

AF3

Advanced Forest Fire Fighting

D10.2.3 – Evacuation Report

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1. EXECUTIVE OVERVIEW

This document aims to describe the issues, tasks and activities that should be taken into consideration with regard to Forced Evacuations of citizens on the occurrence of a future forest fire within Europe or Associated States.

It is not possible to determine all possible parameters and scenarios in case of these events, within this document, due to: laws and regulations in different countries; differences in terrain which will affect precise planning in individual countries; ethical considerations at country level etc. but there are certain elements that are common to Forced Evacuation of citizens during a forest fire.

In a state of emergency, people are highly excitable and have to be controlled carefully, in particular if the fire leads to a forced evacuation. Mandatory evacuation orders necessitate confronting a series of policy questions which this task looks at, for example:

- What happens if some persons refuse to evacuate - given the fact that those who fail to leave their homes endanger primarily themselves, not other people?
 - What level of coercive authority ought to be applied to those who fail to comply?
 - Should penalties be sought in such cases?
 - What duties of rescue, if any, do public officials bear for those who resist orders of evacuation?
 - How are vulnerable people managed? Such as the disabled and the elderly?

Looking at the implications of forced evacuation orders, this report looks at what level of coercion should be applied during such an evacuation, whether penalties should be sought for failure to comply, what the duties are of both public officials and governments.

2. CURRENT POLICY FOR FORCED EVACUATION

2.1 INTRODUCTION

As it stands, wildfires affect about 2,000 square miles of land in Europe each year. The first major assessment of the European Union's fire-adaptation capability, published in September 2014, posits that the acres of damage could increase by 200% by 2090¹.

While wildfires can have dire consequences for farm and wood land, as well as property, they can also have a devastating effect on populations living nearby, and policy makers need to anticipate when to evacuate residents from an area at threat. As an example, the 2009 Mediterranean wildfires were a series of wildfires that broke out across France, Greece, Italy, Spain, and Turkey in July 2009. Strong winds spread the fire during a hot, dry period of weather killing at least eight people, six of whom were in Spain. Some of the wildfires were caused by lightning, along with arson and military training.²

From an ethical standpoint, governments have an obligation to help people in an emergency. While the need for forced evacuations has been debated in the past, the overall consensus is that mandatory evacuation measures are necessary and justifiable because many of those at risk during disasters lack access to the media, and do not have sufficient background knowledge, or adequate experience to make sound decisions about whether to evacuate on their own.

There are various factors to take into account when ordering a forced evacuation, not least the legal foundations, given the fact that those who fail to leave their homes primarily endanger themselves, but could also risk the lives of emergency services. The roles of governments and public officials in deciding when to enforce such an order, and what ethical considerations need to be taken into account when doing so.

2.2 CURRENT POLICIES

A project funded by the European Commission's Humanitarian Aid and Civil Protection known as EVITA is currently looking at wildfire evacuation trigger buffers for sensitive areas³. EVITA says that the experience with wildfires across Southern European countries has shown that when it comes to minimising risk, it is always better to be proactive rather than reactive when evacuating populations. The project aims to help national and regional authorities as well as residents to answer the question of whether they should initiate an evacuation and how long they have to evacuate safely. A full-scale exercise is due to take place in Athens in early December 2014, after which the EVITA approach will be disseminated to wildfire risk community and promoted to new potential users of different sensitive sites such as children's camps and hospitals.

However, there is currently no standard policy or procedures for mandatory evacuation in the case of wildfires across all European countries, and what follows is an overview of several key countries, in terms of previous wildfire evacuations.

We have taken a sample of a few European Countries.

¹ Forest fires and adaptation options in Europe, 7 Sep 2014

<http://link.springer.com/article/10.1007/s10113-014-0621-0>

² http://en.wikipedia.org/wiki/2009_Mediterranean_wildfires

³ EVITA: <http://evita.eu-project-sites.com/>

Greece

Greece is divided into 13 regions, 54 prefectures and 1,053 municipalities. The civil protection structure follows the national administrative structure.⁴

Civil protection in Greece is organised as a co-ordinated resource system whereby national, regional, provincial and local authorities work together with local and public institutions and services. Each of these authorities and institutions has developed its own part of the national civil protection plan (Xenokrates) and makes its own contribution towards achieving the aims of civil protection. Some of the top-tier bodies responsible for the implementation of civil protection measures include: The General Secretariat for Civil Protection (GSCP), The Inter-Ministerial Committee for National Planning (ICNP) and The Central Coordination Body for Civil Protection (CCB).

