



Project FLAT

"Flood and Landslide Assistance and Training"

D.T.3.4.3

**"Practical guidebook for action in
case of floods and landslides"**

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ITALIAN SECTION

1. MANUAL FOR CITIZENS ON ACTING IN CASE OF FLOODS

Landslides and flooding are among the most frequent natural disasters in Italian territory owing to the geodynamic context of our country and to the morphological characteristics of its territory. These events often give rise to conditions of elevated risk, given the presence of human activities even in areas at high risk. Large alluvial plains facilitate the occurrence of extensive flooding. Disruptive events are influenced by a multiplicity of “natural” and anthropogenic factors. The former are mainly tied to the geo-morphological conformation of the Italian territory, as well as to the type and extension of the vegetative coverage and conditions of weather and climate. Anthropogenic causes include, among others, a use of the territory that does not pay sufficient attention to the characteristics and the delicate natural balances of Italian territory, allowing planning and implementation of invasive works (such as embankments, dikes, canals, reclamation works and retaining walls) that prevent evolution according to natural dynamics.

Such activities can even contribute to the danger, modifying areas whose natural balances are already precarious.

Nevertheless, conditions of risk can be significantly reduced through careful territorial planning and the introduction of legislative instruments that place limitations on the use of the soil and/or set technical-engineering standards. In order to arrive at effective risk mitigation, therefore, it is indispensable that the emergency approach, based on after-the-fact responses, be replaced with initiatives combining forecasting and prevention.

The dissemination of information on hydro-geological instability (landslides, floods, avalanches) among the central and local bodies of the Public Administration, as well as the general population, also plays a very important role in risk prevention.

A thorough knowledge of the area is preparatory to emergency planning, which starts primarily with action of citizens during dangerous situations, accompanied by a firm response and organization of the municipal Civil Protection structure. All that helps to reduce the damage caused by the event, and in some circumstances to prevent the event itself; furthermore it causes a cultural growth against territorial emergencies.

It is of fundamental importance that everyone collaborates and is prepared to face emergency situations. The Civil Protection provide the population some information and good rules of general behavior to be taken in all emergency situations in relation to risk identified on the municipal territory. Know what risks are on the territory and what is more likely to happen is what has been done in the Civil Protection plan with the analysis and identification of risks. Based on the likely scenarios of risk, precise emergency procedures are prepared.

- Remember that river waters are highly polluted during and after floods and carry floating debris possibly causing injuries or liable to knock you unconscious.
- Listen to the radio or watch TV for any warnings about bad weather. Cars and objects can temporarily obstruct roads or passageways which suddenly collapse: take your car to a safe place out of reach of floods, as long as there is not a state of pre-alarm and it is not raining; roads often become true and proper rivers in full flood.

What to do before, during and after the event:

Before (pre-alarm)

- It is always useful to have an electric torch and a battery radio for tuning into local stations and listening for any useful information;
- Save property located in places liable to flooding, only if you are in a completely safe situation;

- Make sure that everyone at potential risk has been informed about the situation;
- If you live on an upper floor offer hospitality to those living on floors below you and vice versa ask for hospitality if you live on the lower floors;
- Put up safety barriers to protect ground floors and close or block doors to cellars or basements;
- It is best to stay home, as long as you do not run the risk of being flooded;
- Teach the children what to do in emergencies, such as turning off the gas or phoning the help numbers.

During (alarm or event in progress)

- It is best to concentrate the actions, envisaged for the alarm or event in progress stage, during the pre- alarm stage.
- It is essential to remember that there may only be a slight difference, difficult to foresee, between pre- alarm and alarm or event in progress: rain only has to be concentrated in a restricted area to trigger off sudden floods.
- At home: turn off the gas, heating and electricity. Be careful not to come into contact with any electrical parts with wet hands and feet;
- Go up to the upper floors without using the lift;
- Never go down to cellars or garages to save objects or stores;
- Do not try to take your car or agricultural machinery to a safe place: there is danger of being trapped in the debris and carried away by the currents;
- Avoid confusion and keep calm;
- Help the disabled and older people in your building to reach safety;
- Do not drink water from the tap in the house: it could be polluted.

Outside the house

- Avoid using your car unless strictly necessary;

- If you're in the car, do not try to reach destination at all costs, find shelter in the nearest and safest building;
- Avoid transit or stopping on the banks of watercourses, bridges or footbridges;
- Be careful of underground passageways: they are easily flooded;
- If you are on a trip or excursion, ask a local person for help: they may know where it is safe;
- Escape towards higher ground and never go downwards;
- Avoid passing under natural or artificial embankments;
- Do not take cover underneath isolated trees;
- Use the telephone only when strictly necessary to avoid overloaded lines.

