ECO-RCRM

ECO

ECO Regional Center
for Risk Management of Natural Disasters

(ECO-RCRM)

مرکز منطقه ای مدیریت ریسک بلایای طبیعی
سازمان همکاری اقتصادی اکو

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Introduction

Since climate change has resulted in severe Natural Disasters in the world during last years, especially in some ECO Member States, the necessity for the establishment of a Regional Center for Risk Management of Natural Disasters was approved by the 1st ECO Ministerial Meeting on Agriculture (26-28 July, 2004, in Tehran, Iran) and the 3rd ECO Ministerial Meeting on Agriculture (07 March, 2007 in Tehran, Iran) and the 17th Meeting of the ECO Council of Ministers (COM) ((20 October, 2007 in Herat, Afghanistan). with reference to ECO Secretariat note no. AIH/0141/2004/0862, dated 11May, 2004, and AIH/0141/2004/1521, dated 8 August, 2004, ECO Member States expressed their support to the proposal put forward by the Islamic Republic of Iran Meteorological Organization to establish a "Regional Center for Risk Management of Natural Disasters" in Mashhad, I. R. of Iran. It was agreed to establish this center based on the proposal submitted by the I.R of Iran Meteorological Organization to the 2nd ECO Ministerial Meeting (6-7 December, 2007, Antalya, Turkey). In line with agreement in the 17th Regional Council (RPC), February, 2007, the Ministerial Meeting on Agriculture, March, 2007, the Meteorological Organization of the Islamic Republic of Iran has decided to host the 1st ECO Meeting of the Heads of Meteorological Organizations in 3-5 September, 2007, in Mashad. The Islamic Republic of Iran has proposed to support ECO Regional Center for risk Management of Natural Disasters and its activities. In this sense, IRIMO shall provisionally undertake all the responsibilities required for the operation of the Center, including financial and personnel provisions and premises.

Objectives and Functions of ECO-RCRM

- Establishing an efficient information management system in Natural Disasters
- Short and Long-Term Forecasting/Predictions for Natural Disasters
- Disaster Risk Assessment/Analysis
- Disaster Monitoring and Early Warning System
- Capacity-Building (Education and Training, etc)
- Establishing regional standards and protocols for data quality control and assurance
- Facilitating exchange of data, information and products
- Providing seasonal and long-term climate forecasting, modeling and early-warning system
- To provide Member States with technical assistance in research, through application of new technologies, especially using satellite and radar for meteorological purposes and application of community-based approaches
- To exchange information, knowledge and best practices as well as experts, instructors and trainers
- Facilitates policy dialogue as well as national and regional strategy development for disaster management risk reduction.

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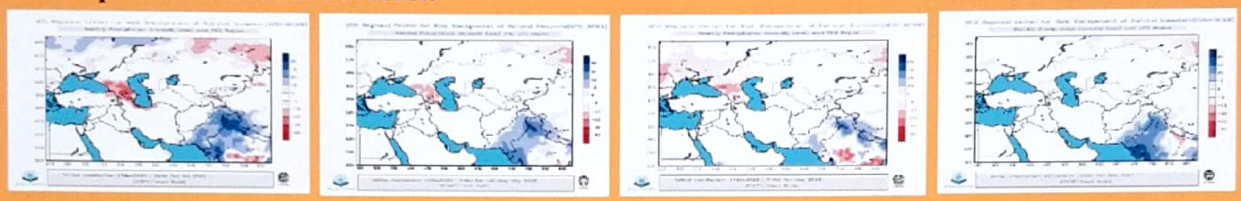
Products:

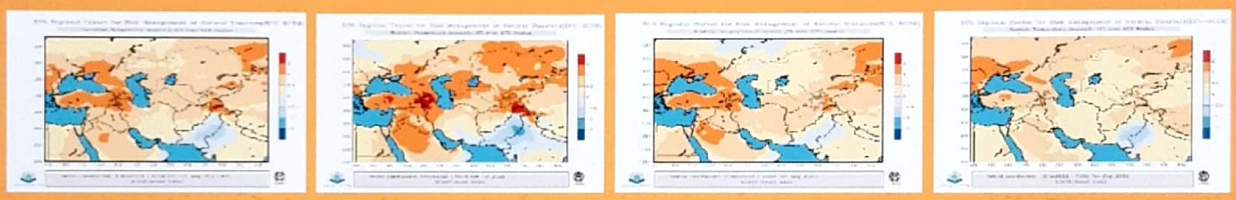
A: Seasonal Forecasts Newslater

Predictions in monthly and seasonal time ranges can be done in two ways: "statistical post-processing" and "dynamic scaling" of the output of general circulation models, which in the Climatology Research Institute, rainfall and temperature forecasting for the eco-region is done by "dynamic scaling" method. Monthly forecast products and reports are prepared every month, and currently, the overall accuracy of these forecasts is 70%.

