Report

Project: I-ALARMS is early warning system in Ionian-Adriatic.

Partner country

Albania

Contracting authority

Aarhus Information Centre Vlore

Country background

Climate changes, especially in the last decade, are accompanied by environmental hazards, like floods, landslides, wildland fires, etc., in a global but also in a more regional scale, as for example in the Mediterranean. More specifically, the areas of the Ionian and the South Adriatic Seas, with a climate and weather directly depending on the tracks of the eastwards moving Mediterranean depressions, appear more vulnerable to climate change. This area is not very well monitored by ground observations (e.g. weather radars), which could improve the assessment of numerical forecast results leading to a more accurate weather forecasting. An accurate weather forecast is necessary for releasing a reliable early warning system for oncoming extreme weather events, available to the local authorities and the public. At present, northwestern continental Greece is covered to some degree by high-resolution numerical model forecasts, while this is not the case for S Albania. On the other hand, in Albania two small weather radars have been just recently put in operation but NW Greece (Epirus and N. Ionian Sea islands) is not covered by radars. Since both bordering areas are experiencing similar weather hazards, a common high-quality weather forecast tool is necessary.

In addition to all the above, the development of a fire risk assessment tool coupled with the weather forecasting model will enable a fire danger forecast, which will be very important for the prevention of the fire spread. To forecast the fire danger, several efforts have been addressed to develop the so-called fire danger models. These models use weather variables alone or in conjunction with other variables affecting fire ignition and spread (i.e. fuel behavior and material, topography), producing indices related to the potential of fire occurrence, viz. the chances of a fire ignition and spread under the expected weather conditions and the values of other environmental variables. The proposed advanced tool is based on the use of ensemble predictions combined from four operational numerical weather prediction (NWP) models, predicting weather and fire danger parameters that support the prevention of hydro meteorological and fire hazards. It will be constructed after the identification of the current gaps and needs with the goal of improving the existing infrastructure for the prevention of environmental multi-hazards. The observed climate change in the Ionian and south-Adriatic area during the last decades has led to increased variability and intensity of the major weather phenomena. Stronger and more frequent atmospheric disturbances are moving from west to east, causing strong winds and heavy rain and sometimes lead to floods, while occasionally they are accompanied by tornados with catastrophic impacts. The same is valid for drought during the warm season, favoring easier spread of fires crossing frequently the Greek-Albanian borders. For the proposed bi-lateral area of S Albania and N Ionian, the development of an integrated fire hazard model based on an accurate weather forecast has not been implemented yet.

Current situation in the sector

In 2015, the transfer of fire fighter and disaster risk reduction competences was transferred at local level based on the law No.139/2015. Vlora municipality, as the project area established its directorates to deal with firefighting and awareness raising on DRR issues at local level. However, the municipality is struggling to cope with local challenges in protecting its vast natural resources such as: Llogara National Park, Narta Lagoon, Soda Forests, flooding from Vjosa River, Vjosa estuary. Some of the challenges consist in lack of human resources, lack of equipment and above all lack of awareness raising for local communities and citizens to DRR issues. Further, the local fire fighters are having troubles in necessary equipment's and also in training capacities to properly understand early warning systems, software and make use of these up-to-date technology for saving resources, and lives. In particular, the local awareness is very basic and it needs a lot of efforts on the side of fire fighter and municipal authorities' to deliver properly. The Aarhus Information Centre Vlora is a partner in the consortium of i-ALARMS project and is in charge of the awareness rising component in Albania by working closely with Municipality of Vlora and local institutions. Part of the project is also collection and processing of precipitation and fires historical data in order to be used for the preparation of the real-time forecast modelling by the lead partner. The data issue still remains a concern in Albania and particular at local level. In this context, the Aarhus Information

Center will need the services of an DRR expert to collect the data from various institutions and compile a dataset for two variables: precipitation and fires.