The mission of General Secretariat for Civil Protection (GSCP) is to protect the citizen's life, health and property from natural, technological and other major hazards. It coordinates the actions of the public services and the civil volunteers while ensuring the country's alertness to confront natural and man-made disasters.

All ministries, regions and prefectures in the country draw up special plans for the confrontation of disasters based on the national civil protection plan "Xenokrates", with the GSCP as general coordinator.

News stories relating to wildfires in Greece mention that areas were forced to evacuate, so it can be assumed that some level of mandatory evacuation order can be brought by regions where residents are thought to be in danger.

Italy

Civil protection in Italy is not a structure, but an integrated system that allows the coordinated use of all available state and private resources⁵. The general mission of national civil protection is, both at central and local levels, to protect the lives, goods, properties and environment from damage or threats caused by natural and technological disasters.

The coordination of the national service and the promotion of civil protection activities are undertaken by the Department of Civil Protection (Dipartimento della Protezione Civile - DPC) under the office of the president of the Council of Ministers. The Department of Civil Protection is thus the operative arm of the president of the Council, when it comes to coping with the protection of the country's people and goods.

In the Italian system, the responsibility for implementing civil protection measures falls with the lowest possible administrative level. The mayor is for this reason the primary civil protection authority within his/her municipality and thus responsible for planning and rescue operations. In case of large disasters, the responsibility escalates progressively through the provincial and the regional levels to the state level (national disasters).

⁴ Greece - Disaster management structure: Vademecum - Civil Protection
http://ec.europa.eu/echo/files/civil_protection/vademecum/el/2-el-1.html

⁵ Italy - Disaster management structure: Vademecum - Civil Protection
http://ec.europa.eu/echo/files/civil_protection/vademecum/it/2-it-1.html

For volcano eruptions, Italy makes use of yellow, orange and red alert levels as part of its emergency planning⁶. The population is very much involved in early planning, and all who want to leave an area safely are able to do so, without fear of leaving their homes unattended. Residents in at-risk areas are expected to follow their municipality's emergency plan, which dictates the means of removal to be followed for easier traffic flow and to avoid obstruction to rescuers.

During an alarm, services will try to remove the entire at-risk population from the red zone, within 72 hours, according to instructions in individual municipal plans. Information points are set up where people can access information as well as logistical and health support.

Having this system in place, would leave Italy in a good position to extend the planning for any cases of wildfire evacuation that occurs.

Spain

In Spain, civil protection is defined as the physical protection of the population and goods in cases of severe risk, public calamity, or extraordinary catastrophes in which the lives and physical integrity of the people are endangered. The national civil protection authorities are responsible for the overall coordination of emergencies⁷.

Spain has 17 autonomous communities and 2 autonomous cities. The civil protection structure coincides with the administrative structure.

The Junta de Andalusia makes use of a service known as Infoca to help combat fires. It enabled the region to reduce the alert level after a local fire had been brought under control.

Also, According to the Law 5/99 on Prevention and Fight against Forest Fire (Articles 42 to 44 (BOJA 82/1999, July 17) and Regulation, article 33 (BOJA 144/2001 , December 15)) , every housing estate in contact with forest should have its own Self-Protection Plan that will establish the appropriate steps for prevention and fight against forest fire. This Self-Protection Plan can be downloaded from the website of the Ministry for Environment of Andalusia. Such a Plan is mandatory; it should be made under the responsibility of the owners, submitted to the corresponding City Council for approval and included in the Local Emergency Plan for Forest Fires.⁸

News stories relating to wildfires in Spain tend to also mention that areas were forced to evacuate⁹ so it can be assumed that some level of mandatory evacuation order can be brought by regions where residents are thought to be in danger.

