



ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Quantifying and demonstrating benefits of weather and climate services

Workshop on “ACHIEVING BENEFITS OF ENHANCED SERVICE
DELIVERY BY NATIONAL METEOROLOGICAL SERVICES IN
EASTERN AND SOUTHERN AFRICA”

21-24 Feb, 2011
Dar Es Salaam, Tanzania

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Shortly

- Socio-economic net benefits of weather services can be excellent
- One shilling invested in weather services will give - at least - benefit of five shillings in return
but cost-benefit ratios of several tens of percents can be achieved

Preconditions

- Realised benefits depend on the actions taken by the users of the services
- Continuous dialogue between the users and service providers is essential
- Development of tailored services require understanding of the users' weather dependent processes
 - Especially the most vulnerable parts/ potentially most beneficial parts of the processes



From meteorological forecast to realised benefit

The benefit depends on the extent to which

1. weather forecast is **accurate**
2. weather forecast information contains **appropriate data** for a potential user (useful for a certain type of decision)
3. a decision maker has **timely access** to weather forecast information
4. a decision maker **adequately understands** weather forecast information
5. a decision maker can use weather forecast information **to effectively adapt behaviour** (e.g. harvesting earlier, storing in other place, postpone trip, etc.)
6. recommended **responses actually help** to avoid damage due to unfavourable weather circumstances
7. benefits from adapted action or decision are **transferred to other economic agents** (e.g. consumers that want the benefits transferred to them via lower prices)



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If each point ~90 % from the ideal, all together ~50 % would be attainable potential

Cost-benefit analysis of FMI weather services - Method

- Only selected sectors – transport, logistics, construction, energy, agriculture
- Literature survey
- Expert interviews and estimates in each sector
- Statistics available
- Experts' judgments
- FMI share of the total benefits
 - 82 % (raw data, data refining, services)
- Current and potential future benefits

Cost-benefit analysis of FMI weather services

| | |
|---|--------------------------------|
| Present weather service benefits | About 330...380 million €/year |
| Budget of FMI | 50 million €/year |
| => Cost/ benefit | 1:5 ... 1:6 |
| | |
| Investment on improving weather services will increase benefits | 400...600 million €/year |
| => Cost/ benefit | About 1:10 |
| | |

Analysis in different sectors (1)

| Sector | Main impacts | Annual benefit |
|---------------------|---|--|
| Road traffic | Less accidents, improved maintenance | Accidents 16-32 M€ Maintenance: 12 M€ All: 28-44 M€ |
| Walking and cycling | Less slipping injuries, improved maintenance | Accidents 160-180 M€ |
| Railroad | Reliable schedule | 0,5 M€ |

Sectoral benefits (2)

| Sector | Main impacts | Annual benefit |
|----------|--|--|
| Shipping | Less accidents and environmental damages, efficient activities | Accidents: 17,5-35 M€ Oil spills: 12 M€ Marine rescue, less fuel etc: 1,5 M€ All: 31,0-48,5 M € |
| Aviation | Less accidents, less emissions, efficient activities, reliable schedules | Accidents: 46 M€ Fuel: M€ Airfield maintenance: 2,5 M€ Environmental impacts: 1 M€ All: 53,5 M€ |

Sectoral benefits (3)

| Sector | Main impacts | Annual benefit |
|-----------|---|--|
| Logistics | Improved predictability in delivery, storage expenses, reduced risk (accidents) | Tens of millions € |
| Building | Prevention of humidity damages, effective maintenance | Building: 10 M€ Real estate maintenance 1 M€ All: 11 M€ |

Sectoral benefits (4)

| Sector | Main impacts | Annual benefit |
|-------------|--|---|
| Energy | Precitability of demand and productibitliy, preparedness for disturbances | Minimised disturbances: 2 M€ Predictability of production: 3 M€ Peat production: 5 M€ All: 10 M€ |
| Agriculture | Yield protection against frost and drought , optimal use of pesticides, timing of harvesting | Increase in grop yield: 12 M€ Reduced expences 8 M€ Prevented damages: 12 M€ Other benefits: 2 M€ All: 34 M€ |