Project objective

To support the Aarhus Information Centre Vlore to collect the precipitation and fires historical data for the last 5 years.

Purpose

The purpose of this assignment is to assist the Aarhus Information Centre Vlore with:

- To collect the historical precipitation and fires data for the Southern Albania;
- To process the historical fire and precipitation data for the Southern Albania;
- To support the preparation of a dataset for the last five years (2013-2018) in Southern Albania.

Geographical area to be covered

Southern Albania.

Target groups

The main target group of the project will be municipality of Vlora and the Southern Albania in general. The fire fighter, research institutes, students and researchers will be also main target of this project.

Results to be achieved by the contractor

- Result 1: Daily values of precipitation of the available meteorological stations for the period 2013-2018. E.g. excel file with dates in rows and stations in columns.
- Result 2: For each fire event (for the same period 2013-2018): ignition date,
- ignition location (latitude, longitude) and total burned area (in square meters). Excel files are welcome too.

General

Project description

To forecast the fire danger, several efforts have been addressed to develop the so-called fire danger models. These models use weather variables alone or in conjunction with other variables affecting fire ignition and spread (i.e. fuel behaviour and material, topography), producing indices related to the potential of fire occurrence, viz. the chances of a fire ignition and spread under the expected weather conditions and the values of other environmental variables. The proposed advanced tool is based on the use of ensemble predictions combined from four operational numerical weather prediction (NWP) models, predicting weather and fire danger parameters that support the prevention of hydro meteorological and fire hazards. It will be constructed after the identification of the current gaps and needs with the goal of improving the existing infrastructure for the prevention of environmental multi-hazards.

According to the Albanian Ministry of Environment, only the last few years the number and intensity of fires in Albania has been increased. Similarly, for Greece, the technical report of the JRC of the EC states that the number of fires varied from 1000 to 2000 per year.

The observed climate change in the Ionian and south-Adriatic area during the last decades has led to increased variability and intensity of the major weather phenomena. Stronger and more frequent atmospheric disturbances are moving from west to east, causing strong winds and heavy rain and sometimes lead to floods, while occasionally they are accompanied by tornados with catastrophic impacts. The same

is valid for drought during the warm season, favouring easier spread of fires crossing frequently the Greek-Albanian borders. For the proposed bi-lateral area of S Albania and N Ionian, the development of an integrated fire hazard model based on an accurate weather forecast has not been implemented yet.

Weather conditions during 2018 has strongly influence growth and development.

Weather and climate are the important factors determining the growth, development and yield of crops. Weather conditions affect the agricultural operations, transport facilities, area connection, business operations and social status and economic productivity. For instance, in agriculture, the variation in crop productivity is mainly due to weather fluctuations. The external environment is the climate which regulates and the weather determines the growth and development and finally the yield of the crop.

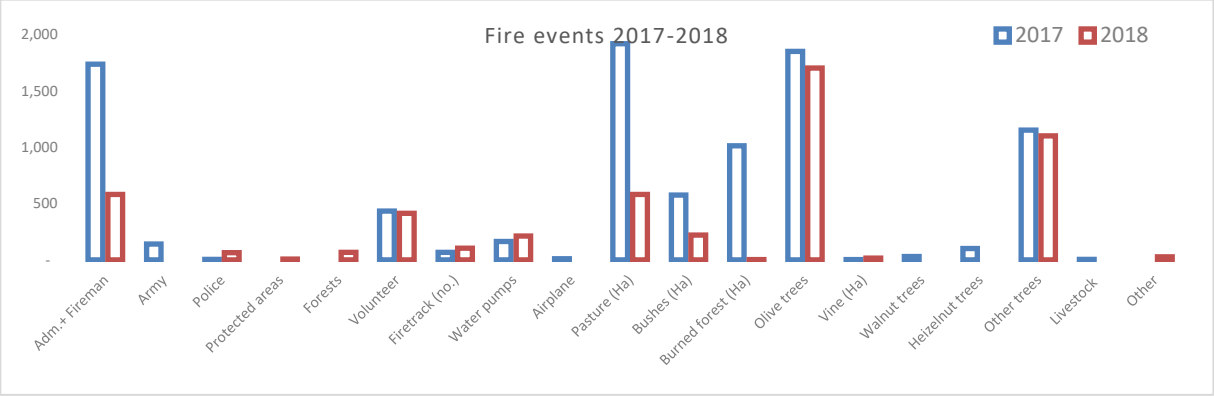
It is therefore; necessary to collect all meteorological parameters /variation and distribution of all-weather parameters such as rainfall, temperature, wind speed, bright sunshine hours and evaporation. Weather observations are also required for accurate weather forecasting and comparison of forecasted weather.

