

## COUNTRY REPORT

### FINLAND

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Name:	Mr. Taito Vainio
Position:	Senior Officer
Organisation:	Ministry of the Interior Department for Rescue Services
Address:	Kirkkokatu 12 P.O. BOX 26 00023 GOVERNMENT
Country:	Finland
Phone:	+358-9-160 42982
Mobile:	+358-40-725 6186
Fax:	+358-9-160-44672
E-mail:	<a href="mailto:taito.vainio@intermin.fi">taito.vainio@intermin.fi</a>
Website:	<a href="http://www.intermin.fi">www.intermin.fi</a>
Other institutions consulted:	Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, Ministry of the Environment

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## **NATIONAL INFORMATION OF FINLAND**

This paper has been done for the Conference on Disaster Reduction to be held in Kobe-Hyogo in Japan in 18-22 January 2005. The UN member countries have been asked to contribute national information on disaster reduction as preparatory process for conference. Although the information should be provided in a given format we would like to add an introductory chapter as background information.

### **Introduction**

Finnish disaster reduction arrangements are based on risks. As far as natural risks are concerned Finland belongs to a low risk area where serious meteorological and geological hazards do not occur except for minor-scale forest fires, floods and storms. These minor-scale accidents usually cause damage to property and very seldom to people.

However, the climate change may cause unpredictable variations in the future weather patterns also in Finland. It has been estimated that e.g. the frequency of storms and heavy rains may increase significantly.

Also the fact that the possibility of terrorism and other deliberate actions like arson is growing mean that all the countries have to be prepared to prevent major accidents and in respect to this to respond effectively so that all the essential organisations could continue their functions as long as possible.

Modern societies are also vulnerable because of the wide use of modern technology that is controlled by the computers. Technology used is very sophisticated and any disturbances in most of the systems create almost immediately problems in the process. Therefore there has to be plans and procedures how these disturbances will be handled effectively.

A special problem worth mentioning here is migration from countryside to the cities. Along with another problem that is ageing this means that in Finland there will be areas where there live only few old people here and there in the countryside. This is something that needs to be taken into account when we are talking about rescue services in those distant areas especially because in Finland a large and important part of rescue services base on volunteer work.

In Finnish legislation all the essential organisations such as governmental and local administration as well as essential industry should make plans how to continue their work also when major accidents occur or even in the wartime. In other words this means that in Finland the disaster reduction plans and necessary measures have been built inside the whole system as an extension to normal function of organisations and these plans should cover major crisis such as possible major accidents or war situation. This will be discussed more detailed later in this paper.

### **1 Political Commitment and Institutional Aspects**

Disaster reduction in Finland contains three parts: prevention, early warning measures and effective response. In each of these three parts roughly three methods are used: legislation, technical solutions and education. As it was already mentioned Finland belongs to a low risk area as far as natural risks are concerned. Also the risk of terrorism is not very high even though the risk is getting bigger.

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In Finland we have the concept of civil defence that concerns not only all the essential agencies, institutions and production plants important to the operations of society but also owners of smaller buildings, companies and even individual people. According to Rescue Act section 8 (self-preparedness):

*“The owner or holder of a building, an industrial or commercial entrepreneur, an agency, institution or other organization shall be liable to prepare to protect people and property in the said premises as well as the environment in danger situations as well as to prepare for rescue measures which they can take at their own initiative.”*

Civil defence arrangements are supposed to work especially under exceptional conditions.

### **1.1 National policy, strategy and legislation**

Internationalisation and structural changes in society greatly affect the country's ability to secure vital functions. The Government's report on Finnish Security and Defence Policy 2001 paid particular attention to the threats associated with further international integration.

In accordance with the report, the Government embarked on a project to define the areas vital to the functioning of society and to draft action and development plans.

This Government Resolution and the related document (Strategy for Securing the Functions Vital to Society) define society's vital functions and establish targets and development policies that will guide each administrative branch of the government in dealing with its strategic tasks in all situations. Ministries are also designated responsibilities for co-ordinating these functions. In this Resolution, strategic tasks refer to tasks which are needed to secure the functions vital to society in all situations. They are based on current legislation and the existing division of powers between the different authorities.

The functions vital to society can be divided into seven broad areas contributing to national sovereignty and the livelihood and security of citizens. The ministries are each responsible for the strategic tasks relevant to their own sphere of operation.

The functions vital to society are as follows: state leadership (The Prime Minister's Office and Ministry of Justice), external capacity to act (Ministry of Foreign Affairs), the nation's military defence (Ministry of Defence), internal security (Ministry of the Interior), functioning of the economy and society (Ministry of Finance and Ministry of Trade and Industry), securing the livelihood of the population and its capacity to act (Ministry of Social Affairs and Health), and their ability to tolerate a crisis (Ministry of Education), prevention of floods and preparedness to arrange water services in exceptional situations (Ministry of Agriculture and Forestry), prevention of environmental hazards (Ministry of the Environment).