⁶ http://www.protezionecivile.gov.it/resources/cms/images/livelli_allerta Vesuvio_d0.jpg

⁷ Spain - Disaster management structure: Vademecum - Civil Protection
http://ec.europa.eu/echo/files/civil_protection/vademecum/es/2-es-1.html

⁸ http://www.juntadeandalucia.es/medioambiente/portal_web/web/temas_ambientales/montes/prevencion_ext_inc/3_recursos_de%20sensibilizacion_y_comunicacion/10_material_divulgativo/4_triptico_prevencion_ingl_es.pdf

⁹ Aug 28 - Fire in Alcaidesa Results in Evacuation
<http://www.yourgibraltartv.com/society/7342-aug-28-fire-in-san-roque>

Cyprus

The Cyprus Civil Defence (CCD) has a national action plan called IFESTOS for Evacuation from forest fires.¹⁰ Evacuating the old, disabled and younger people, a central issue.

Between 1999 to 2009, Cyprus experienced an increasing number of big rural/forest fires. Some of them threatened a number of villages and as a result some of them needed to be evacuated for the first time. One of the greatest problems faced when trying to evacuate isolated villages was the large number of older and disabled people.

¹⁰ http://www.preventionweb.net/files/11564_chrysiliou.pdf

3. DIFFERENT EVACUATION PROCEDURES

3.1 INTRODUCTION

Several different levels of evacuation procedure are suggested by literature on the subject, and by the experience of countries that have experienced weather-related evacuations, or regular wildfires. Although named differently, these are often broken down into the same three key stages:

- Alert – when local authorities issue a warning about an imminent threat to life and property, warning people in a defined area that they need to be ready to leave at short notice
- Evacuation Order – when the order is issued, people are expected to leave their properties and the surrounding area immediately
- Rescind – when local authorities allow people under the evacuation order to return to their properties.

These stages have been simplified into a Ready, Set, Go! Program in the US. It is also referred to internationally amongst the fire community. As part of the programme, dialogue between fire departments and the residents in their areas is a central focus. Several studies show that firefighters are more respected than local authorities within their communities, and, as such, can provide a trusted voice in any public appeal to leave the area.

A key factor in establishing trust amongst a population is by providing accurate information, and being willing to engage with residents in the most suitable methods, not just when an emergency strikes, but throughout a year. Such engagement can also encourage residents to take an active role in their community and helps with them obeying any forced evacuation order.

Some examples of Plans of Action at country level are as follows:

Cyprus

Coming up with a plan of action and maintaining it to a constant updated status is a continuous process and needs excellent coordination and the cooperation of everybody involved. To successfully implement the plan ensuring the evacuation of the most vulnerable in times of a crisis or a disaster means that a number of issues should be addressed beforehand.

Major challenges

- Identifying the individuals
 - Considering their individuality (age, ability etc.)
 - Considering other factors
 - Coming up with a plan suited for the individual
 - Informing them of the threat, dangers and plans
 - “training” them how to participate in the implementation of the plan
 - Training the trainers
-

In order to meet the challenges identified in an evacuation plan, the The Cyprus Civil Defence (CCD) has decided to prepare a different plan for each community:

- CCD officers have met with the community presidents and the community councils and requested their assistance in gathering the necessary information.
- In addition, experts were hired on a temporary term to assist CCD.
- CCD Neighborhood Watch members have been mobilized to assist.

Civil defence stations are placed strategically around Cyprus. The objective of these stations is: to respond immediately after a crisis or a disaster; to collect information and pass it on to headquarter; offer aid/assistance; assist in evacuation missions; assist in search and rescue missions.

Neighborhood Watch: CCD members and Neighborhood watchers, are organized in groups where they reside. Depending on their individual training, they carry an A' Aid bag, and a radio.

Northern Ireland

A publication has been developed in Northern Ireland entitled: "A Guide to Evacuation in Northern Ireland".¹¹ The guidance document is intended as an aid to planning, to

- Indicate what arrangements need to be made
- Give some insight into the needs of evacuees.
- Set out good practice in meeting needs.
- Guide organisations in the creation of their own plans and in integrating them with those of other responders.