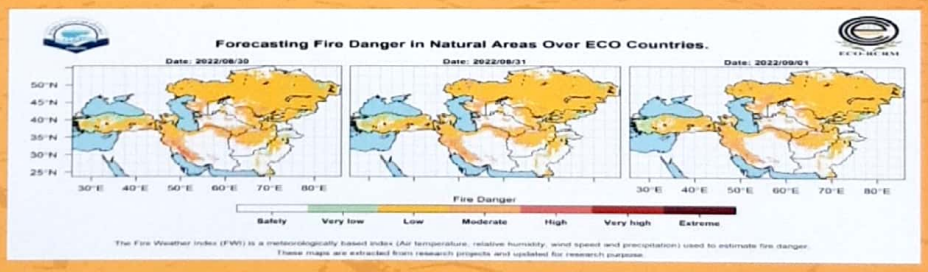
B: Precipitation Seasonal Forecast:



C: Temperature Seasonal Forecast:

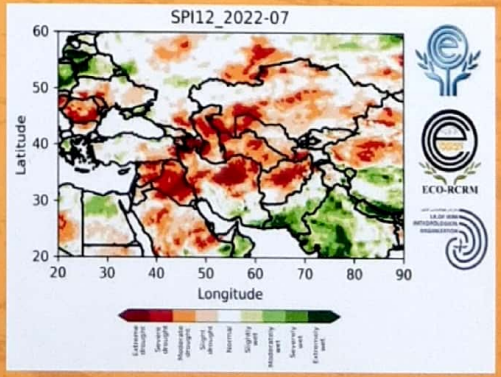


D: Wild Fire hazard



E: Drought Monitoring and Forecast

In order for monitoring and forecast the meteorological drought in the ECO region, the standardized precipitation-evaporation and transpiration index (SPEI) has been used on a monthly time scale.
In this index, the difference values of precipitation and potential evaporation and transpiration (PET) are used.
The drought monitoring and Forecast zoning maps are prepared in ECO-RCRM with Cooperate National Drought and Crisis Management Center in IRIMO.

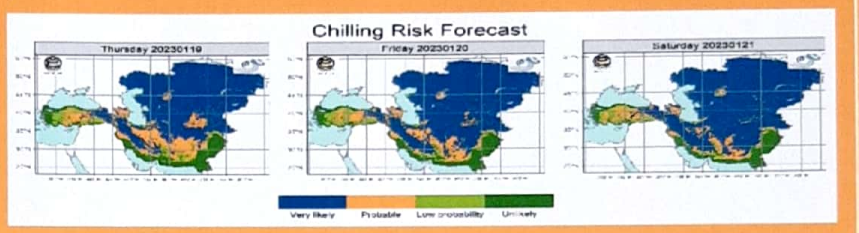


Natural Hazards Forecast:

The outputs of Numerical Prediction Models NWP on a daily time scale and in the form of a three-day forecast are run by the ECO-RCRM and with cooperation by Meteorological and Atmospheric Science Research Institute (ASMERC) and becomes practical products, forecasts and warnings.
in this field some Forecast Products like Chilling days, Icing Days, Heavy Rainfall and Strong Winds are produced and extracted. All products are available on the center's website.