According to the objectives of Finland's security and defence policy, the securing of society's vital functions contributes to the safeguarding of national sovereignty and citizens' livelihood and security.

**Internal security** is needed to maintain the legal system's capacity to act and prevent and control threats to the population's safety and the functions vital to society. This is the case whether we talk

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about major accidents, technological crises or deliberate single actions e.g. arson. The Ministry of the Interior is responsible for co-ordinating the necessary measures. The Finnish Ministry of the Interior is preparing so called programme of internal security which includes border safety, measures against crimes and terrorism, prevention of accidents in general and how to be prepared to respond to different kind of threats.

According to Rescue Act (2003/468) in addition to the rescue authorities, the police, the Frontier Guard, the Defence Forces, the social and health authorities, the authorities and institutions in charge of agriculture and forestry as well as business enterprises, environmental authorities, authorities in charge of passenger and goods transport and communications, agencies and institutions in charge of radiation and nuclear safety and weather services shall be responsible to participate in rescue activities and civil defence as provided for on their tasks in the relevant provisions governing each sphere of operations. Also volunteer organisations are integrated to the system. The rescue authorities may delegate training, advice and information tasks to organizations operating in the field of rescue services. Voluntary people and organizations may be used to assist in rescue services' tasks, however, not in tasks involving significant exercise of public authority. These organisations have planning obligation according to Rescue Act section 9:

*“The rescue authorities as well as the other authorities and organizations referred to in section 6 which are responsible for tasks belonging to rescue services or for executive assistance tasks shall be liable to draw up the necessary emergency plans in cooperation with each other.*

*Municipalities with a nuclear plant referred to in section 3, subparagraph 5 of the Nuclear Power Act (1987/990) or a plant causing a danger of a major accident as defined separately in a Decree shall draw up an emergency plan for an accident taking place in the plant. The population exposed to the danger shall be heard when drawing up the plan and informed thereof.*

*The owner or holder of a building, an industrial or commercial entrepreneur, an agency, institution or other organization to be provided for in a Decree shall draw up a plan on the measures referred to in section 8.”*

In Finland the disaster reduction measures belong to all the essential agencies, institutions and production plants important to the operations of society and in legislation there are clear responsibilities for them. The legislation includes the responsibilities from the local government up to central government as well as other organisations. Starting point is that all the organisations take care and secure their own functions also in major crises. All the arrangements and necessary measures are supposed to be built on the normal functions that are then extended as far as necessary when the situation is getting worse.

The plans that these essential agencies, institutions and production plants important to the operations of society prepare base on risk analyses. The risks that the society will face are defined regularly by the government and according to this definition work and as mentioned before so called strategy of securing the functions vital to society is decided. The risk analyses of the essential agencies, institutions and production plants are based on this national strategy and they analyse how these risks defined in this strategy may affect to their operations and they make necessary plans how to secure their operations also under exceptional conditions. The planning includes of course how to prevent the risks totally or if this is impossible how to mitigate the possible damage if something happens all away up to response plans.

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If some of the organisations are in danger and they won't be able to function there is a possibility to make special arrangements based on decisions of the government. According to Readiness Act (1991/1080) under exceptional conditions the powers of government can be strengthened.

### ***1.2 National coordination of the various sectors***

The coordination of different sectors is defined in legislation. In the national level the general coordination belongs to government and to all ministries in their own sector of responsibility. In the local level the mayor of the municipality is responsible for general coordination of the different sectors of municipality and also in this level the municipal sectors themselves are responsible coordinating their own sector.

In here it has to be pointed out that in Finland the local level i.e. the municipalities have strong self-governance and that is why they take care of most of the responsibilities and also finance them (e.g. health care, social services, education, building activities, environment, rescue services) in their own area or in cooperation with other municipalities together.

It is crucial that local level and national level is connected in a coordinate way. In Finland this is taken care of by the provinces that are sort of intermediate level administration between the municipalities and state. There are five provinces in Finland and they are state representatives in their own area.

When we talk about the acute crisis that is going on the general leader of the rescue operations is the respective rescue authority. General leading role means that the rescue officer can give general tasks to other authorities as far as rescue operations are concerned but of course each authority leads its own operation. There are three command levels and it depends on the severity of the crisis which level is taking the lead. Most often it is a regional level fire officer who leads the operation. According to Rescue Act the state authority i.e. state provincial centre or the Ministry of the Interior can take the lead of rescue operations when they see it necessary.

### ***1.3 Risk analyses and plans of the different sectors***

As mentioned earlier different sectors are responsible for preparing the necessary plans. The plans and arrangements are done according to risks. Of course prevention is primary goal and therefore e.g. near the dams and rivers there are restrictions to land use. Restrictions to any activity base on risk analyses and calculations of the different scenarios.

Land use planning takes also into account industrial risks so that they will cause only small damage to people and environment even if something happens. In Finland the land use planning is easy in that sense that population density is low and there is a lot of land that can be used.

The same goes for other sectors too and there are certain obligations in their respective legislation.

### ***1.4 Disaster risk reduction in relation to UN declarations***

N/A.