"This guidance refers specifically to situations where people need to be evacuated from a dangerous or potentially dangerous location and moved to a place of safety where their welfare needs can be met. The needs of survivors of incidents, whether injured or not, are somewhat different from those of people evacuated for their own safety and are not covered in detail in this guide."

This publication has sections describing: Evacuation Requirements, Warning and Informing; Organising the Evacuation

3.2 METHODS OF CONTACT

Traditional methods of contact

Dr John Drury of the University of Sussex writes¹² of three main methods for contacting residents to start an evacuation order:

- reverse emergency calls
- door-to-door
- neighbourhood-to-neighbourhood (including the use of loudhailers or other community announcements)

¹¹ <http://www.ofmdfmi.gov.uk/aguidetoevacuation.pdf>

¹² *Don't panic: The psychology of emergency mass evacuation*, University of Sussex (January 2006)

Dr John Drury, Department of Psychology,

The same methods are described in much of the literature on the subject.

Methods of contact will depend on the nature of the evacuation. Schools, hospitals, prisons and other institutions can be expected to have internal procedures in place for evacuation, including having a named contact in charge of emergency planning and evacuating premises if necessary. It is imperative that any list of such contacts is kept up-to-date and is easily accessible by anyone who may need to launch an evacuation order in an area.

Social media and new innovations

Just as more people are using social media tools to report emergencies or call for help, they increasingly expect government response agencies to be actively engaged in using the technology as well.

The American Red Cross surveyed 1,058 adults for their report *Social Media in Disasters and Emergencies*.¹³ The report indicated that 18 percent would turn to social media services if calls to emergency services were unsuccessful. Sixty-nine percent of the adults surveyed said emergency response agencies should regularly monitor their Web sites and social media networks so they can respond promptly to requests for help posted there. Additionally the Red Cross found that Facebook was second only to email as the preferred method of sharing content amongst adults. In suggestions for utilizing social media during a crisis, the Red Cross mentions that communities will often have a further reach than official sources, and will be willing to share and re-tweet messages relating to an emergency situation, with properly-used hashtags on Twitter allowing for further reach and joining interested parties together.

In the UK, Twitter Alerts were launched in November 2013. The service, which also runs in America and Australia, makes it easier for emergency services, government organisations and charities to share critical information as quickly as possible via Twitter. The service includes all 47 of the UK's police forces, An Garda Síochána, the London Fire Brigade, the Mayor of London's office, the Foreign Office, CEOP and the Environment Agency. The UK Fire Services joined the Alerts service in February 2014. Any organization signed up to the service can send critical information to followers by marking Tweets as alerts, which adds an orange bell to them for added visibility.

In San Francisco, the city also uses a text-based notification system, AlertSF, and encourages Twitter followers to sign up for the service. Other text-based notification systems almost certainly exist and provide another way of quickly getting in touch with a number of people who have signed up to be notified of incidents and emergencies.

However, the downside to relying on social media alerts, is that connectivity can be greatly affected both by an emergency itself and by communication networks being overwhelmed with the number of people trying to use a network at the same time.

¹³ *Social media and disasters*, American Red Cross, 21 Aug 2013:
http://www.redcross.org/images/MEDIA_CustomProductCatalog/m22442828_Social_Media_-_Suzanne_Bernier_-_SB_Crisis_Consulting.pdf

3.3 KNOWING THE COMMUNITY AND ITS NEEDS

It is vitally important that local emergency authorities understand the make-up of their communities and have regular emergency planning meetings with key stakeholders. Hospitals, prisons, shopping centres, schools and any other institution all need to be monitored for evacuation purposes. Contact details, including those for out-of-hours contacts must be maintained centrally so that people can be informed of any forced evacuation measure with as much forewarning as possible.

Key predictors that determine when people leave due to an evacuation notice include information on the nature and timeline of the threat, rather than a simple alarm or siren, and personalisation of the warning. Residents and community members are more likely to listen to a warning from someone they know, although this may not be possible.

