Role of E-Learning in Knowledge Promotion and Capacity Building for Monitoring and Assessment of Natural Disasters:
A case study for Drought Monitoring

Remote Sensing Department
Iranian Space Agency
Jeiran Amiraslani
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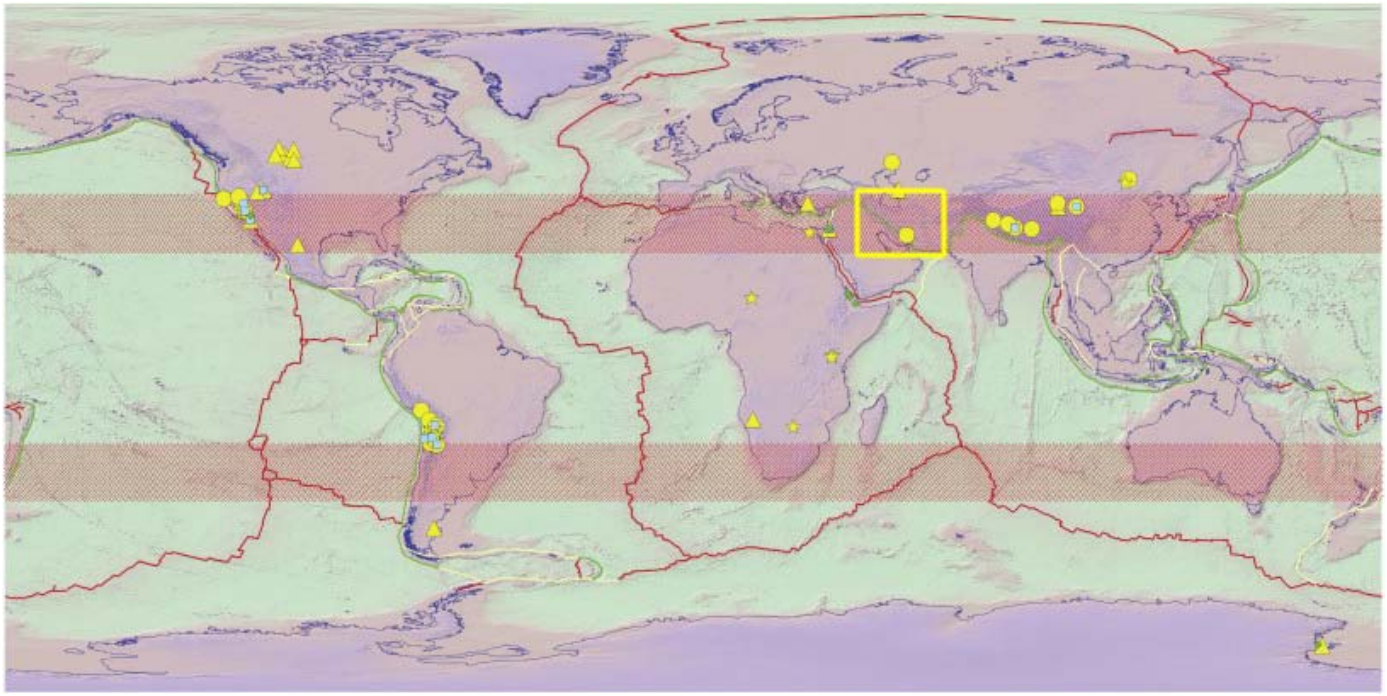
Regional Support Office of Iran