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### **1.5 Building codes**

In Finland there are thorough building codes of practices and standards but none especially for seismic risk because there is no need for that.

### **1.6 Annual budget for disaster risk reduction**

For the civil defence purposes there is money inside the budget of different agencies, institutions and production plants. There is no separate budget for disaster risk reduction.

### **1.7 Private sector, civil society, NGOs, academia and media**

All these actors mentioned in the topic have responsibilities in civil defence as regulated in their respective legislation, Readiness Act or Rescue Act.

## **2 Risk Identification**

### **2.1 Hazard mapping/assessment**

In Finland there are 22 regional rescue services where municipalities together are responsible for rescue services. The regions are determined by the government. In addition to this according to self-government in Åland (islands) there are 16 municipal rescue services. Rescue services are obliged to assess the accident risks in their own area and to do so called decision on service level that base on risk assessment. The service level of the rescue services shall correspond to the accident threats present in the region. The regional rescue service shall ascertain and assess the threats present in the region and determine, on the basis thereof, the service level of the rescue services comprising the personnel and equipment of the fire brigade as well as the full-readiness time of the fire brigade. The service level also covers planning, prevention of accidents, civil defence as well as support measures necessary for rescue activities.

In order to help this work Ministry on the Interior has developed tools to do risk assessment in a systematic way. This tool is based on probability of accidents that come from historical data. This tool is for every kind of accidents i.e. from everyday minor accidents to bigger accidents. The tool is GIS-based and accident probability is counted to a 250 x 250 metre square. Accident probability base on population density and building square metres in this 250 x 250 metre square. This means that we can get population density according to age (0-14, 15-64, 65-) from whole Finland as precisely as 250 x 250 metres. From the buildings we can get coordinates, square metres and the type of building in the same way. In this data there is also the probability of traffic accidents included taking into account the type of the road. According to risk population density and building square metres the whole territory of Finland is divided into four risk zones. The requirements to respond any kind of accident is defined by risk zones. The first response unit should reach first risk zone within 6 minutes, second risk zone within 10 minutes and third risk zone within 20 minutes. In the fourth risk zone there is no time limit defined and these areas are usually not populated.

In addition to this the places that cause danger to people and environment are located on map. The location is precise and more information about the location can of course be added such as photographs and drawings.

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This data makes it also possible to predict the necessary resources of the rescue services when new areas are planned. In other words this enables more precise planning and can direct the decisions as far as land use is concerned. This data is designed for rescue service purposes but it can be used by other sectors as well if they find it useful.

In addition to this data other authorities have of course their own databases. E.g. Finnish Meteorological Institute has satellite information and weather stations and they can make precise forecasts related to weather. Meteorological data is a precondition of many dispersion models used in different kind of accidents (e.g. dispersion models of oil spills, chemical clouds or forest fires).

The final proposals of a national task force on large floods set by the Ministry of Agriculture and Forestry were published in 2003. The task force assessed the most important risk zones, where an exceptional flood may cause great damages to people or property. 65 risk zones have been identified and more detailed work is now being done based on the results.

At least in one dam area it has been made very thorough research in EU-project called rescdam. The result was the data that can be used if the dam breaks. In this project it was calculated how fast and what areas will be affected in a dam break situation and final result was presented in 1- and 2-dimensional model. The model showed the depths of water in given time and place and according to this information the rescue plan was made. In other dam areas the information is more general and less technical but of course the same aspects can be found from there too.

### ***2.2 Vulnerability and capacity assessment***

Vulnerability and capacity assessments are at least in some respect done when the risks are analysed and the service level decided. As far as rescue services is concerned the regional rescue services are responsible of these and municipalities or regional authorities with regards to their sector of responsibility.

### ***2.3 Mechanism for risk monitoring and risk mapping***

In major accidents the situation is followed all the time. There is, first of all the regional command and control centre that is following the situation in its own area. Secondly, there is provincial command and control centre that is following the situation in the provincial level and it gets the information from the regional command and control centres. Finally, there is national command and control centre that is getting the information from the provincial command and control centres and national centre is naturally following and analysing the situation in the whole country. Of course only the relevant information is delivered to each level. The second and third level command and control centres are set up during exceptional conditions and in normal conditions they are not active.

Finland is building the world's first digital national radio network based on the **TETRA** standard for use by the safety authorities. The network enables top quality sound, data and moving image transmission even in extreme conditions.

The primary users of the public authority network in Finland are the authorities responsible for public safety on both national and municipal level. The most important user groups are the emergency and rescue services, the Police, the Frontier Guard, the Social and Health Services, the Customs Authority and the Defence Forces. Although the network functions as an internal system for each re-



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spective authority, its sophisticated features mean it will improve the authorities' readiness for joint communication if required.

### ***2.4 Impact and loss analysis after major disasters***

When major disasters or even big accidents happen they are analysed and according to analysis recommendations are made. The results are public and available.