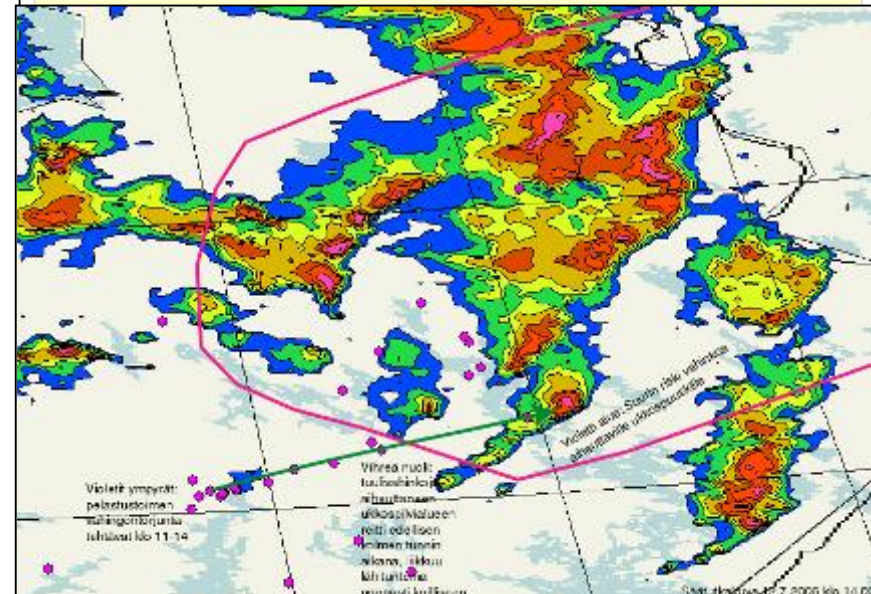


Severe Weather Outlooks

- Short “alert e-mail” via mailing list
- E-mail includes a hyperlink to a www-page with complete outlook
- Complete outlook includes
 - Expected time of severe weather
 - Area of risk
 - Reason of outlook
 - Severity classification (4 levels)
 - Description of weather situation and severe weather
 - Changes compared to the previous outlook
 - Uncertainty information
 - Attached images (warning map, radar picture...)

Vaaraa aiheuttavan sään tiedote
Laadittu 9.5.2008 klo 13:29
Ensimmäinen tilannetta koskeva tiedote
Seuraava tilannetta koskeva päivitys 12.5.2008 klo 12:00 (SA) mennessä

| | |
|---|---|
| Laatija Henri Nyman | Vaaraa aiheuttavan sään kehitys Matalapaine liikkuu sunnuntain ja maanantain vastaisen yön aikana Oulun läänin yli itään ja samalla syvenee. Sen jälkipuolella lännen ja pohjoisen välinen tuuli voimistuu ja on hyvin puuskaista. |
| Vaara-aika 12.5.2008 klo 00:00 - 12.5.2008 klo 21:00 (SA) | Säätilanteen kuvaus ja epävarmuustekijät Tämän hetkisten ennusteiden mukaan voimakkaan tuulen alue saapuu Länsi-Lappiin aikaisin maanantaina ja muualla maan keski- ja pohjoisosaan maanantain aikana. Suurin riski voimakkaalle myrskytuuskille on näillä näkymin Pohjanmaan alueella sekä muualla maan keskiosassa. |
| Vaara-alue Oulu, Maan keskiosa, Etelä-Lappi, Keski-Lappi | |
| Tiedotteen syy Voimakkaat myrskytuuskat | |
| Ilmiön vaarallisuus Säätilanne ei aiheuta välitöntä vaaraa, mutta voi aiheuttaa ihmisille ja omaisuudelle haittaa | |





Severe weather outlook e-mail list

200 members including...