4th June 2009, Signing of the cooperation agreement between RSO and UN-OOSA

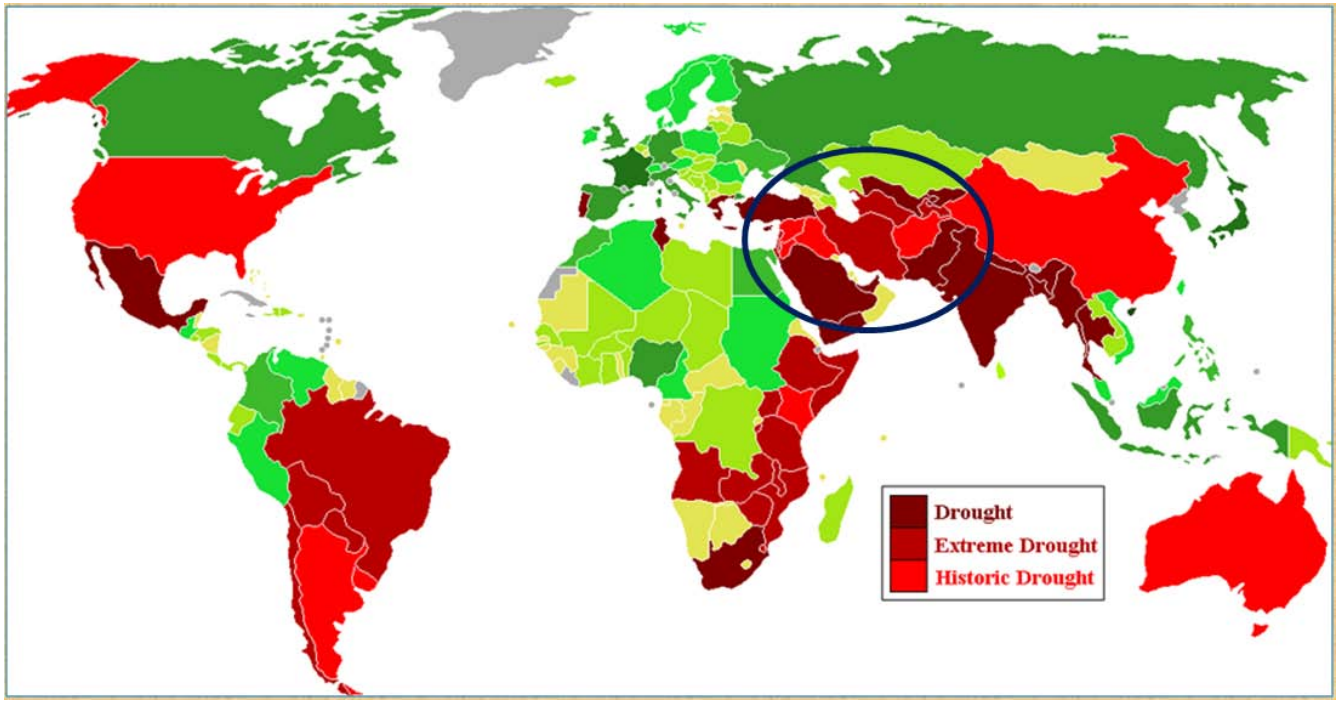
Iran location on World Desert Belt



• Iran is located in an arid and semi-arid region in the south of Asia between 44º 02´ and 63º 20´ eastern longitude and 25º 03´ to 39º 46´northern latitude.

• The average annual rainfall is about 240 mm (around one third of the global average) .