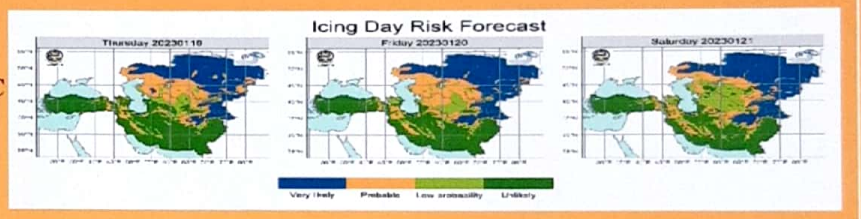
F: Chilling Days:

(Daily minimum temperature) < 0°C



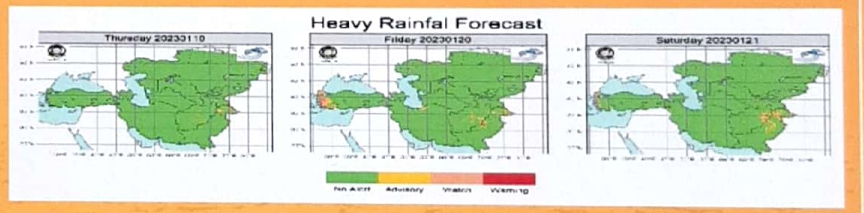
G: Icing Days:

(Daily maximum temperature) < 0 °C



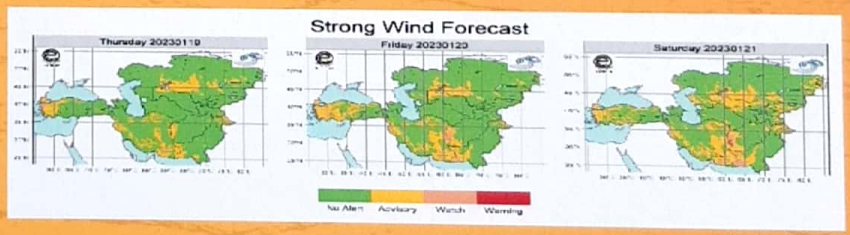
H: Heavy Rainfall:

Rainfall	Status
< 5 mm	No Alert
5-10 mm	Advisory
10-20 mm	Watch
>20 mm	Warning



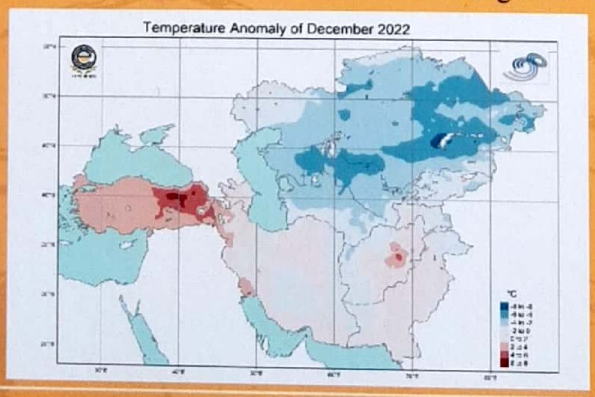
K: Strong winds:

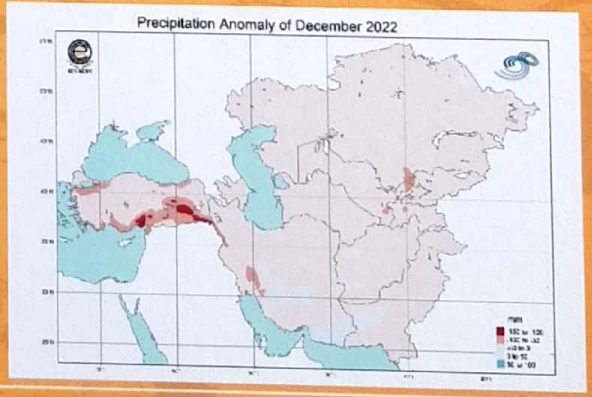
Velocity	Status
0-5 m/s	No Alert
5-10 m/s	Advisory
10-15 m/s	Watch
15-20 m/s	Warning



P: Monthly Anomaly Maps: (Precipitation-Temperature)

Anomaly indicates the amount of changes from the long-term average in the region, where positive values indicate more than normal and negative values indicate less than normal.





Facilities to Support ECO- RCRM'Activities

1. Computer Clustering (Super computer)

A cluster system was established in the research institute in July 2003, with the cooperation of the Scientific Boards of various universities around the country. The above mentioned system is operating with 16 computers with the highest speeds and the most information storage ability regarding the current facilities and abilities of the country. It should be mentioned that **several types of** Numerical Weather Prediction Model **such as** (ARPS) **and MMS were** implemented on the cluster system of the research center.
By the end of 2007 a new computer cluster system which includes 128 Dual Nodes will be operated in this center.
This cluster system would be a supercomputer with highest speed in Middle East and central Asia.

