ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

EU LIFE + MONIMET STAKEHOLDER WORKSHOP

September 29, 2015
Finnish Meteorological Institute
Helsinki-Finland

Introduction to EU Life+ MONIMET Project

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Climate Change Indicators and Vulnerability of Boreal Zone Applying Innovative Observation and Modeling Techniques

MONIMET

LIFE12 ENV/FI/000409

PROJECT LOCATION: Helsinki

BUDGET INFO:

Total amount: 2,755,288 €

% EC Co-funding: 1,366,952 €

DURATION: Start: 02/09/13 - End: 01/09/17

PROJECT'S IMPLEMENTORS:

Coordinating Beneficiary: Ilmatieteen Laitos (FMI)

Associated Beneficiary(ies): Metsäntutkimuslaitos (METLA), Suomen Ympäristökeskus (SYKE), Helsingin Yliopisto (UHEL)

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BACKGROUND :

- EU Life+ MONIMET is an ambitious project spearheaded by scientists in Finland to increase turnover of climate data by implementing a network of webcams in Finland's boreal forest and wetland environments.

- While climate change is a problem in need of global action, its effects are localised and affect regions in very different ways. Equally, certain areas exert a greater influence on the global climate and carbon balance than others, and it is this dynamic relationship that makes tackling climate change so complex.

- Over the next century, scientists predict a mean annual temperature increase of 2-6 ° C. This change will be particularly important in the boreal forest biome, which is distributed in a band around the northern sub-polar regions of Earth.

- Boreal forest represents the world's largest terrestrial biome and exerts a pronounced effect on global climate and weather systems.

- In Finland, the boreal zone is blended with wetland environments that account for one-third of the country's territory. They are important for boreal greenhouse gas balances due to methane emissions.

OBJECTIVES:

- To collect information, data and expertise that is currently spread over several institutes, in order to build a comprehensive platform for analysing climate change effects on seasonal dynamics of various phenomena

- To create links and add value to existing monitoring mechanisms such as ICOS and EO systems (GMES/COPERNICUS) and make use of data acquired in previous EU Life+ funded, and other projects related to ecosystem monitoring

- To create new webcam monitoring system in order to facilitate Earth Observation systems by providing time-series of field observation for calibration and validation, as well as to improve the assessment of forest ecosystem services

- To synthesize modeling and observation approaches to identify climate change indicators
- To establish link between the climate change indicators and their effects in order to create vulnerability maps of boreal zone in connection to climate change scenarios

MAIN EU POLICY(IES) TARGETED:

The project develops and demonstrates carbon and water cycle related monitoring systems, methodologies and vulnerability assessments for Finland and surrounding areas. As other EU countries have similar information needs, the developed system, could be useful to other EU countries. The actions to be taken in this project are applicable to support a wide variety of EU activities.

- **MONIMET supports the EU white paper Adapting to climate change: Towards a European framework for action (COM(2009) 147) that sets out a framework to reduce the EU's vulnerability to the impact of climate change. It states that in addition to mitigation we must take adaptation action to deal with the unavoidable impacts .**
- **MONIMET is linked to DG ENV: European Climate Change Programme (ECCP). Supporting the initiative of the European Commission for a policy strategy to adapt to the impacts of climate change that is aimed at assisting local, regional and national efforts. Pan-European, spatially detailed data on northern latitudes and improved models on its changes for future climate scenarios are very relevant for these efforts.**

MAIN EU POLICY(IES) TARGETED:

- **MONIMET aims are in concordance with EU Commission Communication: "Winning the battle against global climate change"** [COM(2005) 35] calling for more and better focused research to further improve knowledge on climate change and its global and regional impact. The project objectives are also related to "Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond" [COM(2007) 2] setting out more concrete steps to limit the effects of climate change and to "Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss" [COM(2008) 645 final] calling for strengthening of forest governance and institutions at local and national level by rewarding the value of the services provided by forests and by taking account of demand and the responsibility of consumers.
- **MONIMET objectives are congruent with 'Global Monitoring for Environment and Security' (GMES/COPERNICUS) that is the European Programme for the establishment of a European capacity for Earth Observation.** GMES/COPERNICUS represents a concerted effort to bring Earth observation data and information providers together with users, so they can better understand each other and make environmental and security-related information available to the people who need it through enhanced or new services.
- **MONIMET contributes to objectives of ICOS (Integrated Carbon Observing System) Infrastructure.** ICOS is a long term (20+ years) European Research Infrastructure for quantifying and understanding the greenhouse balance of the European continent and adjacent regions.