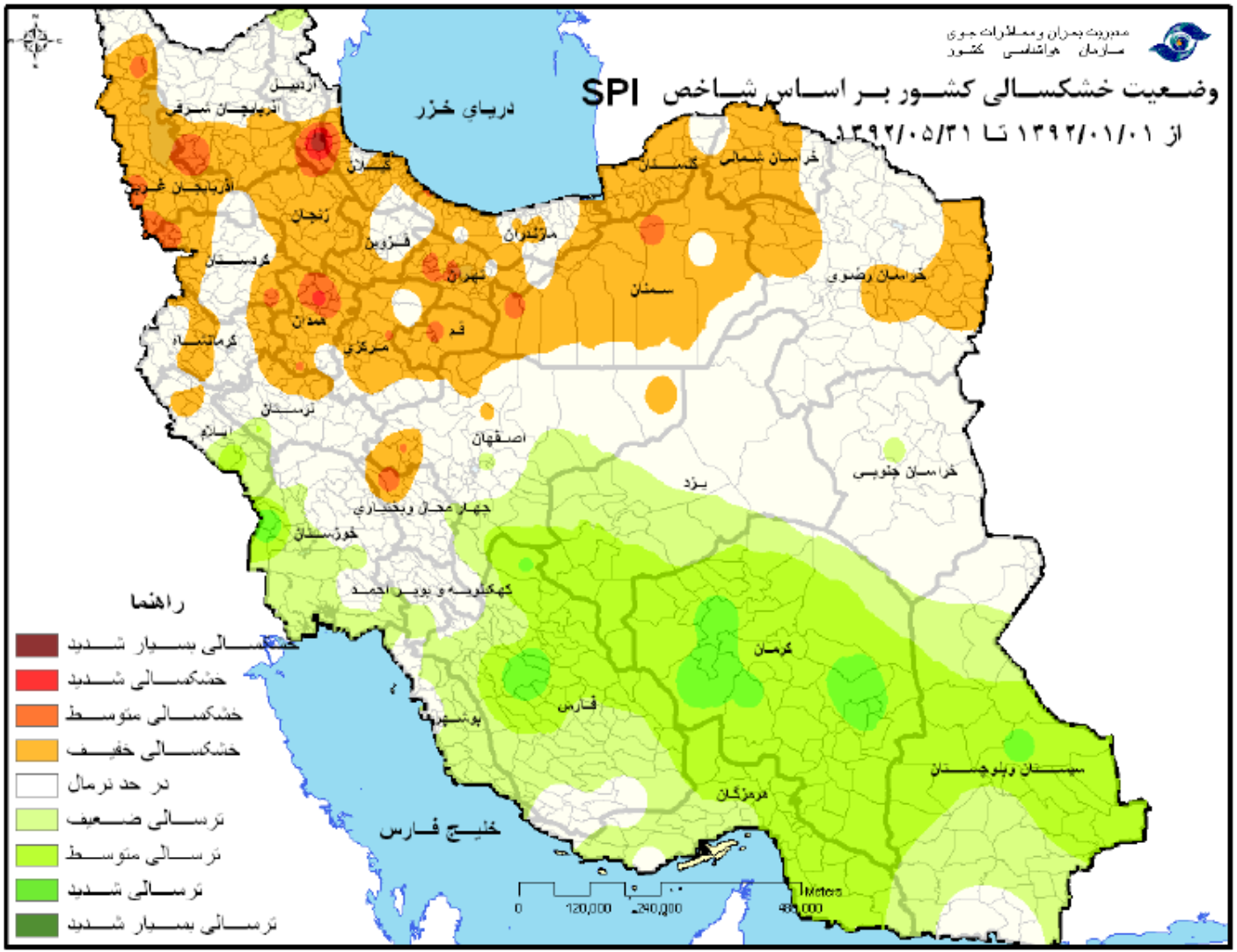
Global Drought Map & Iran Situation



Iran has an extreme drought situation in the world

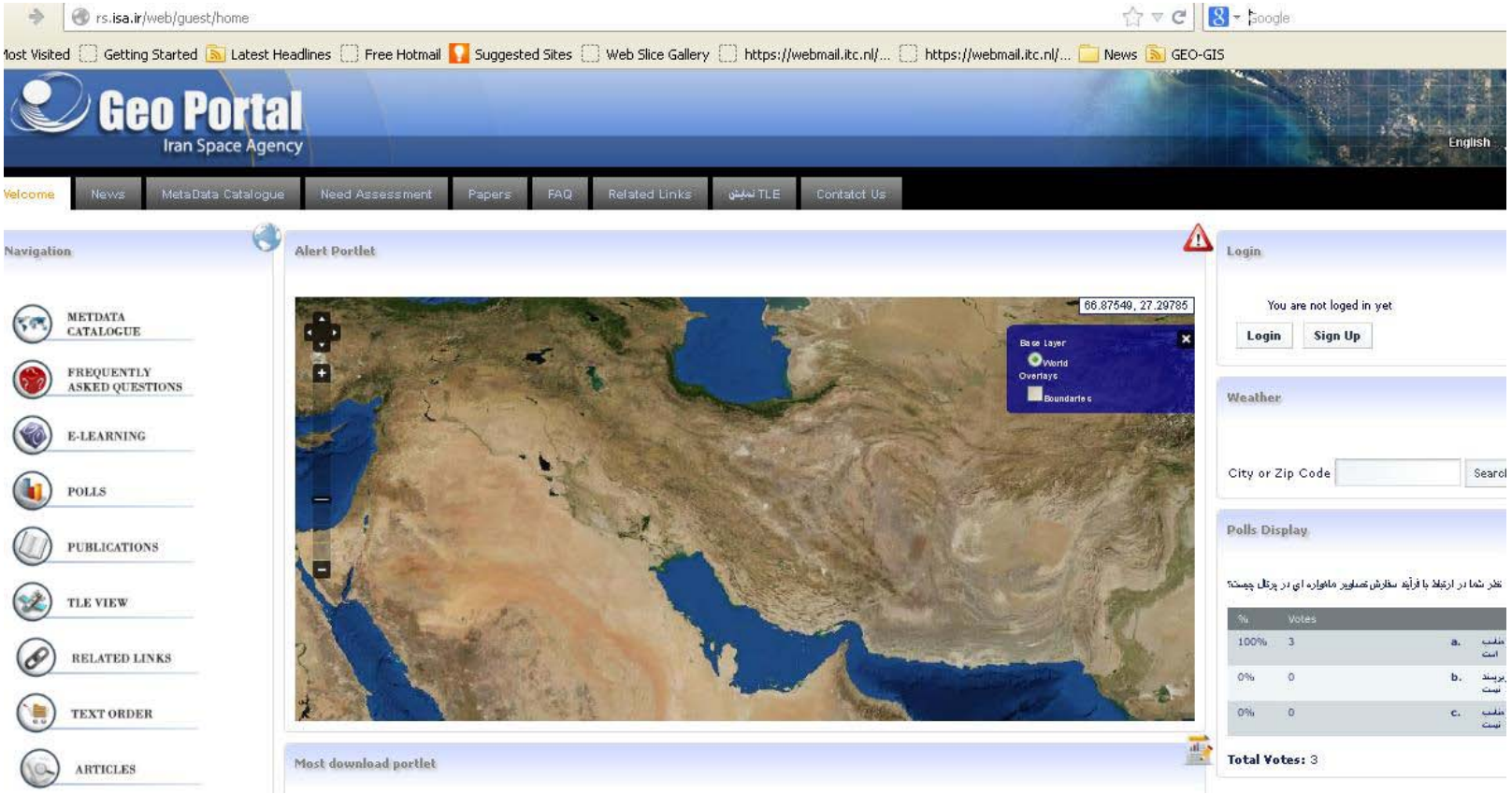
According to the FAO report entitles “Millions of people seriously affected by drought in Near East and South Asia”, in Iran, severe drought in 1999 cut wheat production by more than 3 million tons, or about 25 percent compared to the previous year.

SPI index from Apr 2012 to Aug 2012 (187 stations)



Activities at the RSO (related to drought monitoring)

- Establishing NOAA-AVHRR and MODIS data receiving stations
- Establishing the National Geo-Portal for Archiving, Searching, downloading satellite imagery and value added products



Activities at the RSO (related to drought monitoring)

- Mapping of Incoming and Net Solar Radiation using MODIS imagery
- Drought Monitoring and Forecasting using NOAA-AVHRR, Rainfall and Temperature data with Artificial Neural Network methodology (on-going)
- Conducting several workshops, e-learning and traditional courses

A key factor in knowledge promotion at the field of drought monitoring

Capacity Building is the Key to Sustainable Development

And

Key to Capacity Building is Education

Why choosing E-learning in our RSO?

1. Since all employees are busy through E-Learning courses, **Presence** at classrooms is not required
2. RSO can **assess** the levels of trainers any time , easily .
3. Participants have **24/7 access** to all course materials.
4. **Continuous education**, everywhere for everyone
5. No need to have **budget** for class participating , Transportation, Living expense , …
6. Capability to **communicate and collaborate** (through using Chat Rooms, Email, Bulletin Board,…)
7. **Risk Free** Learning
8. Ability to **select different levels**
9. **Up to Date** learning
10. Capability to have simple **reports and queries**
11. **Un-limited number** of participants

e-learning systems can be classified into two broad categories,

1) **synchronous :** uses a learning model that emulates a classroom course, lecture, or meeting using Internet technologies. It is specified as “synchronous” because it requires all participants to be present at the same time.
2) **Asynchronous:** is the Web-based version of computer-based training , which is typically offered on a CD-ROM or across an organization’s local area network. In the case of e-learning, the learning content or courseware is served from a Web server and delivered on demand to the learner’s workstation. Learners can thus take courses at their own pace. Courseware is normally available to learners 24 hours per day, 7 days per week (24/7) and, subject to the setting of the appropriate permissions, can be accessed from any workstation connected to the Internet or to an organization’s intranet.