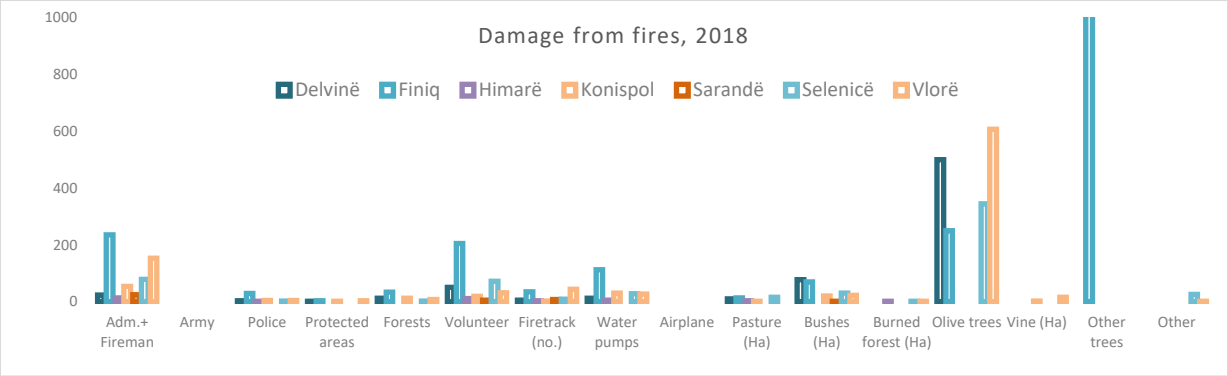
The geographic relief directly affects the formation and distribution of precipitation of a geographical area. Albanian relief as a physical factor stable, plays an important role in geographical positioning and in the intensity of precipitation. What emphasizes most the influence of local factors on rainfall, is the unique relief of Albania which consists of mountains and hills to the extent of over 76% territory, with an average altitude of 700 m above sea level, twice as much as average European height.

In the conditions of such a relief, the sea winds bring towards the territory Albanian, warm and humid air which in contact with barriers the natural relief is subject to adhesion to the slope of the relief.

Fire events

The fire events are to be considered in the last years given the dry climate of summer in the last decade. Civil Emergence has been able to engage tools and means to cope with fire events, however immediate measures are to be taken to develop e prevention strategy. Most of fire events happen in months of August-October. Midday, between 11am to 3:30 pm are recorded most of fire events. On average 6.7 firefighters, one police officer, one forest personnel and 4 volunteers are engaged in a fire event, given the total of 86 events in 2018. About 104 firetracks and 213 water pumps have been used in 2018 to cope with 86 fire events. Olive trees are mostly damaged by fires. In 2018, the average estimated financial damage for a fire event is 629,000 lek, whereas the total estimated financial damage is 57.8 million lek. Year 2017 was really a very bad year, with more than one thousand ha forest burned and with an estimated damage of 9 milliard lek. Four major fires damaged an area of 730 ha forest, the largest one was 285 ha in Konispol. There's a reduction in fire events from 130 in 2017 down to 86 in 2018.