As wildfires can move very quickly and sometimes unpredictably due to weather conditions, it is important for any at-risk community to be made aware of contingency plans in the event of the need for a forced evacuation. For some this may be which roads to take and how to travel to safe areas, who to contact once moved and where to find out when one can return. For others, including vulnerable people, this may involve information about remembering to take medication, or taking supplies for a baby.

The more information a community has about the evacuation plans before an evacuation order is needed, the better.

3.4 EVACUATION

In order to plan for forced evacuations, towns, regions and local government organisations, in connection with emergency services need to consider the following:

- Who do we evacuate first?
- What are the routes for evacuation?
- What happens if cross-border evacuation is needed?
- How do we deal with those who will not cooperate?
- When do rescue efforts cease and recovery efforts begin?

Answers to these questions will change for every region, naturally, but they all need close consideration by those in charge of planning evacuations. It should never be assumed that planning will be perfect, unexpected events will always occur, operational failures will develop and those with field responsibility will have to make immediate ethical judgments. These should always be made within the spirit of ethical judgments that steered the planning process to begin with.

It is hoped that residents will always listen to local media, and follow instructions, and advice to residents in high risk areas should include preparations such as an emergency supply kit, including important documents and any medication needed. The state should organise short-term shelter and food, and communication networks for uniting families and friends.

There may be cases where evacuation is not possible and a 'shelter-in-place' policy becomes a primary option for reducing wildfire casualties. Cova, Denison and Drews in an article for Sustainability¹⁴ present an optimisation model based on the premise of three possible options:

- Evacuation
- Shelter-in-refuge
- Shelter-in-place

They suggest at-risk households are assigned to one of these actions in order to best protect a community.

¹⁴

Modeling Evacuate versus Shelter-in-Place Decisions in Wildfires by Cova, Denison and Drews. Sustainability 2011, 3, 1662-1687; doi:10.3390/su3101662 (pdf) [ISSN 2071-1050]

4. EVACUATION RESISTANCE

4.1 ENCOUNTERING EVACUATION RESISTANCE

One of the chief problems mentioned alongside any discussion of forced evacuations is that of resistance from residents, and what the ethical challenges are of actually enforcing an evacuation order.

Some believe that governments act too paternalistically, others argue that there is a valid issue of public safety. The key question is whether the dangers posed by a wildfire are a case where people need to be told what is best for them, removing an element of choice.

From previous case studies of wildfires across the globe, there are tales of those who resisted leaving their homes and possessions. Such resistance can endanger emergency services, and can stall rescue efforts where they may be better dispatched.

Actually enforcing a mandatory evacuation through force, however reasonable, is not likely to be effective or beneficial in the long run, as arresting people raises issues and takes valuable time away from other efforts. From the perspective of emergency responders there are also liability questions.

In the end, it is accepted that there are some people who will not want to evacuate, no matter how nicely they are asked, or how many options they are given to do so. In California, which has experienced many wildfires, some residents simply do not see the urgency. In such cases, the concern is less the life of those refusing to leave and more the safety of emergency services who may feel that ethically they need to rescue everyone, even if some of these rescues could have been avoided. In the United States, North Carolina and Texas require people who refuse a mandatory evacuation order to be civilly liable for the costs of any later rescue, while making it clear such a rescue may not come at all.

Another prurient point is that a delay in evacuation can prove deadly. Until 7th February 2009 most civilian deaths in wildfires in Australia occurred due to late relocation. It is therefore crucial that evacuation is ordered in a timely manner and enforced where possible to prevent deaths.

In Italy, if there is resistance, residents are forcibly moved as the concern is for saving life in times of emergency.

4.2 AVOIDING EVACUATION RESISTANCE

The key to avoiding resistance to evacuation is providing information and working alongside a community to provide the knowledge and preparation needed to explain why forced evacuations may be necessary. Clear guidance needs to be given on the penalties for resisting a forced evacuation and this should be distributed to communities at-risk.

Each country needs to consider what level of coercion ought to be applied to those who fail to comply to an order to evacuate.