2. Climate Modeling Lab.

For long term climate prediction
some Models runs like:
- RegCM - Precis - Lars WG - MM5

3. Library

The library has two reference hall of Foreign language and Farsi books with more than 2000 copies in specialized fields on climatology, meteorology, agricultural meteorology, basic sciences and etc.
In addition to books, the publication section is also active and has more than 188 titles of Farsi and English magazines related to the climatological sciences. Further more, more than 45 dissertations are available for the use of researchers.

4. Training Center

Meteorology and Atmospheric Science High Training Center in Mashhad was established in 1990 with the aim of staff training, and promoting scientific and applied meteorology. This center has held various courses such as: synoptic expertise (for new employed staff of the Organization), various meteorological training courses Afghan, for countries such as Tajik and Iraqi Experts.

5. Information and Communication Technology

- Web
- Data Center
- VSAT Network
- Intranet

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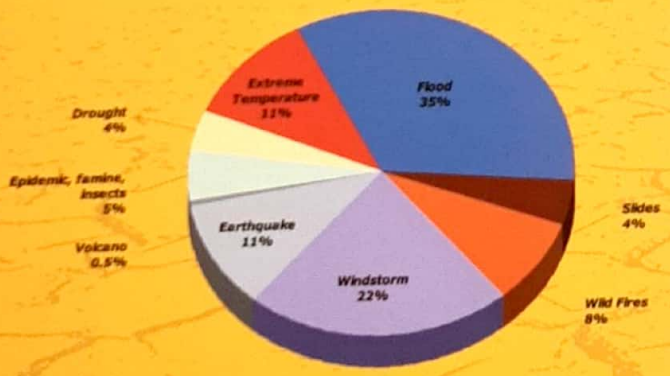
Natural Disasters

Hazards are an unavoidable part of life. The hazards that we face with them are very diverse. At the end of the twentieth century, natural hazards and consequence disasters are one of the most forms of disasters around the world. The number of these disasters is on the rise and in comparison with the previous century, the number and damage caused has had growth. An exact decision about the dangers involved and a spectrum of social, economic and political analyses can reduce these damages.



Percentage of natural disaster occurrence in the world 1980-2005
(Source: EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - University Catholique de Louvain - Brussels – Belgium)

Nearly 90% of natural disasters are related to meteorological factors, and about 70% of human fatalities caused by natural disasters are also linked to meteorological factors.

We can not avoid Natural Hazards, but we can prevent them from Becoming Disasters.
Investment of one monetary unit on Natural Disaster Prevention can lead to save and reduce losses up to 5-10 times in a Society.

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NMHS Regional Cooperation for Disaster Risk Management

Supporting National Capacities for Disaster Risk Management

24 hours a day, everyday of the year, in every country

Need for Partnerships and Coordination Among Different Players

Disaster Risk Management

Components of Effective Early Warning Systems

Need for Effective and Harmonized Governance, Institutional and Operational Mechanisms

Challenges for Effective Early Warning Systems

Risk Identification

- **Data gaps, quality, accessibility, sharing**
  - Hazard
  - Vulnerability (e.g. socio-economic, topographic…)
- **Standardized methodologies and expertise** (e.g. hazard analysis, risk modelling)
- **Understanding of the changing patterns of risk** (e.g. hazard, vulnerabilities)
- **Local capacities**

Observing, Detecting, Forecasting

- **Strengthen observation systems**
  - coverage
  - sustainability
  - inter-operability
  - multi-use of networks (where practical)
  - built on "system of systems" concept
  - data policies
- **Prediction and forecasting**
  - methodologies, accuracy and lead time
  - multi-disciplinary

Communication and Dissemination

- **Effective warning messages:**
  - Incorporation of information about risks in warning messages
  - Understandable warning messages
  - "Authoritative" warnings (Authentication of sources)
- **Dissemination networks:**
  - Interoperability (use of international standards)
  - Redundancy and resilience of networks
  - Same distribution channels for warnings of different hazards (cost efficiency, reliability and effectiveness)
- **Standard warning terminologies**
  - Nationwide and across borders
  - Traffic light concept

Emergency Planning, Preparedness and Response

- **Education and awareness** (emergency responders, authorities, risk managers, emergency responders, media, public…):
  - Understanding of warnings and uncertainties
  - Awareness of less frequent events
  - Cross-training of operational agencies and media
- **Operational planning**
  - Drills
  - Community preparedness and programmes

Coordination and partnerships across components !