### ***2.5 Early warning systems***

In Finland there is constant automatic real time environmental radiation monitoring. There are about 290 measurement points and the real time monitoring information is going to one place. The monitoring equipment is very accurate. It detects even the slightest amounts of foreign radioactive substances in the environment. The monitoring results are reported annually.

Outdoor siren system can be regarded as one of the early warning systems. The siren system covers more than 80 percent of the population. The fixed outdoor siren system is supplemented by mobile loudspeakers and of course by radio broadcasting system (RDS). Siren system with radio broadcasting system makes it possible to warn a lot of people at the same time.

The third early warning system is forest fire detection system based on satellite technology. This system analyses the satellite image (NOAA-satellite, AVHRR-signal) and under 30 minutes from satellite observation the system delivers the alarm to a closest emergency response centre. The system is working in Finnish conditions and in boreal forest zone where earths surface temperature is not too high unlike in the Mediterranean countries. The satellite monitoring system covers Finland Sweden, Norway, Baltic countries and Karelian area which is in south western part of Russia. This system is constantly monitoring and detecting forest fires and sending alarms to emergency response centres.

Finnish Meteorological Institute has developed flash monitoring system that can be regarded as one application of early warning systems.

The military and coast guard have of course their own monitoring systems.

## **3 Knowledge Management**

### ***3.1 Disaster risk information management system***

Yes we have, refer chapter 2. The users are the organisations that need the information in their decision making process. Main users are municipalities, rescue services, state provincial offices and ministries.

### ***3.2 Academic and research communities***

Refer chapter 1. All the different organisations deliver the information that they gather normally everyday also in disasters. The specialists should be present in the command and control centres.

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### ***3.3 Educational programmes***

The amount of information and education is decided also in the service level as well as to whom this education and information is given. There is material for Finnish purposes and most of it is related to minor-scale accidents that people can prevent or respond themselves. More generally all the administrative sectors themselves are responsible for information and education in their own sector.

### ***3.4 Training programmes***

Because in Finland most of the organisations are responsible for civil defence there is continuous training going on in municipalities, emergency services college, volunteer organisations and so on. In addition to training there is regular exercise activity going on. The exercises show how the arrangements work and what need to be developed in the future.

The Emergency Services College provides education and training in its special field under the supervision of the Ministry of the Interior. The College plans and arranges basic and advanced education and training in fire and rescue work, civil defence training and other training in emergency operations.

### ***3.5 The use of traditional knowledge***

The whole system has been built according to experiences of the exercises. In this sense the traditional knowledge is the corner stone that is constantly developed so that the system is working ever better.

### ***3.6 National public awareness programmes or campaigns***

National public awareness programmes or campaigns are also related to Finnish conditions i.e. how to make an emergency call, what to do when you face a fire, what to do when somebody is hurt (first aid) or what to do when you hear a siren. There are various target groups starting from 6 to 7 up to adult age.

## **4 Risk Management Applications/Instruments**

### ***4.1 Environmental management and risk reduction practices***

As it has been mentioned in Finland there is low risk of natural disasters. However, land use is planned in a way that the possible damage will be quite limited. This means that usually only some tens of houses may get wet during a flood that is considered severe flooding in Finland. Usually houses only get wet and they can be dried and repaired. Also in places near the dams there are restrictions where it is possible to build houses and of course also near industry that may cause danger to people.

The proposals of the national task force on large floods set by the Ministry of Agriculture and Forestry contains suggestions for the next 12 years on diminishing the potential flood damages in

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Finland. The Ministry has also set up a task force to draft guidelines on how to arrange water services safely under exceptional situations (floods, drought, vandalism etc.).

### ***4.2 Financial instruments***

In the state budget there is allocated money for financial assistance for the damage caused by natural accidents. The damage caused by exceptional floods is partially covered by the government according to the Act on compensating flood damage. In addition the government can make financial arrangements case by case if there is strong need for that. Of course there are different kind of insurances that people can take themselves. However, most common household insurances do not cover damage caused by natural accidents.

NGOs have their own special catastrophe funds e.g. Finnish Red Cross, churches. These funds are usually used in catastrophes outside Finland.

### ***4.3 Technical measures or programmes on disaster risk reduction***

Refer chapter 2. (Radiation monitoring, satellite monitoring of forest fires, siren system, rescdam-project)

## **5 Preparedness and Contingency Planning**

### ***5.1 Disaster contingency plans***

Yes there are both national and municipal (community) level. Please refer chapter 1.

### ***5.2 Emergency funds for disaster response and national or community storage facilities fore emergency relief items***

As already mentioned most of the organisations have to do plans how to secure their functions in exceptional conditions. The government has decided that the essential functions that need to be secured are:

- Technological infrastructure of society
- Transportation, logistics and distribution systems
- Food supply
- Energy supply
- Social and healthcare arrangements
- Industry and systems that are related to national defence

The state buys products that are vital for the function of the whole society e.g. oil, coal, gas, grain, medicine, raw materials. These products are placed in safe locations across the country. According the law there is so called Maintenance and Supply Security Centre that takes care of stockholding responsibilities of vital products.