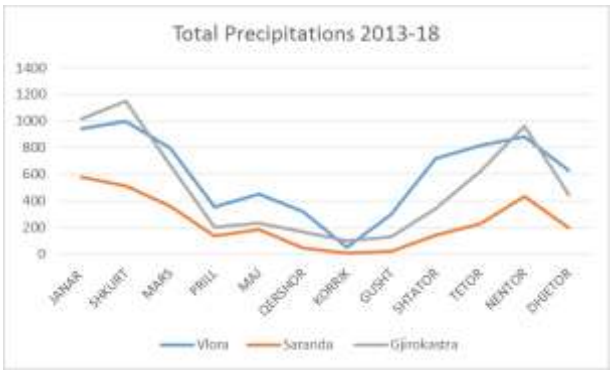
Precipitations:

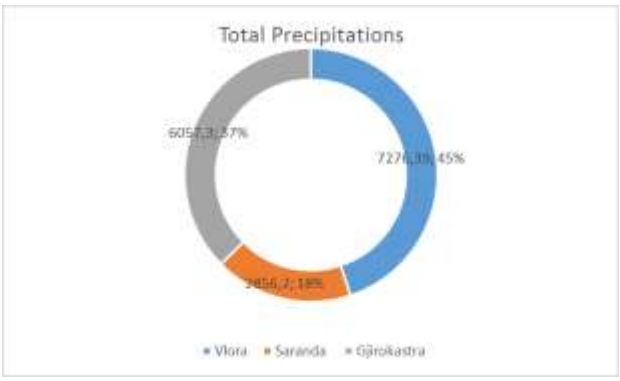
A probability of precipitation (POP), also referred to as chance of precipitation or chance of rain, is a measure of the probability that at least some minimum quantity of precipitation will occur within a specified forecast period and location.

Rainfall and rainy days

The annual precipitations in the Southern Albania vary among districts. In Gjirokastra, Vlora and Saranda precipitations fluctuate. The graph below represents precipitations for the three districts during 2013-2018. The majority of rainfall happens around September – March. February seems to have the most of precipitations as showed in the graph. June to August are the dryiest months of the year. Vlora and Gjirokoastra were exposed to more precipitations compared to Saranda, often up to two times more for a given time period.

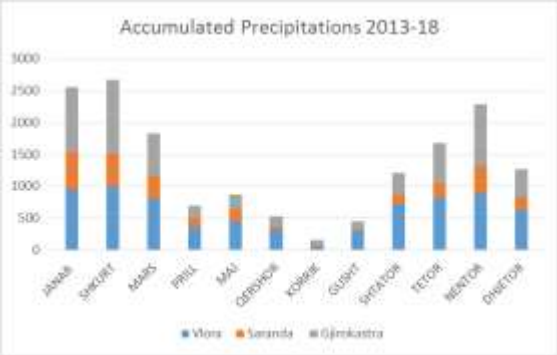
The total precipitation in the five researched years (2013-2018) spots Vlora with 7276mm, compared to Gjirokastra with 6057mm and lastly Saranda with 2856mm of rainfall.