4.3 EVACUATION DUTIES AND LIMITS

Duties and Limits

There are general ethical principles that need to be adhered to in order to maintain the trust of residents and communities during a mandatory evacuation due to wildfire. These include:

- Joint responsibility
- Non-discrimination
- Humanity
- Impartiality
- Neutrality
- Territorial sovereignty

All people in an at-risk area need to be evacuated in a wildfire, not just a country's citizens or residents. Emergency services and local governments acting with neutrality and treating people humanely and without discrimination is also mandatory to keep the trust of those being moved, possibly against their will.

Forced evacuations should only be enforced where there is an actual imminent threat, and persons who refuse to evacuate should be told this is at their own risk. They also need to know that they may be endangering the lives of rescue workers if they fail to evacuate when ordered to.

At the time of such an evacuation, those being moved need to be kept informed of the threats of disaster the area is facing, along with procedures to be followed, where they are to go and the expected duration of the evacuation.

Arrangements for evacuation should also guarantee dignity and protection of fundamental human rights, and where possible, protection of property and effects.

The primary consideration, however, is to provide for people. This extends to rescue and emergency workers, as well as residents in an at-risk area, and governments should also consider support for emergency workers so that they can also enjoy their fundamental rights during disaster situations. Some have suggested that psychological assistance be available to emergency and rescue workers during and after relief operations.

After an emergency situation, a government also needs to put in place measures to safeguard and to rehabilitate the environment, including the restoration of social ties through meeting places, places of worship and places for leisure activities.

Evacuating across borders

There may be cases in Europe where cross-border evacuations are needed and the cross-border impact of disasters should not be forgotten. It requires cooperation between governments and local and regional authorities, as well as the involvement of civil society.

The United Nations' Guiding Principles¹⁵ seek to protect all internally displaced persons in internal conflict situations, natural disasters and other situations of forced displacement. The principles state that such displaced persons should enjoy, in full equality, the same rights and freedoms under international and domestic law as do other persons in their country. Additionally, certain internally displaced persons, such as children, expectant mothers, mothers with young children, persons with disabilities and elderly persons, are entitled to protection and assistance required by their condition and to treatment which takes into account their special needs.

The European Forest Fire Information System (EFFIS) provides near real-time and historical data on forest fires in Europe, the Middle East and North Africa, from pre-fire conditions to assessing post-fire damages. EFFIS was established in order to support the responsible national authorities in charge of preventing forest fires in the European Union and neighbouring countries, as well as to provide the EC and the European Parliament with reliable information on the trends associated with these incidents.¹⁶

EFFIS is a comprehensive system covering the full cycle of forest fire management, from fire prevention and preparedness to post-fire damage analysis. The system provides timely and reliable information on forest fire events to European countries, and currently receives regularly detailed information on forest fire incidents from 22 contributing countries.

This system, which has been fully operational since 2000, will be integrated next year into the Copernicus Emergency Management Service as part of its Early Warning component. EFFIS supports strategic decision-making during fire-fighting activities as well as the management of logistical operations and evacuation.

The Emergency Management Service (EMS), the first Copernicus service to become operational, will integrate the European Forest Fire Information System (EFFIS) into its set of services in 2015. EFFIS will become an integral part of the EMS Early Warning component, which since 2011 has included the European Flood Awareness System (EFAS).

¹⁵ Guiding principles on internal displacement – LSE/Brookings <http://www.brookings.edu/about/projects/idp/gp-page>

¹⁶<http://newsletter.gmes.info/issue-08-october-2014/article/copernicus-and-effis-improving-eu-capabilities-forecasting-and>

5. VULNERABLE PEOPLE

5.1 INTRODUCTION

Vulnerable people are of special interest during a time where a forced evacuation order might be needed. A number of institutions such as hospitals, nursing homes, mental health units and sheltered housing could all face legal implications if they do not evacuate when ordered to do so, and workplaces would also be expected to release their workers if local authorities demand an area is evacuated for safety.

Vulnerable populations are said to be less likely to evacuate prior to a disaster due to lack of access to personal transportation, health conditions that make mobility difficult, jobs that require them to remain, or misperceptions about their level of risk. Individuals and families in these communities require extra attention in the evacuation planning stage to ensure that they are both prepared and willing to evacuate.

Special evacuation needs should be considered by anyone responsible for a vulnerable person, including mothers and their newborn or young children.