Natural Disaster Risk Reduction

Natural disasters have posed great threats to people and their livelihoods all over the world and the number of disasters and people affected by them are increasing worldwide. Asia is especially prone to various types of natural disasters due to its geographical and meteorological conditions.

Earthquakes, storms and torrential rains are natural phenomena we refer to as "hazards" and are not considered to be disasters in and of themselves. For instance, an earthquake that occurs on a desert island does not trigger a disaster because there is no existing population or property affected. In addition to a hazard, some "vulnerability" to the natural phenomenon must be present for an event to constitute a natural disaster. "Vulnerability" is defined as a condition resulting from physical, social, economic and environmental factors or processes, which increases the susceptibility of a community to the impact of a hazard. "Exposure" is another component of disaster risk and refers to that which is affected by natural disasters, such as people and property.

In general, "risk" is defined as the expectation value of losses (deaths, injuries, property, etc.) that would be caused by a hazard. Disaster risk can be seen as a function of the hazard, exposure and vulnerability as follows:

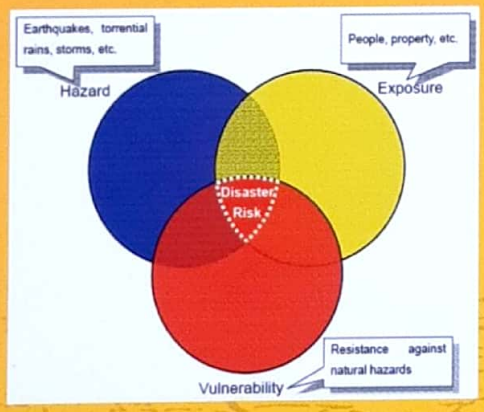
Disaster Risk =

Function (Hazard, Vulnerability, Exposure)

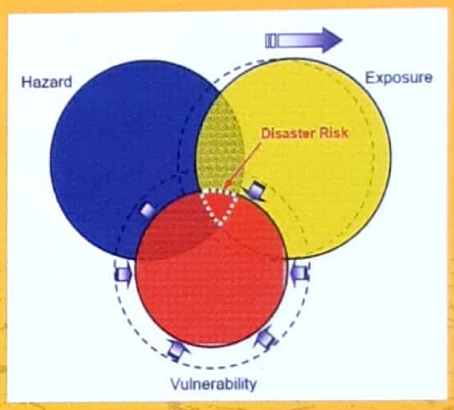
Growing exposure and delays in reducing vulnerabilities result in an increased number of natural disasters and greater levels of loss.

To reduce disaster risk, it is important to reduce the level of vulnerability and to keep exposure as far away from hazards as possible by relocating populations and property. The reduction of vulnerability can be achieved through such measures as mitigation and preparedness.

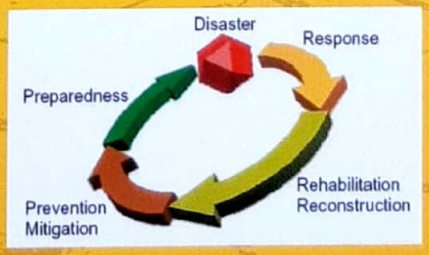
The disaster risk management cycle consists of four phases: Prevention/Mitigation, Preparedness in the pre-disaster stage, Response and Rehabilitation / Reconstruction in post - disaster stage. In the "Prevention/ Mitigation" phase, efforts are made to prevent or mitigate damage Activities and measures for ensuring an effective response to the impact of hazards are classified as "Preparedness". In the "Rehabilitation/Reconstruction" phase, considerations of disaster risk reduction should form the foundations for all activities. Taking appropriate measures based on the concept of disaster risk management in each phase of the disaster risk management cycle can reduce the overall disaster risk.



Mechanism Behind the Emergence of Natural Disasters



Mechanism of Natural Disaster Reduction



Risk Management Cycle