Providing Landslide Hazard Zonation (LHZ) Map of ECO Member States

1. Project Category:	**Disaster Risk Reduction**
2. Project Code:	**HRSD2/H/2020**
3. Project Title:	"Providing Landslide Hazard Zonation (LHZ) Map of ECO Member States
4. Project Objective(s):	Comprehensive studies and researches have been conducted on understanding the vulnerability factors of landslides and consolidation,stabilization and zonation of landslide masses hazard in Iran and many countries of the world; such as Canada, USA, Italy, Nepal, India and Brazil.. All these measured fall in three categories: a. Methods of engineering judgment and weighting to effective factors maps b. Two and partial variable statistical methods c. Certain methods of geotechnical models Choosing any of the above methods depends on the spread of the study area, availability of data, etc. According to the study area dimension and geotechnical data accessibility, specific methods of engineering judgment and weighting to maps of vulnerability factors will apply. This method has been utilized in some parts of Iran and has had significant identity with occurred landslides according to the field study.
5. Project Budget (US$):	USD 290,000
6. Project Funding Source:	At least 17% from ECO Budget (in-kind), the rest (in-cash) from the partner/s,
7. Coordinating Country/Organization:	ECO Secretariat

8. International/Regional Partner:	---
9. Duration of Project (Months):	2 year
10. Project Starting Time (M/Y):	2020
11. Project Progress Ratio (%):	Quarterly
12. Expected Project Completion Time (M/Y):	2 year

13. <u>Background</u>:

Natural hazards as the greatest natural enemy of human, every year causes death and injuries thousands of people and leaves millions of people homelessness across the world.

Landslide which is the falling down massive and often rapid movement of the sediments along the slopes, is being one of the worldwide problems threats the humankind. Most of the landslides cause the long-term economic and financial damages, population displacement and will have negative impacts on natural environment which undoubtedly their dimensions will be increased in the future. Landslides cause severe physical damages by making farmlands and forests useless, and also by destructing roads, bridges and other infrastructures. Landslides also resulted in a severe damage to the environment and different species of plants and animals.

Although landslide is often considered as a local problem it could affect the adjacent areas and turn to a state, province and even national scale disaster and impose financial crisis.
Increasing population growth alongside the geopolitical boundaries and limitation, have caused the occupation of unstable slopes and faraway regions. The stabilization of the landslide-affected areas is often very costly measure and on the other hand some of high risk zones' inhabitants, do not have any other places to movement.

Regarding the fact that landslides are more manageable and predictable than other natural hazards such as floods, volcanic eruptions, earthquakes, etc. recognition the phenomena and spotting the high risk area are of the key importance to prevent its damages.
Figure 2- The ECO-LHZ project covers the whole region of the ECO-Member States ECO Member States cover 10 countries with total area of 7937197 sq. km. This Area is located in the Alps-Himalayan orogenic zone. According to its highland topography, tectonic activity, seismicity, various geological and climatic conditions, has many natural conditions to create a wide range of landslides. In addition, the high population density in these countries, more than 463 million people (201 7), causes vulnerability and higher risks of landslides. For examples;

Destructive landslide (2000) in Baku, cause 11 killed and about 23 million dollars damages in the capital of Azerbaijan.
In Afghanistan, from 1954, the occurrence of landslide and avalanche cause about 1000 casualties and other negative effects.
In the northern parts of Pakistan, and in the area between China, India and Afghanistan, which is strategically very important, major landslides frequently occur. Of course, all the landslides in Pakistan are important in terms of economic and social issues. For example, landslide of Ryala in 1988, destroyed more than half of the village. In this event 100 houses and 62 hectares of farmland were destroyed.
Between 1926 and 2005 in Kirgizstan seven landslides happened. These affected 60000 people and left more than $37 USD damages.
With regard to the frequency of events, infrastructures and constructions, landslides' damages vary. It imposes direct and indirect costs on government and affects the GDP. Based on published statistics, direct damages caused by landslides are more than tens of millions dollars. In this regard, and for reducing the costs imposed by the landslides, identifying different vulnerability factors in landslides-in order to plan for stabilizing and reducing risk in areas vulnerable to landslides- is essential. Both human and natural factors have an effective role in landslides. In addition to the natural factors such as geological structures, stone and soils unit material, fault, climate, rainfall, slop and …, humane factors such as land use change, road network construction, dams and other construction operations affect the landslides.

15. Expected Outcomes of the Project:

- **a. Preparing digital basic database:**
Parameters used in this project include lithology, active fault, slop and its orientation, climate and rainfall, land use, landslides and seismic zones.
The collected data are evaluated and processed.
* Collected data and maps will be digitized and stored as database in ArcGIS.

b. Preparing basic thematic maps:
In this level, basic data (vulnerability factors) will be extracted as the basic maps and as a layer with an appropriate scale for using in the GIS.

c. Calculation of Score Factor:
The score factor will be calculated by determining weight of each factor and sub-factors regarding of their effect on landslide susceptibility.

d. Integration and modeling:
All the influencing factors of different variables will be added simply together to find out the probable areas of landslide occurrence.

e. Zonation & Classification:
The whole range of variation was classified into different groups of a Landslide Hazard Zonation map of the study area.

16. Current status:

The project will be completed in 24 month since signing the contract. The ECO Secretariat and the project team will ensure the fulfillment of the envisaged activities within the timetable.