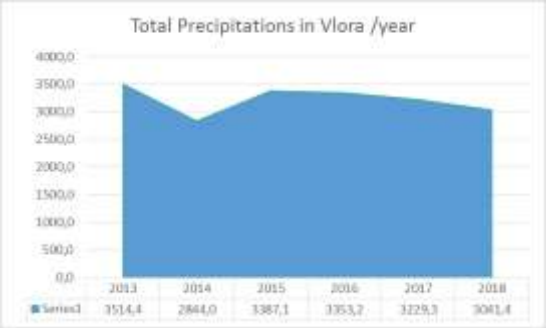


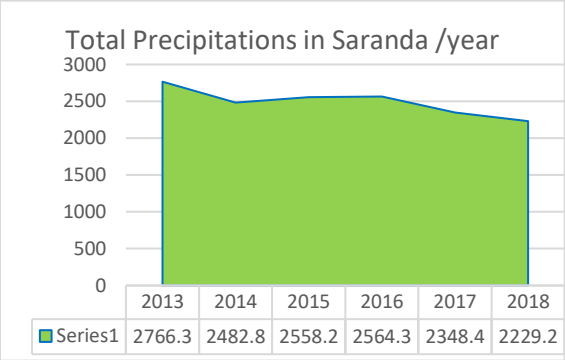


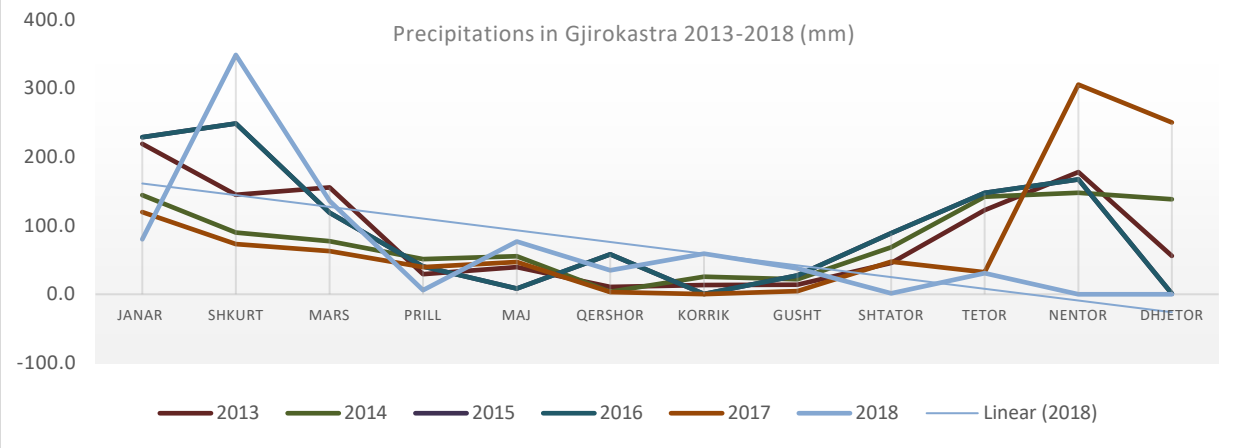
The graph on accumulated precipitations clearly shows January and February as the most of rainfall months over the year cycle. Precipitation during October – March are up to five times higher compared to the other months of the year, in spring and summer.

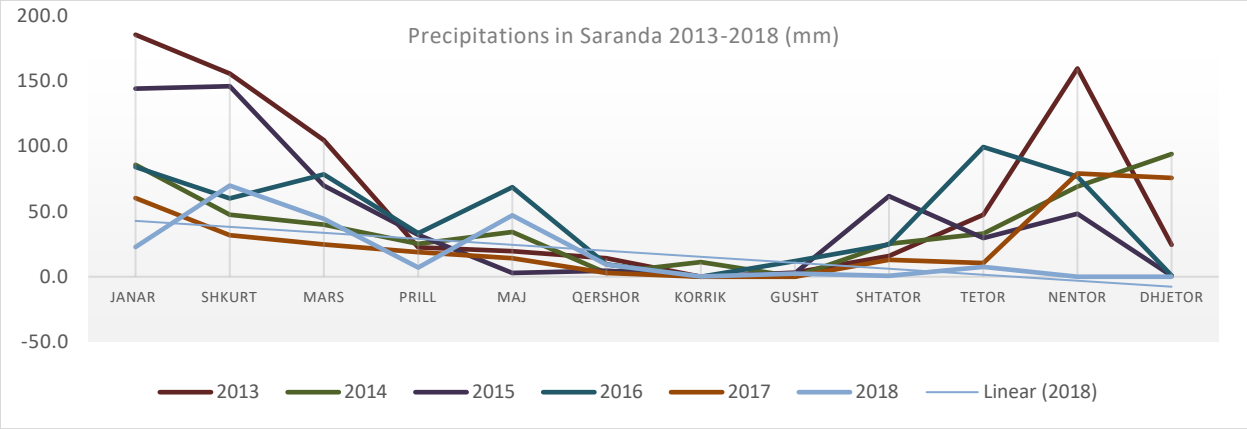
It barely rained on July, for instance, in Gjirokastra much more compared to Vlora and Saranda. It never rained on July in 2013, 2015 and 2017 in Vlora, no rain in 2016 and 2017 in Saranda, and the only reason to draw is because both are cities by the see.