Institutions should be aware of emergency evacuation preparations and should prepare individual evacuation plans for the most vulnerable people under their care. This might also include a planned order for which people in an institution should be evacuated, according to their needs. Communication and decision-making at all levels from local and emergency authorities is key. In some circumstances a 'shelter-in-place' policy may make more sense for institutions, and this needs to be considered in advance of any emergency developing.

America's Centers for Disease Control and Prevention has provided advice¹⁷ for pregnant women, and for parents of young children who might face a mandatory evacuation due to a wildfire. These recommendations could well extend to anyone caring for a vulnerable person. They include:

- Being prepared to evacuate quickly, with important items ready to go
- Take copies of medical records and any prescription medications
- Bring bottled water
- Tell staff at a shelter or temporary housing about your status

Drawing on lessons from Hurricane Katrina¹⁸ in New Orleans, a study of disaster planning and risk communication with vulnerable communities found that there was a heightened importance of extended families and social networks within these communities. This meant that better community-based communication was advised for future disaster preparation strategies.

¹⁷ Wildfires: Information for Pregnant Women and Parents of Young Infants, Centers for Disease Control and Prevention: <http://www.cdc.gov/reproductivehealth/emergency/wildfires.htm>

¹⁸ Disaster Planning and Risk Communication With Vulnerable Communities: Lessons From Hurricane Katrina <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1855003/>

After the Japanese earthquakes in March 2011, the Japanese Government has made some amendments¹⁹ to disaster plans that involve vulnerable populations. Based on the revisions, municipalities are required to create lists of the most vulnerable people, including the disabled, to ensure evacuation of those with special needs goes more smoothly. A list of names, addresses and contact numbers if compiled and shared with neighbourhood associations and social workers. Municipalities have also been asked to draw up guidelines for issuing evacuation advisories and warnings.

In order to develop a best practice for the evacuation of vulnerable people, it is necessary to study what has happened in other disasters worldwide. What is clear is that communication and knowledge of the locations of the vulnerable is key in reducing loss of life.

¹⁹ Disaster plan to swiftly evacuate socially vulnerable citizens revised
<http://www.japantimes.co.jp/news/2014/01/17/national/disaster-plan-to-swiftly-evacuate-socially-vulnerable-citizens-revised/>

6. CONCLUSIONS

The key to a successful evacuation lies in education, awareness, and training. Residents should be made aware of the possibility of evacuation well in advance of an actual emergency. Local governments should create, review, and practice emergency plans

In order to comply with ethical and legal procedures and regulations within individual EU countries and at EU policy level, planning is of paramount importance before a forest fire event in order that reactive procedures and cooperation between relevant organisations, and between organisations and affected citizens, is well in-place beforehand and training exercises including simulations have been tested and drilled as far as possible.

Activities include local, national and cross-border cooperation between governmental and non-governmental agencies in the areas of emergency management, police, security etc. and include use of shared resources such as computer systems and databases.

Warnings and Contingency plans should be made well-known to citizens in affected areas and institutions (e.g. hospitals, prisons etc.). There may be cases where evacuation is not possible and a 'shelter-in-place' policy becomes a primary option for reducing wildfire casualties. New technology e.g. related to weather predictions should be utilised and shared as quickly as possible with emergency organisations and citizens in affected areas in order to save time and make decisions at an earlier stage than currently is possible.

It is important to note that training and analysis is a continuous on-going process; especially taking into account the fast innovation process of researching and developing technology which will provide in the future more efficient and cost-effective preventative measures, including better management processes within and between organisations at local, national, and international levels.

Some Recommendations:

- Educational materials and resources should be made available in multiple languages
- Residents of a given area should be familiarized with evacuation procedures and convinced of the need to act early.
- Evacuation plans should be practiced regularly.
- Evacuation orders should be compulsory, not voluntary. Prior research has shown that people who said they heard mandatory evacuation orders are the most likely to evacuate.
- The warning methods should be developed to help citizens take appropriate, responsible action. A combination of warning method most effective.
- Evacuation warnings should be clear, easy to understand, available in multiple languages, and come from trusted sources.

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