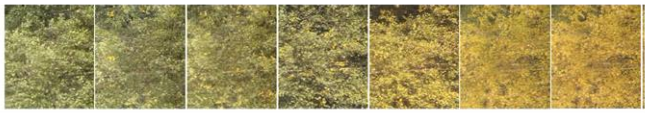
IMPLEMENTATION:

- **The plan of MONIMET project is to observe climate change through the use of indicators such as water and carbon cycles and phenology – the study of plant and animal life cycles. This is also the approach used by the EU; the European Environment Agency, for example, lists more than 40 indicators of climate change based around vegetation, water and gas levels.**

IMPLEMENTATION:

- **The first step is implementing an innovative new system for in situ monitoring: a webcam network. This new network will provide an unparalleled insight into forest ecosystem services, enabling spatially representative monitoring of vegetative processes and their change over time. Indeed, this work will lead to the design and harmonisation of webcam networks all over Finland.**

Data flow



AUTOMATED TRANSFER

SERVER

RS PRODUCTS

MODELS

OTHER MEASUREMENTS

DEVELOP/ COMPARE/ CALIBRATE

VALIDATE

GREEN-UP DATES

SNOW INFORMATION1

SCRIPTS

IMPLEMENTATION:

- **Using other available network data (GEOSS, COPERNICUS, ICOS, FLUXNET etc.– and the novel observational approaches the webcam network will facilitate – the team of MONIMET project then plans to create and calibrate high-resolution climate models for developing accurate estimates of climate change effects on soil and plants. These models will not only be useful in Finland, but worldwide – and the data produced may contribute to climate models for other regions within the boreal forest or peatland biomes. The project therefore has clear scalability, beginning at the level of individual webcams and building up to local, national and global relevance.**

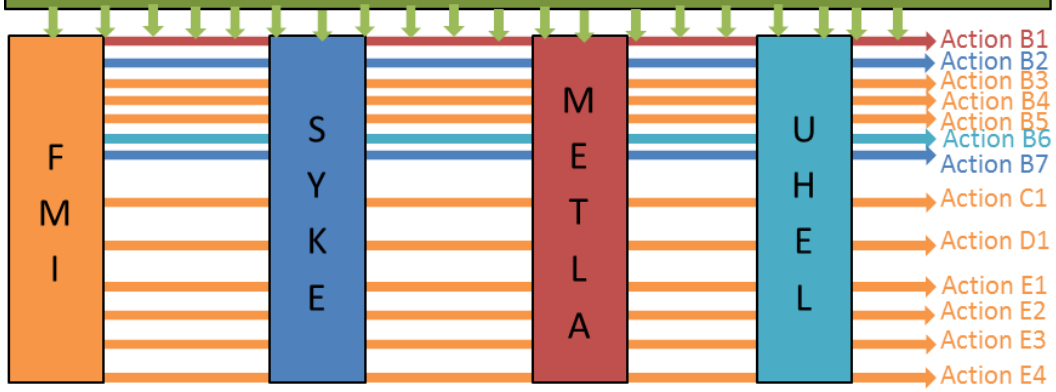
IMPLEMENTATION:

- **The project will use its accumulated data in conjunction with more advanced modelling techniques to determine vulnerability maps for wetlands and boreal zones in the context of various climate situations. If such maps can ultimately be created, providing a reliable and clear path towards efficient future strategies, then this would be an invaluable asset to Finland and the EU. The project's studies will also give an indication of the mitigation potential in these habitats, and an estimate of the risk of decrease in the provision of ecosystem resources such as the carbon sequestration of trees, and the nitrogen retention of soil.**