The NGOs also have their own storages where they have medicine, tents, food, blankets.

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### ***5.3 Coordination responsibility***

Refer chapter 1. In national level the general coordination belongs to government and different ministries in their own sector of responsibility. In local level the mayor of municipality is responsible in general and again different authorities in their own sector of responsibility.

The coordination is working relatively well and the responsibilities are clear. The resources seem to be adequate.

## **6 Call for Good Practices in Disaster Risk Management (3 examples)**

### ***6.1 Emergency response centres***

A new emergency response centre system can be seen as one example of disaster risk management because it connects different safety authorities together and makes their flexible cooperation possible. The Emergency Response Centre Administration, a public sector organisation, is based on a unique operational model. Centralising the handling of urgent emergency calls for the police, rescue, social, and health services in joint emergency response centres (ERCs) has proved an efficient and economical way of providing versatile, high-quality ERC services. All the emergency calls are received in all-European number 112.

The Administration's operational model is based on a network organisation, top-notch professional skills, and efficient co-operation combining with a strong team spirit and motivation to ensure the best possible ERC services.

Altogether 15 emergency response centres will be built by 2006. It is estimated that the Emergency Response Centre Administration will employ nearly 750 professionals by the beginning of 2006. Of these personnel, the number of Emergency Response Centre Operators is likely to amount to 600. A single emergency response centre will employ approximately 30-100 professionals depending on the size of the area. The administrative emergency centre unit will have a staff of 20 professionals.

The Administration works to ensure comprehensive, high-quality ERC services for the general public and the various public authorities involved. ERCs always provide assistance in emergencies. This is done rapidly and efficiently. The Administration ensures the smooth operation of the ERCs. It also promotes and develops their work.

The Administration acts as a communication centre for the rescue, police, social and health services. The Administration supports and assists the service units, also dealing with other tasks foreseen for it.

### ***6.2 Forest Fire risk management in Finland: Satellite observation and alarm system***

The purpose of project was to establish a satellite based operational real-time observation and alert system for forest fire management in Finland. VTT automation, Space System Finland, Finnish Meteorological Institute, Finnish Ministry of the Interior and Joint Research Centre of the EC conducted the project in 1999-2000. The satellite based "Fire Alarm" system has been developed and integrated into the existing fire control system of Finland and demonstrated during the summers of 1999-2000. It works operationally, is stable and reliable, and alert messages are used by the dispatchers. The Satellite fire observation system has been designed to work continuously, and to

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automatically send alerts when a fire is detected. Thanks to the available satellite system it can observe forest fires also outside the operational area, and it is very useful for monitoring sparsely populated regions and to direct airborne surveys to critical areas. The currently used satellite systems (including ERS/ATSR and NOAA/AVHRR infrared radiometers) have, however, certain constraints: a revisit rate of 3.7 hours on average at high latitudes, a spatial resolution of 1 km that makes the smallest detectable fire size about 1 hectare, and low saturation threshold that reduces the fire detection capabilities especially during daytime. The false alarm rate estimated during the exploitation period was about 10 %. The satellite based, boreal forest fire alarm system is a valuable tool to improve the capability of operational forest fire fighting. Further improvements can be achieved only if dedicated satellite sensors are available in the future, with suitable infrared dynamic range, higher spatial resolution and repetitive observation.

### **6.3 Rescdam: Development of Rescue Actions Based on Dam-break Flood Analysis**

The Grant Agreement No Subv 99/52623 was signed between the Commission and the Finnish Environment Institute on June 11, 1999. According to amendment no 1 (DG ENV 07/02/01, 801451) the operation ("Development of Rescue Actions Based on Dam-Break Flood Analysis project, RESCDAM") lasted for 22 months beginning June 1, 1999. Thus, the agreement period ended on March 31, 2001. The total project costs were € 861.332 the Commission's contribution being € 451.416. Other contributions came from the Finnish Ministry of Agriculture and Forestry, the Finnish Ministry of the Interior, the West Finland Regional Environment Centre, the Finnish Environment Institute and the partners mentioned below. The contact person in the Commission was Mr. Ernst Schulte (DG ENV Civil Protection and Environmental Accidents). The RESCDAM project was co-ordinated by the Finnish Environment Institute. The partners were: Enel.Hydro Polo Idraulico e Strutturale (Milan), EDF Electricité de France Laboratoire National d'Hydraulique et Environnement (Paris), the Laboratory of Water Resources at the Helsinki University of Technology, the Emergency Services College (Kuopio), Seinäjoki Fire Brigade (Seinäjoki), and the West Finland Regional Environment Centre (Vaasa, Seinäjoki).