After

- After reaching a safe place, pay full attention to information provided by the civil protection authority through radio, TV and clearly identified civil protection vehicles;
- Avoid contact with the waters; they can often be polluted by petrol, fuel oil or sewage water;
- Avoid areas where currents are still flowing;
- Be careful of places where the water has retreated. The road surface may be weakened and liable to collapse under the weight of a car;
- Throw away any food wetted by flood waters;
- Be careful of bathroom utilities, septic tanks and damaged cesspits. Damaged drainage systems are serious sources of risk.

To keep on hand

It is also useful to always keep some objects of fundamental importance in case of emergencies somewhere in the home in a place known by the whole family, such as:

- First aid kit + medicines;
- Non-perishable foodstuffs;
- Heavy shoes;
- Reserve of drinking water;
- Spare heavy clothing;

- Light raincoats or oilskins;
- Electric torch with spare battery;
- Radio and spare batteries;
- Multipurpose knife;
- Photocopy of ID's;
- Keys to the house;
- Property of value (cash and valuables);
- Paper and pen.

2. MANUAL FOR CITIZENS ON ACTING IN CASE OF LANDSLIDES AND ROCK FALLS

A landslide is defined as the movement of a mass of rock, debris, or earth down a slope. Landslides are a type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity. The term "landslide" encompasses five modes of slope movement: falls, topples, slides, spreads, and flows. These are further subdivided by the type of geologic material (debris flows or rock falls).

Almost every landslide has multiple causes, that can be divided into two groups:

- Predisposing (intrinsic) factors. The characteristics of the territory as geometry, lithological-structural conditions, hydrography, steepness and others that make the slopes susceptible to breakage
- Triggering (extrinsic) factors. Individual events such as intense rains, earthquakes and human activities that trigger landslides. Given that the estimation of the extrinsic characteristics of a territory is extremely complex, both in terms of identity and occurrence, it can be stated that the spatial distribution of intrinsic characteristics, in a certain area, substantially determines the spatial distribution of the relative "susceptibility to instability" in the whole region.

The main intrinsic factors that contribute to landslides in the territory are:

- geology (lithological and structural-stratigraphic peculiarities): the response to the erosive processes of the geological formations depends, predominantly, on the physical-chemical and mechanical characteristics of materials constituting them, but also on the tectonic and relationships that exist between the different lithologies;
- land use;

- acclivity: to this factor are linked a series of conditions that regulate the dynamics of the slopes such as the extent of runoff and infiltration of rainwater and the value of the component of gravity that acts parallel to the topographic surface;
- drainage density (ie the ratio between the length of the fluvial stems that flow in a given area and the areal extension of that area): the superficial flow waters accelerate the erosive processes on the slopes;
- orientation of the slopes: greater failures are noticed along slopes subject to greater insolation;
- orography: the orography gives information about the area distribution of the altitude bands, which, in turn, conditions the climate distribution in a territory;
- geomorphology: the geomorphology describes the forms of the territory and therefore provides indications about the morphological dynamics in place; some forms, because of their nature, are more subject to failure phenomena than others.

In terms of landslide disturbances, Italy presents an especially high risk, taking account of its morphological characteristics (75% of the territory is mountainous-hilly). Landslides are the natural disasters that occur with the greatest frequency and cause high number of victims and damage to urban areas, infrastructures and environmental, historical and cultural resources.

Early warning, planning, training, dissemination of knowledge of civil protection, information to the population and application of technical regulations are the main instruments for the prevention of territorial risks and are intended to prevent or limit damage in occurrence of an emergency.

The aim to promote prevention, consciousness and a more active role of citizens in risk reduction led the Italian Civil Protection to synthesize a “what to do” list, mentioned below.

Remember that when there is a landslide there are no houses or walls to stop it. Only somewhere higher up will offer you safety.

Landslides often start moving all of a sudden, like mudslides: avoid going near areas where there have already been slips, especially during thunderstorms and heavy downpours.

What to do before, during and after the event:

Before

- Contact your local council to see if there are any risks of landslides in the domestic territory;
- From a safe position, carefully observe the land around you to see if there are signs of small landslides or slight alterations in the land: small changes in morphology can sometimes be considered as a forewarning of landslides;
- In some cases, cracks or fissures will appear in buildings and walls may tend to rotate or move before a landslide;
- Listen to the radio or watch TV for any warnings about bad weather. It is important to keep listening to the radio or watch TV during and after the event to follow developments;
- Keep away from watercourses or gullies where there could be a possibility of mud sliding down rapidly.

During a landslide

- If the landslide is coming towards you or is underneath you, get away as quickly as possible and try to reach higher or anyhow safer ground;
- If you can't escape then curl yourself up into a ball and protect your head;
- Always look towards the landslide being careful of not be hit by stones or other objects as they bounce down;
- Never stop under poles or pylons: they could collapse or fall down;
- Never go near the edge of a landslide, it's unstable;
- If you are driving along a road and you come up against a landslide that has just fallen, try to warn any other cars approaching about the danger.