STEERING GROUP
Members of Management Board
End-User Representatives

MANAGEMENT BOARD
Project P.I (FMI)
Project manager (FMI)
Partner coordinators(SYKE, METLA, UHEL)
Project secretaries
Action Managers

Project Manager (FMI)



Implementation Actions

B1 Webcam network implementation & harmonization by FMI,SYKE, **LUKE**, UHEL

B2 Earth Observation and data processing by FMI, **SYKE**

B3 Ground-based and airborne observation and data processing by **FMI**, SYKE, LUKE, UHEL

B4 Model System Calibration by **FMI**, SYKE, LUKE, UHEL

B5 Retrieving climate change indicators by models **FMI**, LUKE, UHEL

B6 Assessment of uncertainty of climate change indicators by FMI, LUKE, **UHEL**

B7 Demonstration on ecosystem services and vulnerability by FMI, **SYKE**, LUKE, UHEL

Monitoring of the impact of the project actions

C1 Monitoring of the impact **FMI,** UHEL
C2 Monitoring of socio-economic impact **SYKE**

D. Communication and dissemination actions

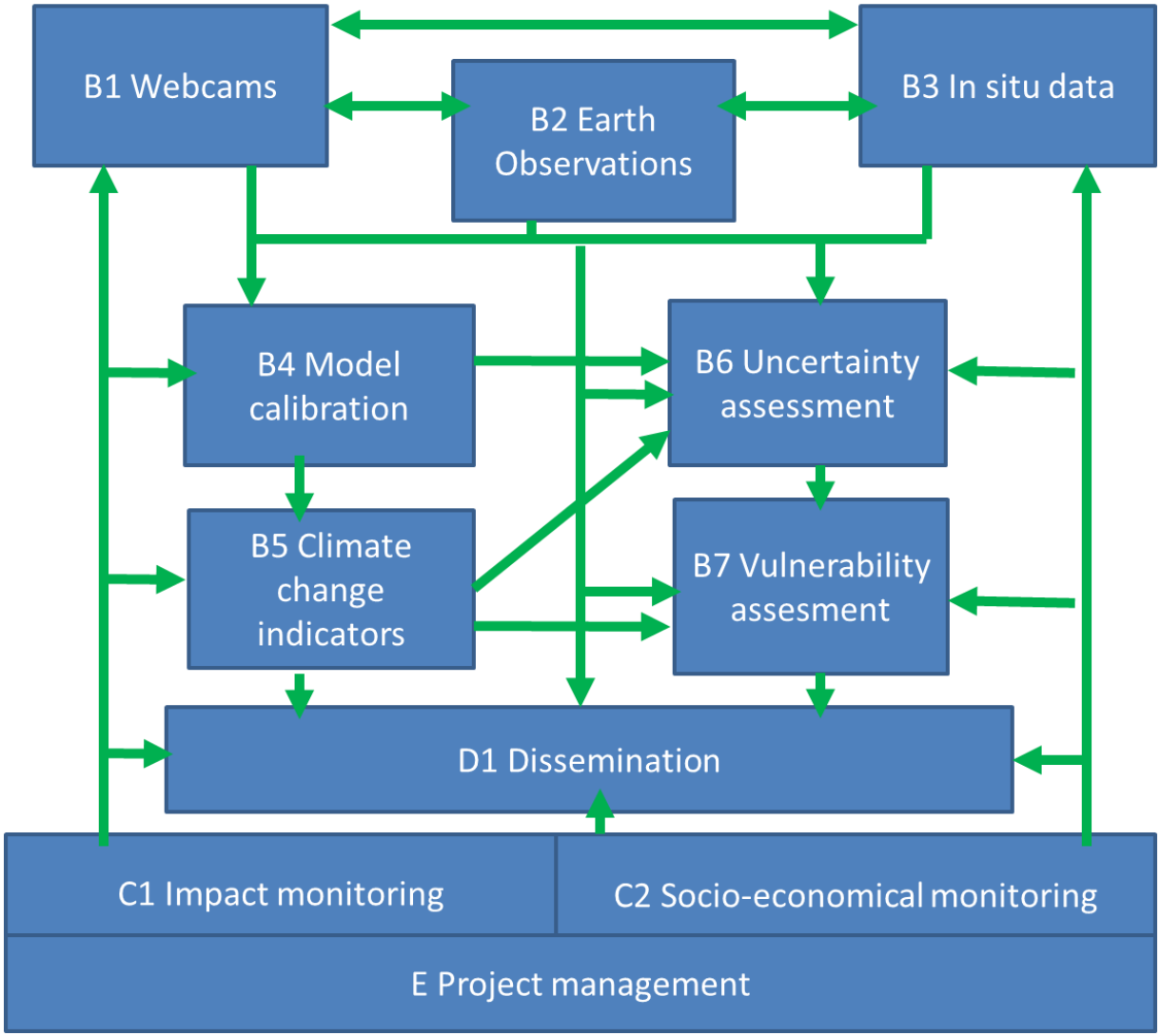
D1 Dissemination by **FMI**, SYKE, LUKE, UHEL