The project work was divided into three sub-projects: 1) Risk Assessment (Analysis), 2) Dam Break Hazard Analysis and 3) Emergency/Rescue Action Planning. In addition to these subprojects the International Seminar and Workshop was arranged on October 2-5, 2000 in Seinäjoki and a study visit to the Emergency Services College in Kuopio on October 1, 2000. The main purpose of the RESCDAM project was to develop emergency action planning for dams. A dam break hazard (flood) analysis is a necessary aid for this. A risk assessment (analysis) was also included in the project work. The pilot project of RESCDAM was the embankment dam of the Kyrkösjärvi reservoir located in Seinäjoki in Western Finland. Because dams and especially consequences of a dam failure are quite similar in different countries, results and activities of the RESCDAM project should benefit EU and associated countries.

In summation, the RESCDAM project met all the aims originally set. The measurable result elements are:

- The risk analysis methodology has been studied and refined on the basis of literature and Finnish experience and as an application example, the risk analysis of Kyrkösjärvi dam was conducted (see Chapter 2 of this report).
- The numerical flow models (1- and 2-dimensional) were applied to Kyrkösjärvi dam and the results of the different models compared (see Chapter 3).

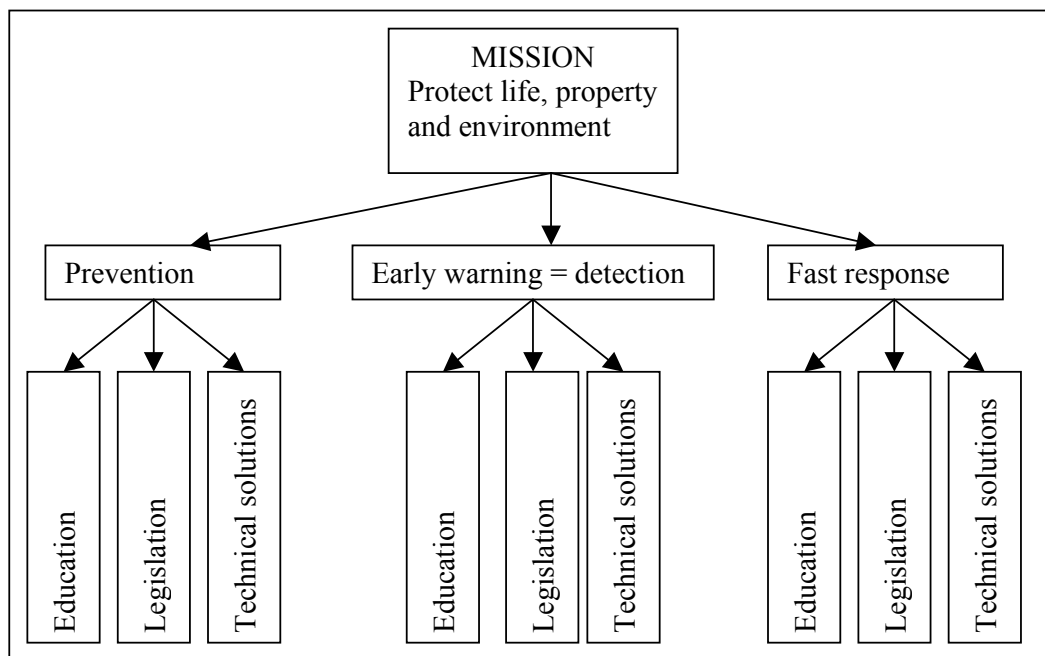
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- Emergency/rescue action plan for Kyrkösjärvi dam was drafted (see Chapter 5.3).
- Recommendations to update the Finnish Dam Safety Code of Practice (guidelines) concerning emergency and rescue activities were made (see Chapter 5.4).

### 7 Priorities on Disaster Reduction

All the disaster reduction measures should be based on risk analysis. We would like to point out that disaster reduction calls for systematic approach that will include prevention, early warning and effective response by using legislative, technological and educational means rather than some independent inventions that are not related to the whole system in a manageable way. In all the countries but especially in the developing countries it is important to see that the whole system needs to be built based on risk analysis and making the development work step by step starting from those parts of the system that offer the best cost benefit value. Cultural facts need to be taken into account when choosing the means that are used to develop the system.

Disaster reduction system:



When talking about areas where natural disaster risk is considerable the only way to mitigate the damage is systematic approach. First of all there has to be legislation that prohibit building activities in areas that are always flooded or there have to be building codes in areas where seismic risks are considerable. The legislation should be legitimate i.e. people have to understand and respect the legislation. This can only be done through education and information sharing. If, as it is a case in many countries, there is lack of space and therefore disaster prone areas are used then it is absolutely necessary to use all the technological applications. However, in many areas prevention is not possible when we are talking about natural disaster.

Disaster prone areas are used even though it is known that they will most probably face natural disasters. In these cases it is vital to build early warning systems so that people can be evacuated before the disaster or at least very fast because in many cases it is impossible to predict a natural disaster. This calls for technology and again huge education and information sharing. The people

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aster. This calls for technology and again huge education and information sharing. The people living in disaster prone areas need to know that they will eventually face a disaster and they need to understand what that means and what they are supposed to do themselves.

