1.5	1	5	2	3.1
5	6	0	2	5	2.5	3.1
6	6	3.2	2.8	5	3.7	4.14
7	6	0	2	5	1	2.8
8	6	8	7.6	5	9	7.12
9	6	3.1	2.5	5	3.7	4.06
10	6	0.5	1	5	2	2.9

The graphical representation of economic evaluation matrix is shown in Figure 7; which shows that investigation points selected in the central and south eastern side of the project area are more economical for undertaking the construction activities. Similarly, the north western and eastern corners are less suitable for construction activities from economics point of view.
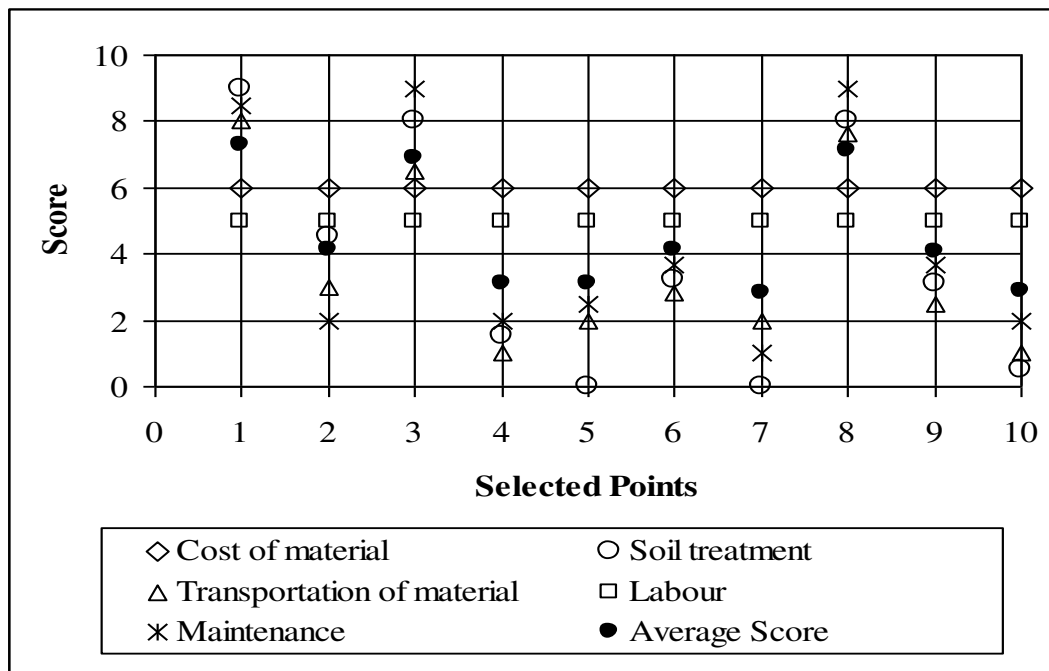

Figure 7: Economic evaluation of the project site.

11. Economic Suitability Map

Economic suitability mapping is a relatively new field which remains unexposed mainly due to large variations in economic conditions and absence of accurate tool to draw correlation between various factors affecting economics of project site. The subject of economic suitability mapping

is, however, very important and highly significant as it hold the promise for rapid and relatively inexpensive economic characterization of the site.