E-Learning Implementation

First Step: Objective Identification

- First of all, organization should define its objectives and should be aware about effectiveness of educational programs for all participants and main audiences.

- Increasing the productivity of employees, improvement of their efficiency and economic growth could be some of the main defined objectives.

Our Objectives

❖This course is designed to

- ❖increase the knowledge of participants about drought definition and impacts
- ❖ increase the knowledge of participants about role of Remote Sensing in drought monitoring and risk assessment
- ❖Fill the technical gaps between different sectors working in the field of Space Technology and Disaster Management
- ❖Teach a simple methodology using free of charge archived satellite imagery for drought monitoring and risk assessment

Upon completion of the course, participants will be able to:

❖ Define and describe different types of drought and its risk;

❖Explain how Remote Sensing and Geographic Information Systems (GIS) technology are utilized for drought monitoring and risk assessment

Target Groups

The course is targeted at:

- **professionals with skills on the use of GIS and RS background who require knowledge for drought monitoring**
- **University students, Researchers interested in the field of Geosciences, GeoInformation, Drought monitoring**
- **Staff in**
  - **Disaster Management org**
  - **Space technology org,**

E-Learning Implementation
Second Step: Course Content Creation

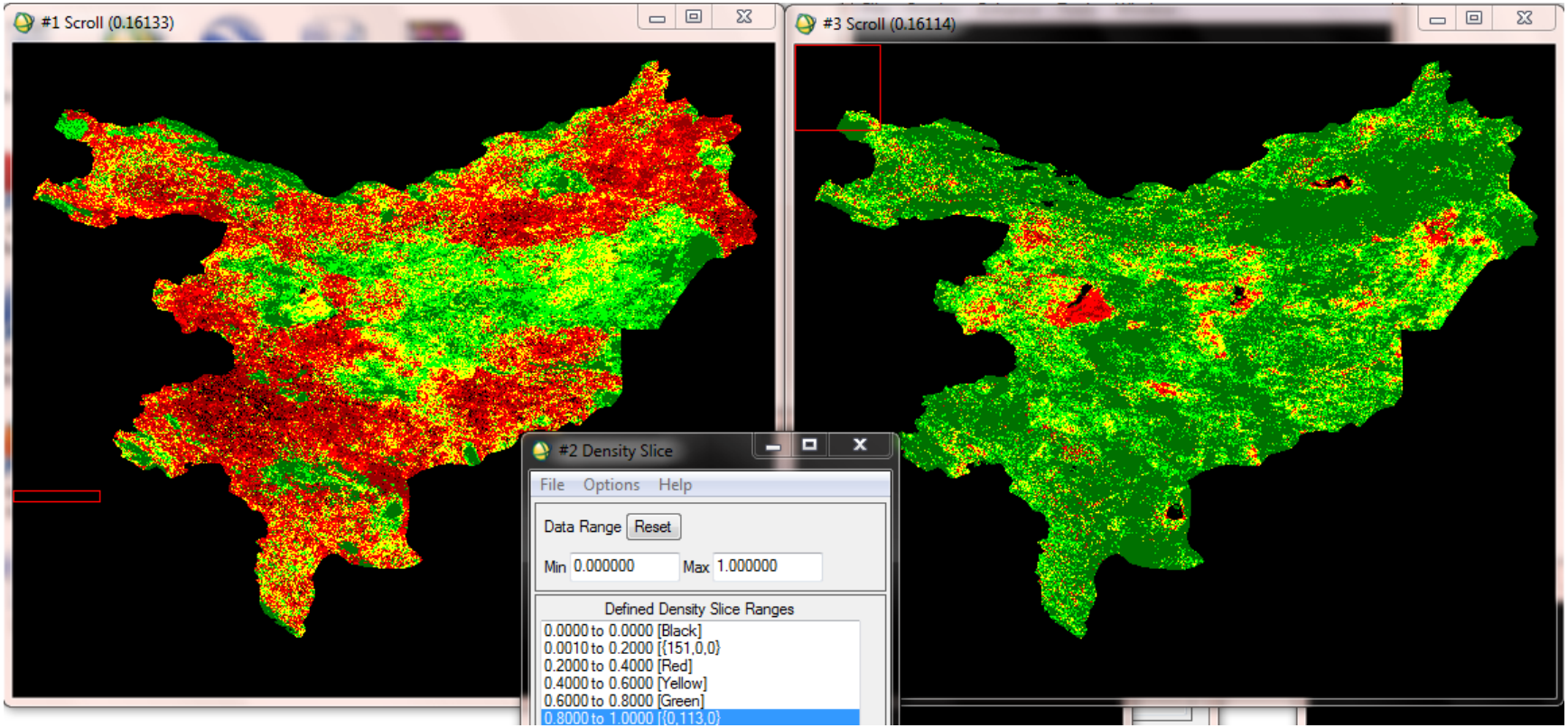
- The second step is creation of required and interdependent course content. At each level all materials and course contents should be independent , but at the same time should pursued the overall goal.