It is clear that effective response is always needed during the disaster. This presupposes very good planning because disasters destroy the responding units and also the infrastructure near the disaster area. Especially important is to plan how and from where the help is coming from. When help from abroad is needed there should be a plan how this help is received and organised. If this is not planned beforehand it takes time before these international organisations can work effectively.

We would like to address also that disaster relief is not only a task of some organisations. The whole society needs to be prepared to exceptional conditions. This means that all the organisations assess the risks to their own sectors of responsibility and secure their functions.

Development towards systematic approach needs to be strengthened in a way that it composes a clear entity and that prevention, early warning and effective response is developed in relation to each other. By this we mean that usually development work is done without thinking how the new applications fit to the whole system. It needs to be seen that certain decisions e.g. in prevention demand certain decisions in early warning methods and effective response. In other words the entity can be build in different ways using different mixture of these three parts using diverse legislative, technological and educational means.

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### ISSUES RELATED TO INTERNATIONAL DEVELOPMENT COOPERATION ON FOREST FIRES

*"Describe you Government's current international policy on risk reduction, including within development or other donor agencies, as well as trans-border agreements or regional cooperation. Attach any information sources."*

#### **1. Policy framework for development cooperation in forest fire management**

In February 2004 the Government of Finland issued a resolution on development policy. The resolution takes the UN Millennium Declaration and the Millennium Development Goals as a key framework. It also reiterates the commitment of Finland to nurture sustainable development. Protecting our common environment is an inherent part of the Declaration. Among the MDGs the ensuring of sustainable development of the environment is highlighted. Finland is taking through this resolution also the first MDG, reducing extreme poverty and hunger as a central objective of its relations with developing countries. The resolution also defines nine focal areas through which the attainment of MDGs will particularly be done. Forestry as a means of rural livelihoods and as tool for poverty reduction is one of the nine focal areas. These principles and focal area give the basic platform for the work on forest fire management, as a means for reducing poverty, while preventing disasters.

#### **2. Current status of forest fire management work in Finnish development cooperation**

##### **2.1. Developing the Finnish-Namibian model of integrated forest fire management**

Finland has during the past decade been active in rural forest fire management in three African countries. The work begun in 1996 in Namibia within the framework of a bilateral forestry cooperation programme financed by the Ministry for Foreign Affairs of Finland and the Ministry of Environment and Tourism of Namibia. Fire management was one of the priorities of the Namibian Government in the forestry sector. The initial plan was to establish fire fighting teams and equip them to suppress fires in the East Caprivi Region, which has a land area of some 1.2 million hectares.

Soon it became obvious that East Caprivi, which is only a fraction of Namibia's total area, has far too many and extensive forest fires to be suppressed every year. The situation in the late 1990's was that practically all the East Caprivi forest area burned once a year. It was quickly discovered that most of the forest fires were started by rural people due to a variety of reasons. The only feasible solution was to prevent and manage the forest fires, instead of suppressing them. Such management could only be done by making the rural people the main actors and beneficiaries. The idea was adopted from Thailand, where good experiences had been obtained earlier.

When developing the local level fire management in Caprivi, it was noted that the responsibility for forest fires needed to be decentralised from government forest offices to traditional authorities. Forestry and other government offices cover the areas sparsely and have rather limited personnel resources. Furthermore, in rural Caprivi, the traditional authorities have real influence of the rural communities and can make commitments.

An extensive awareness campaign including radio programmes, signboards, a theatre play, extension work and visits to local schools was launched. In addition, incentives were made available for rural communities to build fire cutlines in their area. National capacity for fire monitoring through remote-sensing technologies was established. The remote sensing data confirmed that in a few years



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the area affected by fires was reduced from almost 1 million hectares to a half. The Finnish-Namibian model clearly worked.

The most likely reason for this tremendous initial success was the clear benefits for the rural residents. The benefit from reducing forest fires materialised as better pastures for cattle, lasting the whole dry season. In East Caprivi, most cattle graze in forest areas and is highly dependent on the ground biomass available for fodder. When forest fires destroyed the ground vegetation during the dry season, the cattle suffered. Among the Caprivi communities the cattle are a bank, each head worth of several hundreds of Namibia dollars. The economic benefits of the pilot work in East Caprivi was studied in 1998, and according to the study the calculated annual benefit from better fire management was roughly € 870 per family. With some 25000 families affected with forest fires destroying the pastures, the total benefits were estimated to be in the range of 22 million €. The costs of the work, i.e. the awareness campaigns and the cash incentives provided to communities to construct and maintain fire cutlines, were only some 140 000 €.

Currently the Namibian Government is successfully applying the model in forest fire management in five northwest regions. There potentially further 1 million hectares are protected benefiting about 100, 000 people). Further in Namibia a draft “National Forest and Veld Fire Management Policy”, based on an extensive consultative process, has been developed in 2003. The model forms the central element of the forest and veld fire management policy of Namibia.