E. Project management and monitoring of the project progress

E1 Project management and monitoring by **FMI**, SYKE, LUKE, UHEL
E2 Auditing
E3 Networking with other projects
E4 After Life+ Communication Plan by **FMI**, SYKE, LUKE, UHEL

TIMETABLE

Action		2013				2014				2015				2016				2017				2018			
Action numbe	Name of the action	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A. Preparatory actions:																									
B. Implementation actions:																									
B.1	Webcam network implementation & harmonization by FMI,SYKE, METLA, UHEL			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
B.2	Earth Observation and data processing by FMI, SYKE			■	■	■	■	■	■	■	■	■	■	■				■							
B.3	Ground-based and airborne observation and data processing by FMI, SYKE, METLA, UHEL			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
B.4	Model System Calibration by FMI, SYKE, METLA, UHEL			■	■	■	■	■	■	■	■	■	■	■											
B.5	Retrieving climate change indicators by models FMI, METLA, UHEL					■	■	■	■	■	■	■	■	■	■	■									
B.6	Assessment of uncertainty of climate change indicators by FMI, METLA, UHEL						■	■	■	■	■	■	■	■	■	■	■	■	■	■					
B.7	Demonstration on ecosystem services and vulnerability by FMI, SYKE, METLA, UHEL			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
C. Monitoring of the impact of the project actions:																									
C.1	Monitoring of the impact			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
C.2	Monitoring of socio-economic impact			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
D. Communication and dissemination actions:																									
D.1	Dissemination by FMI, SYKE, METLA, UHEL			■			■			■			■	■	■	■	■	■	■	■					
E. Project management and monitoring of the project progress:																									
E.1	Project management and monitoring by FMI, SYKE, METLA, UHEL			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
E.2	Auditing																			■					
E.3	Networking with other projects			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
E.4	After Life+ Communication Plan by FMI, SYKE, METLA, UHEL																			■					


B1 Webcams
B2 Earth Observations
B3 In situ data
B4 Model calibration
B6 Uncertainty assessment
B5 Climate change indicators
B7 Vulnerability assesment
D1 Dissemination
C1 Impact monitoring
C2 Socio-economical monitoring
E Project management

EXPECTED RESULTS:

- ✓ **A harmonized webcam network for monitoring the seasonal cycle in boreal ecosystem carbon exchange**
- ✓ **Demonstration of the mapping of climate change indicators in boreal forest zone**
- ✓ **Demonstration of the vulnerability assessment for Finnish municipalities to climate change effects**
- ✓ **Calibrated soil-vegetation-atmosphere model parametrisations for the boreal zone**
- ✓ **Estimates of the uncertainty of the results**

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