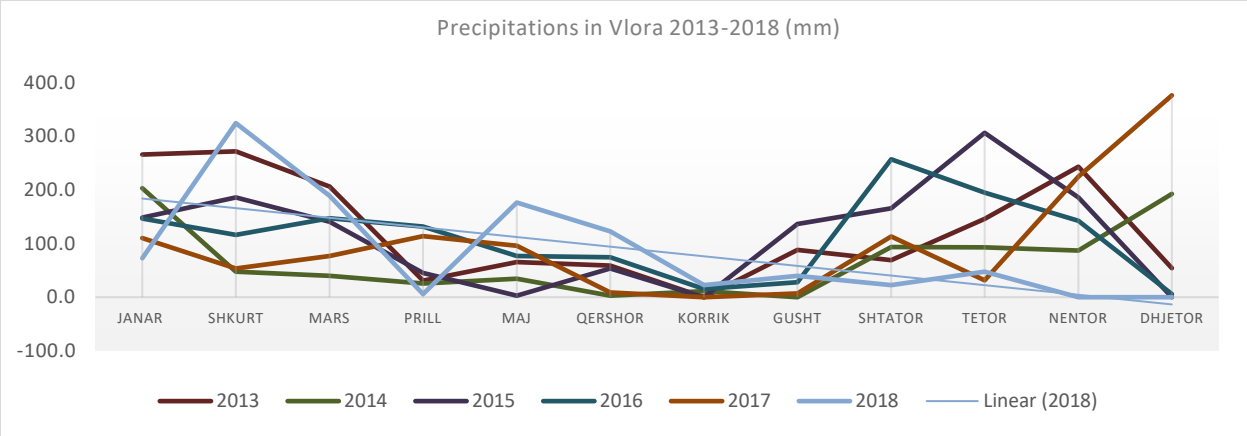












The linear precipitation forecast (based on 2018 rainfall analysis) shows a downtrend for all three districts of Vlora, Gjirokastra and Saranda. Although close distance between these three districts, rainfall varies from district to district and from year to year. No similarities can be drawn based on rainfall data. For example, February 2018 precipitations are high in Vlora and Gjirokastra, but not in Saranda. Likewise, precipitations in November-December 2017 are lower in Saranda.

Reporting challenges

The Project challenged support of the Albanian public institutions which provide the relevant data. Often the response from IGJEUM as the research institute of the University of Tirana for the use, processing of flooding and fires information was limited. Data availability remain yet a challenge all relevant state institutions have to address at a large extent. A system of data collection must be established to allow for information flow, in duet time, ensure data coherence, data standards, timely data processing, availability in easy-to-use formats and transparency of data.

The response from the local authorities in Vlore, Saranda and Gjirokastra for the relevant figures has been very weak. Often the annual database is not completed with all relevant figures, for example, there are months for which figures are missing.

Also, the information is not fully structured, but scattered with regards to floods and fires in different departments, and public institutions.

Report date: _____

by: 
Rezart Xhelo

Annexes:

1. Rainfalls data 2013-18 for Saranda
2. Rainfalls data 2013-18 for Vlora
3. Rainfalls data 2013-18 for Gjirokastra
4. Rainfalls data 2013-18 for Kuc, Brataj, Muzine, Vergo, Himara, Orikum, Selenice, Xarre, Konispol
5. Fire events data 2013-18