### 2.2. Adoption of the Finnish-Namibian model in other African countries

The Finnish-Namibian model for integrated forest fire management has since been adopted in other African countries. Finland is supporting a bush-fire management programme in Burkina Faso, where the same concept of rural responsibility in fire management has been applied. In Mozambique Finland is financing a large forest cooperation project, which has also adopted the model to local conditions and developed it further. Other African countries, such as Ethiopia, Botswana, Zimbabwe and South Africa have apparently also taken an interest in the model. It has been found to work better than a centrally planned and implemented fire management.

### 3. Main lessons learned

Forest fires are a major factor influencing the human environment in Africa. While it has seldom been reported that forest fires have caused immediate disasters in rural Africa, their influence on problems like major floods and famines resulting from crops destroyed by fire is clear. Furthermore, the negative impacts of fire on rural livelihood, agriculture, livestock and infrastructure is well documented. The Finnish-Namibian model for forest fire management is based on community participation and ownership and has proven successful. The model can and should be developed further and adopted to national and local conditions. Application of the model is site and culture specific. However, there are certain issues that have already been learned and which should be kept in mind:

- 1) Forest fires frequently occur and influence large areas in Africa every year. Due to the large area affected, suppressing burning fires is often not a feasible solution, because of the extremely high costs involved. Active forest fire management, which focuses on reducing occurrence of fire, reducing their intensity through early burnings and containing fires with cutlines is clearly a more feasible strategy.
- 2) To be effective, responsibility of forest fire management needs to be at the local level, with the rural communities and their natural authorities. Few countries have government structures strong and efficient enough to manage extensive fires in rural

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areas. Fire management by government may work in special areas, such as strict nature reserves, which are under more effective management.

3) Forest fire management needs to produce immediate benefits to rural communities. Attempting to make them responsible of the laborious part of management (such as opening or maintaining cutlines, conducting early burning etc.) while referring to incentives such as common good whether at national or global level is simply not realistic. The time communities spend on forest fire management requires concrete economic return in some form. The most crucial thing in adapting the model to different conditions is to identify those forest products, which either currently or potentially have an economic value to the communities and which will be secured by or enhanced by forest fire management. Explicit tenure or ownership to resources or land provides a general incentive for people to look after their assets.

4) Women are often in key position in raising the awareness on harmful effects of fires and on the fact that fires can be controlled and managed. In rural Africa women are mostly responsible for working in the fields and using fire to clear them. Women have also often a great influence over the whole family and once aware of the problem and possibilities, can pass the message to their children and spouse. Women should be appropriately targeted in awareness raising campaigns.

5) In order to achieve large impacts and cost efficiency, free-standing fire programmes are not a feasible solution in the long run. Instead, it is reasonable to integrate fire management into other rural development initiatives and rural livelihood strategies. Fire management should also be made an integral part of the agricultural extension work as well as agricultural training because fire is one of the most common and cheapest tools in rural agriculture in Africa.

6) Fire management is an issue which requires naturally driven local commitment to field work, a supportive national policy framework and large-scale monitoring. These three elements ensure a wholistic approach to the problem. Any attempt to deal with only one or two elements is likely to fail. Local action is difficult to promote in large areas without a supportive policy frame. Impacts of the management work in the field are impossible to verify without efficient monitoring of large areas, which are compatible with the extent of fires. Without facts on the impacts, political support and funding for the management work are difficult to be found.

7) Remote sensing is an extremely usefull and cost-efficient tool for monitoring fires and their impacts. Appropriate monitoring data can provide possibilities for more and better targeted extension inputs. Remote sensing based early warning systems may also help to contain fires in identified critical areas (e.g. the protected areas).

### 3. Challenges for the future

Forestry is seldom at the top of the list when developing countries express their needs to donor countries. Issues such as donor support to improve health, education or infrastructure are often considered more important and relevant to poverty reduction, which currently is the commonly accepted goal to all development cooperation.

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Forestry and forest sector in general and forest fires in particular do have a great impact on poverty reduction, but this influence often goes unnoticed. In 2002 Finland organised an international meeting on the relationship of forestry and poverty reduction strategies. The meeting concluded that major reasons for the lack of recognition of forestry's contribution to poverty reduction are: i) major parts of forest sector economic contributions are not accounted in the GDP, hence making the ministries of finance unaware, ii) forest sector authorities are generally not aware of the importance of poverty reduction strategy processes in national budget allocation and defining the focus of donor assistance. Hence the challenge for Finland is to continue to improve the understanding of the positive poverty impacts of all forest sector work and particularly of the effective management for forest fires.

Many African countries are progressing towards more efficient use and management of forest concessions. There is a common trend that along with the cutting right, a concessionaire also receives an obligation for the sustainable management of the concession area for increasingly long time. It is rather obvious that the concessionaires will have to take forest fire management as a part of the obligations that come along with the licence and the attached forest management plan. This presents a great future challenge, for both forest authorities and the concessionaires. The authorities need to be aware of the fire problem and include forest fire management in the concession agreements. On the other hand, the concessionaires need to be prepared to work on the fire issue, as it clearly is a part and parcel of the benefits to be gained from the operation. The real challenge will most probably how to promote the involvement of rural communities in concession area forest fire management.