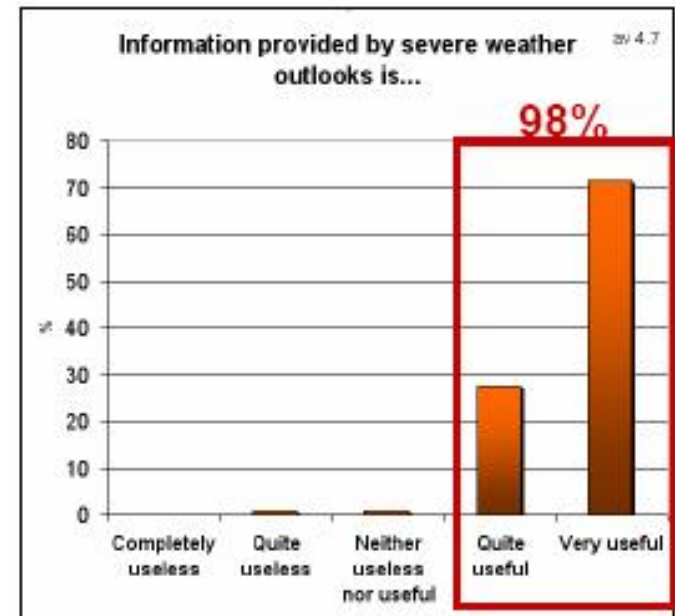
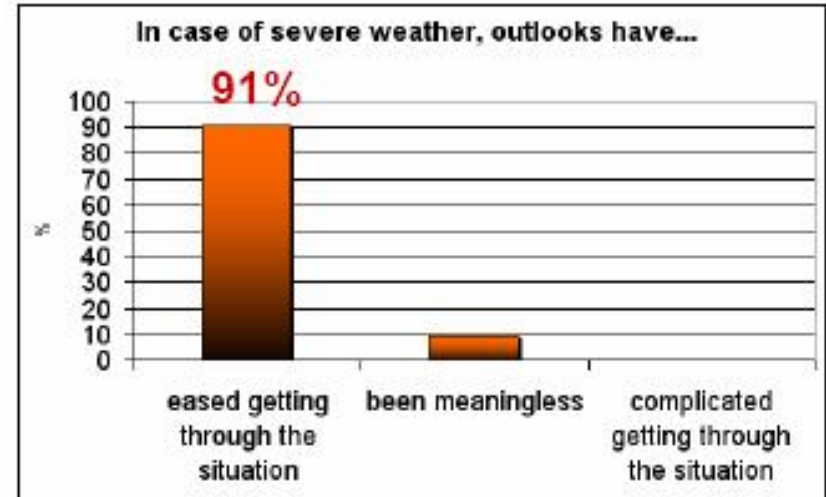
- Ministry of Interior
- Ministry of Traffic and Communications
- Ministry of Social Affairs and Health
- Ministry of Agriculture and Forestry
- Prime Minister's Office
- State Provincial Offices
- Emergency Response Centers
- Rescue departments
- Operative P3 units of rescue departments
- Police
- Finnish Institute of Marine Research
- VR group (Finnish railroads)
- Finnish Rail Administration
- Forestry Development Center
- Red Cross Finland
- Fingrid – Electricity transmission system operator
- Finnish Maritime Administration
- Vessel Traffic Centers
- Accident Investigation Board
- Emergency Services College
- Border Guard
- Finnish Road Administration
- Finnish Customs
- Finland's Environmental Administration
- Several FMI email addresses for internal communication