- Curriculum design must be accurate and complete. Different educational contents should have appropriate depth with logical connection with other contents.

Course Content and Curriculum

- ❖Chatper1: Description of Drought
- ❖Chapter2: Drought Management Phases
- ❖Chapter3: Remote Sensing and Vegetation Indices
- ❖Chapter4: Drought Monitoring Using Remote Sensing
- ❖Test and Examination
- ❖Feedback

Drought Monitoring using VCI index as one the methodologies described in Chapter-4



May, VCI 2000

$$VCI = \frac{NDVI_{CUR} - NDVI_{MIN}}{NDVI_{MAX} - NDVI_{MIN}}$$

May, VCI 2008

E-Learning Implementation

Third Step: Test Plan and Assessment

- The next major step is planning of a test methodology and internal assessment. This will be used for determining the objective achievement's level of success.

- At this step, we can decide on any required changes in the program in such a way that it can help to achieve predetermined goals.

Test Plan & Assessment

- Assessment with Likert Scale : First we designed a pre-test questioner including 20 questions to assess the knowledge of participants before starting the course , after completing the course again all participants answered to the same questions, later on these quizzes will inform us about effectiveness of the E-Learning course on knowledge promotion , awareness raising and attitute changing.

- Number of Participants: 60 (BSc 10%, Msc 75%, PhD 15%) (75% Male, 25% Female)

- Each question was included with 4 answers with values equal to very high (4), high (3), low (2) and very low (1) :
- E.g: What is your level of knowledge about drought indices like SPI and remote sensing indices, such as VCI.

Methodology

- To make our tests stable and valid we used an index named Krumbach alpha which shows the internal coordination in of measurement tool which here was questioner .

Krumbach alpha for this test was 0.919 for 20 items which shows that the given test was a stable test .

results

- 1 –There was a meaningful difference Between pre test and post test results.
- 2- There was a positive and meaningful difference between post test results and education level of participants .
- 3- There was not a correlation between test results and the participants gender .

Our Future Plans

- **<u>On-Going Projects:</u>**
  - **Developing a Fire Detection and Fire Risk Assessment System in Forest Regions**

- **<u>Workshops:</u>**
  - **Drought and Dust Storm in the Middle East (2015)**

- **<u>E-Learning Courses:</u>**
  - **Advanced Remote Sensing and Digital Image Processing**
  - **Land Use/Cover Change Detection**
  - **Technical courses for the following hazards:**
    - Earthquake
    - Drought
    - Avalanche
    - Landslide
    - Flood
    - Fire Detection and Risk Assessment

  All including “Samples” and “online Exercises”

Thanks for Your Attention