FINNISH METEOROLOGICAL INSTITUTE

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Design and implementation of Weather Radar Networks in some other countries with support of Finnish Meteorological Institute

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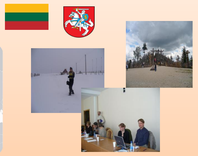
Introduction:

Since 1975, disasters have claimed the lives of more than 2.2 million people. Storms, floods, droughts, heat waves and other weather-related phenomena are responsible for two thirds of the fatalities and economic losses from disasters (UNISDR 2009 Global Assessment Report).Governments can reduce this risk by assessing and reducing vulnerability to existing weather and climate hazards, incorporating disaster risk reduction into national adaptation and development plans, and by strengthening the resilience and adaptive capacity of the communities most at-risk. Investment in the development of hydrometeorological capacity plays a key role in the reduction of weather related losses. For decades the FMI has addressed this issue through international and national development cooperation projects. International co-operation is a natural part of the day to day operation of the Finnish Meteorological Institute. In addition to being a leading expert in several research areas, Finnish Meteorological Institute is also committed to help other countries, especially the developing world, in the development of their meteorological services. We are also an important participant in several international organization's and projects. Annually about 35 FMI's experts are taking part in short-term missions on all inhabited continents of the world to either provide training or assist in development tasks. FMI took and take part in Radar Networks development projects in some countries such as Lithuania, Moldova, Vietnam, Georgia, Nepal, Ecuador, Colombia, Myanmar, Jamaica and Central Asia.

The main objectives of these projects:

Improved capacity of NHMS to establish a weather radar network as part of its real-time observation and nowcasting system; Providing guidance in assessing the suitability of the existing structures to accommodate the radar with ancillary systems and facilities and advice on changes needed to existing structures; Providing technical expertise during the tender process for the procurement of the radar; Determination the appropriate training needs for maintaining the functionality of the radar Providing technical supervisory services for the installation of the radar; Preparation a transition plan (inclusive of implementation schedule) for the decommissioning of the existing radar and the to put into operation of the new one; Creating basic and specialized weather radar products, based on identified stakeholder and customer needs.

Lithuania

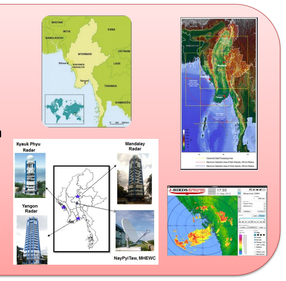


Project name: Institutional Strengthening in preparation for upgrading of Lithuanian meteorological network, 2005-2006.
Funding: EU (European Union).
Activities: Analysis of current and designing of modern meteorological observation network, including AWS, Weather Radar, soundings and data management system.

Jamaica

Project name : Improving Climate Data and Information Management. 2016-2018.
Funding: WB (World Bank)
Activities:
- To develop detailed technical specifications for a Weather Radar;
- Provide technical expertise during the tender process;
- Prepare a transition plan for the decommissioning of the existing Radar and the operationalization of the new one;
- Provide technical supervisory services for the installation of the Radar;
- To develop a training programme.

Myanmar



Project name : **AIRBM**- Ayeyarwady Integrated River Basin Management.
System Integrator. 2017-2020.
Funding: WB (World Bank)
Activities: Hydromet Observation and Information Systems Modernization:
- Institutional and regulatory strengthening, capacity building and implementation support of DMH;
- Modernization of the Observing Infrastructure; Data Management Systems and Forecasting

Nepal

Project name: **PPCR/ BRCH** -Pilot Program for Climate Resilience/ Building Resilience to Climate –Relate Hazards. System Integrator. 2013-2018.
Funding: WB (World Bank).
Activities:
- DHM Weather Radar network analysis, development plan;
- Sites selecting;
- Hardware & civil works tendering;
- Installation & testing;
- Radar commissioning complete;
- Training.