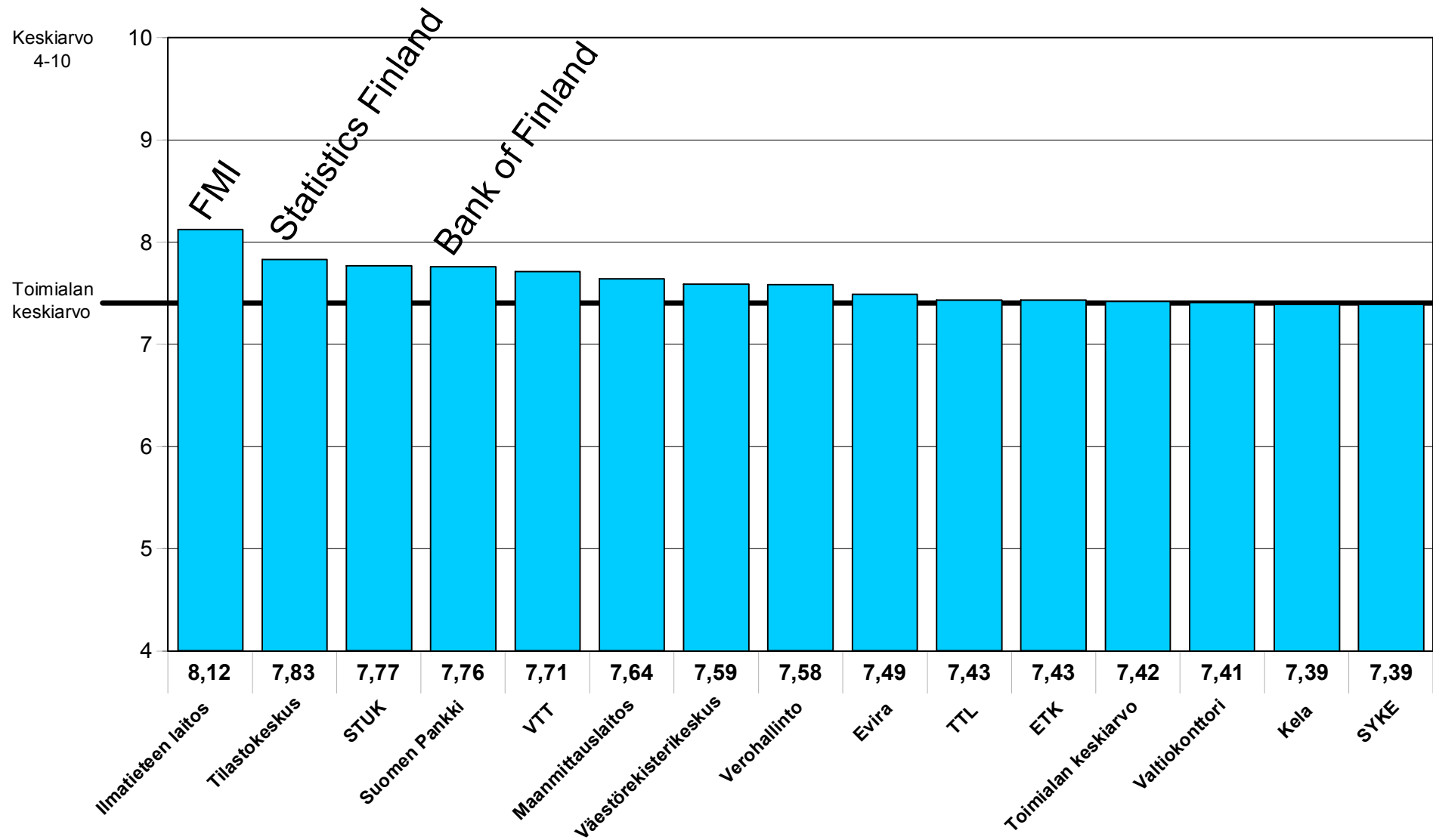


User survey 2007

- 144 replies, extremely encouraging feedback
- 80% used outlook information in the planning of their own preparedness activities. Most common activities
 - Reorganizing resources
 - Increasing standby personnel
 - Rearrangement of shifts
- Severe convective straight-line winds and tornadoes over land areas the most significant severe weather phenomena



Grades for organizations' all over performance





Status of SADC Meteorology project

- Inception report delivered to the Ministry for Foreign Affairs
- Funding decision of ~8 milj. €/ 4 years done
- Project appraisal phase ongoing,
 - the consult will interview MASA, possibly some SADC NHMSs
- Call for tenders, June 2011?
- SAMPRO project will start late 2011?



In the SADC Region

- Current status of national and regional services is not satisfactory (except South Africa)
- Vulnerability to weather and climate events and extreme events is among the highest in the world
- Lack of investment into the improvement of NMHSs in most countries
- Initial investment can spur cost recovery and paid services
- Safe to assume that **at least ten-fold return on investment would be achieved in the SADC region**



SADC Meteorology Project (SAMPRO)

Mainly a Regional Project

To respond to the challenges, four main **regional** development initiatives are being proposed:

- Establishing a SADC Climate Change Information service
- Establishing a SADC Disaster Mitigation and Early Warning Service
- Upgrading regional observation network with emphasis on regional lightning detection network
- Capacity building

In addition to regional activities some of the most crucial **country-specific** development projects shall be implemented. The regional initiatives together with the country-specific activities form **the five Sub-Projects (SP)** of SADC Meteorology Project (SAMPRO).



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Thank you for your interest!

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