Based on the economic evaluation, an economic suitability map was created for the study area with the SURFER software as shown in Figure 8.
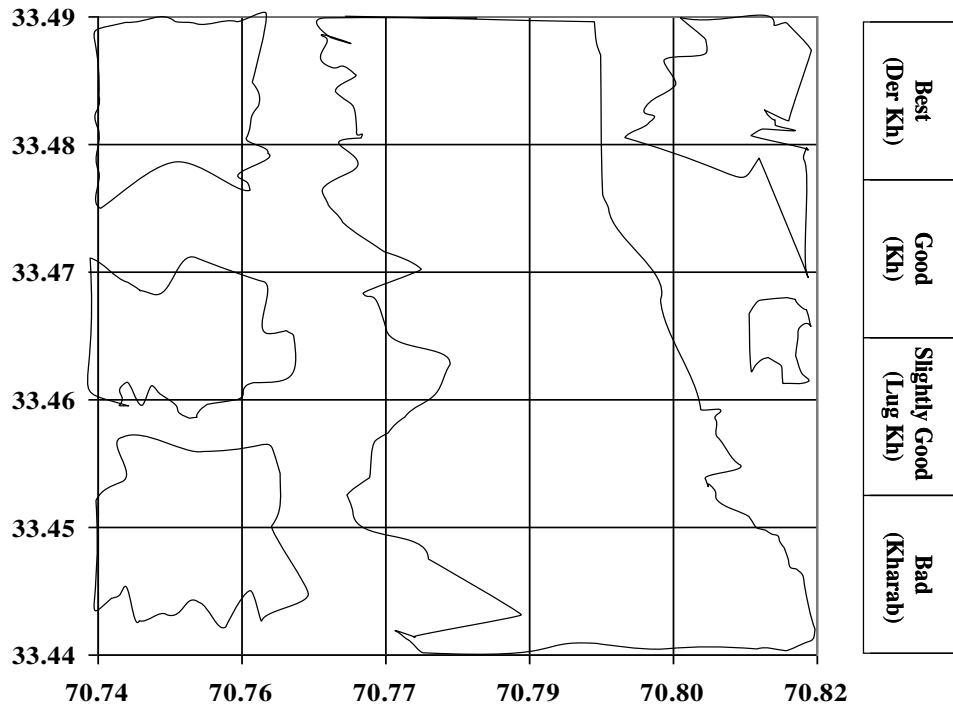

Figure 8: Economic suitability map of the project site.

12. Comparison of Maps

By mere looking at geotechnical and economic suitability maps drawn as a result of this research in 21st Century and the map drawn by Khewa Gul in 18th Century, one can easily notice the close similarities. A view of the three maps together is shown in Figure 9.

Trends shown in these maps can be summarized as under:-

- All three maps show that region in the centre of the study area extending towards south east is the best for construction both from economics and geotechnical point of view.

- The land on north east and west corners is bad for construction activities both from economics and geotechnical point of view.