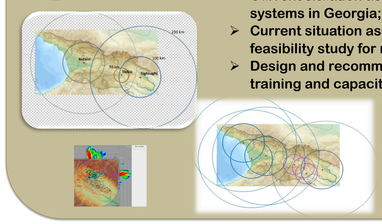
Moldova

Project name: Developing the Operations of the State Hydro- Meteorological Service in Moldova. 2014.
Funding: WB (World Bank)
Activities:
Training and capacity building on the fundamentals of radar meteorology concentrating on the features of the
dual polarization radar and usage of the radar products for weather surveillance and hazard weather forecasting, nowcasting and warnings.

Ecuador & Colombia

Projects names : **FINAMHI & COFIMET.** Building capacity at INAMHI and IDEAM to reduce harmful impacts due to changing climate and changing climate extreme weather in Ecuador and Colombia, 2012-2014.
Funding: ICI(Institutional Cooperation Instrument), MFA (Ministry for Foreign Affairs of Finland)
Activities: Improved capacity of INAMHI and IDEAM to establish a weather radar network as part of its real-time observation and nowcasting system, including the following activities:
- Basic training on weather radars;
- Training on operation and maintenance of radars;
- Support to weather radar network planning;
- Creating basic and specialized weather radar products, based on identified stakeholder and customer needs.

Georgia



Project name : Preliminary assessment of a hydro-meteorological observation network and Weather Radar network in Georgia. 2015.
Funding: Swiss Confederation, represented by the Swiss Federal Department of Foreign Affairs.
Activities:
- Current situation assessment of meteorological observing systems in Georgia;
- Current situation assessment of radar systems in Georgia, feasibility study for modernizing the radar network.
- Design and recommendations of new modernized systems, training and capacity

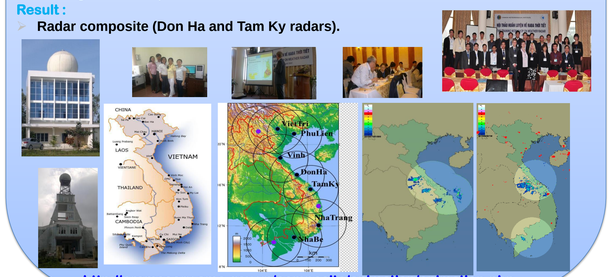
Central Asia, Uzbekistan

Project name : **FINUZ** - Promoting Modernization of Meteorological and Hydrological Services in Central Asia. 2011-1013. **Funding::** ICI,MFA.
Activities: Capacity building and training in the different observations techniques (AWS, Weather Radars, satellites, sounding and lightning detection), and use of them when detecting, monitoring and warning on hazardous weather phenomena.
Result: Training "Weather Radar and Nowcasting".

Vietnam

Project name: **PROMOSERV** -Promoting Modernization of Hydro-Meteorological Services in Vietnam. 2010-2012.
Funding: ICI(Institutional Cooperation Instrument), MFA
Activities:
- Current situation assessment of radar systems in Vietnam and feasibility study for modernizing the radar network in Vietnam;
- Performing first radar composite in Vietnam;
- Capacity building and training in radar operation, including data interpretation and making radar composites.

Result :
- Radar composite (Don Ha and Tam Ky radars).



http://promoserv.amo.gov.vn/composite/animation/animation.php

Summary:

The Capacity building projects is needed to help the NHMSs improve capacity in risk analysis of natural hazards and early warning and severe weather forecasting services. The Weather Radar Network design depends on the aimed uses of the radar data. Typical uses of radar data are nowcasting, hydrology and aviation. A network is usually built in a number of steps, because the investment cost of radars is high. Therefore, it is necessary to define the general structure of the network from the very beginning to the full extent. Availability of a reliable electrical power connection is a prerequisite for reliable radar operations. Modern radars are remotely operated and produce considerable quantities of data. A reliable communication method is needed for data transfer from radar site to the operating center, remote monitoring of the radar hardware, software and physical environment, remote control of the operation and change of the settings and the operation. Siting a radar is a task in which many different points need to be taken into account which have effect on the decision. A site can be selected in a way to maximize the coverage of a given territory where a network of radar stations exists or to best observe a predefined region for the identification of hydrometeorological risks.