- There exists a good region on the western edge of the study area as shown in the maps; however, the size of this region is bigger in case of economic suitability map than the Khewa Gul's map and geotechnical suitability map.
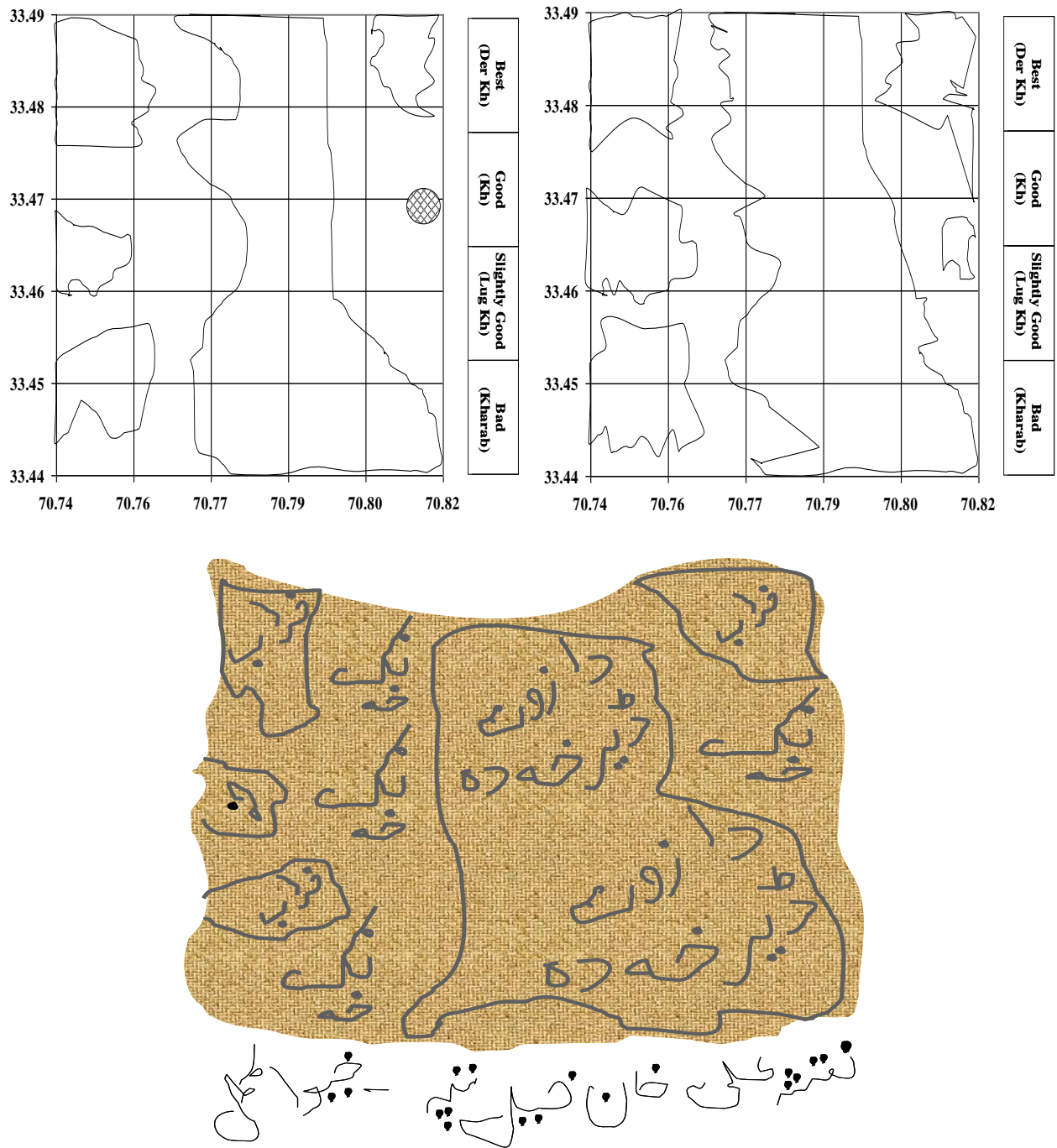
Figure 9: Geotechnical and economical suitability maps for the study area.

- There exists a good region on the eastern edge of the study area in geotechnical and economical suitability maps. This region is missing in Khewa Gul's map.

- Size of bad region on the western edge of the study area is bigger in case of economic suitability map than the Khewa Gul's map and geotechnical suitability map.

- The best region is broader on Khewa Gul's map than the geotechnical and economic suitability maps.

- Contours of Khewa Gul and geotechnical suitability maps are comparatively smooth while the same are sharp on the economic suitability map indicating that economics believes in sharp precision.

13. Conclusions

Overall there is a close similarity and agreement between the three maps, though there are some minor dissimilarities of ignorable nature. Khewa Gul was an illiterate and unknown economist of 18th Century, but his map is valid to a greater extent in 21st Century. This validation shows how much that unknown economist of 18th Century, from tribal mountains, was gifted with wisdom to accurately locate the best, good, slightly good and bad locations for construction from economics and technical point view. We in 21st Century had to carry out extensive investigations and make two separate maps to reach on to the conclusions which were sketched in only one map by Khewa Gul long ago. Indeed, it is worth appreciating to know how an unknown economist of 18th Century, without any technical and academic know-how, has produced a valid and accurate site suitability map in 18th Century.

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Thematic Satellite Map of Risalpur Town taken from www.googlemaps.com

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