After a landslide

- Go away from the landslide area. There might be a risk of other slips or landslides;
- Look to see if anyone is injured or trapped in the landslide area, without going there yourself.

If so tell the rescue workers about these people;

- Check to see if anyone needs assistance, especially children, older people or disabled persons;
- Landslides can often disrupt electricity lines, gas and water mains as well as roads and railways. Report any interruptions to the competent authorities;
- If any gas is escaping from an apartment building, do NOT enter to turn it off. Check for a gas cock outside the building, if there is one turn it off. Report this to the Fire Brigade or other qualified personnel.

MONTENEGRIN SECTION

1. MANUAL FOR CITIZENS ON ACTING IN CASE OF FLOODS

Floods are frequent natural disasters which occur locally – if they affect a settlement or smaller communities, or they can be of a large scale – when they affect entire river basins and a large number of municipalities.

The time frame of flood development varies from case to case. Floods in the flat regions develop slowly, over several days, unlike torrential floods which develop rapidly, sometimes without visible signs. Such floods form a dangerous and destructive flood wave, which carries mud, stones, branches and waste.

Flooding also occurs when the water level in rivers rises so high that groundwater emerges or there is an overflow over the embankment or, due to water pressure, the embankment breaks. Flooding can also be caused by damages and overflows of the dam due to excessive water inflow – causing a flood which is similar to a torrential flood, but to a much wider and catastrophic extent.

Floods can happen anywhere. Even very small streams, rivers, drainage channels or rain channels, which seem harmless, can cause large scale flooding.

Floods are usually not preventable, but there are certain activities which a person can take to prevent or reduce consequences of this natural disaster.

Flood prevention and mitigation activities – preventive measures

- Get acquainted with the history of flood events in your area.
- Design your plan to protect yourself, your family and property in case of a flood.
- During periods when there are no floods, act responsibly and do not throw waste into rivers, streams and canals.

- If the waste is already in the troughs and canals, report it to the competent municipal service and take part in actions of cleaning the watercourses.
- In cities with heavy rainfall and increased water drainage, do not dispose of waste and cover manholes which drain atmospheric water.
- Do not block watercourses to accumulate water during summer.
- Prepare the most basic reserves of food, water and medicine.
- Raise electrical appliances to a safe location.
- If possible, prepare sandbags which, in case of a flood, you can put at the entrance and close all places on the house through which water can enter.
- Find out evacuation routes and safe evacuation points.
- If you live downstream the dam, be informed about the danger signal, time it will take you to the shelter and the safe limit to take shelter in the event of its collapse.
- Plan how to inform other occupants of the building (neighboring houses) about flood hazard, preventative measures and rescue and protection procedures.
- Monitor the situation and warnings of possible floods through media.

How to act during floods and evacuations?

- Follow information via radio, television and Internet for adequate information.
- If there is a risk of torrential floods, immediately move to the higher floors of the house.
Do not wait for instructions to do this.
- Be cooperative and collaborate with rescue teams.
- Wear waterproof clothing and shoes.
- Strengthen personal hygiene measures to preserve your health and prevent epidemics.
- Do not drink tap water until you are sure it is safe to be used, as drinking water may be contaminated in flooded areas. Until then, use only bottled, boiled and disinfected water.
- Do not touch electrical equipment when wet or standing in water.

- Do not use phone unless it is really necessary, as this will help to relieve the telephone network and lines required for rescue and evacuation.
- If you are unable to leave your house, go to the top floor of the house and wait for rescue teams to arrive.

If you need to evacuate – leave your home:

- Turn off all electrical appliances, turn off gas, and unplug the main switch even if there is no electricity in your house.
- Lock the object/apartment you are leaving.
- Bring the favorite toy/picture book of your child.
- Evacuate pets and, if this is not possible, release them from the premises where they are located.
- Take the necessary things you prepared. Remember to bring your IDs and medicines, as it may be that you will be away for a longer period from your house.
- Bring bottled drinking water.
- Inform the competent evacuation authorities if you wish to evacuate using your own vehicle.
- Notify the competent evacuation authorities if you have a sick family member who needs special procedures and health care.
- Do not cross the bridge for any reason or go past rivers, torrents, slopes, etc. Do not cross rapids and streams. A flood wave can drag you along.
- Keep a close eye on roadmaps and any other information published by competent institutions. This way you will avoid going to dangerous areas.
- Do not walk through moving water, as 15 cm deep water may cause a fall. If you have to go through water – walk where the water does not move. Use a stick to check the water depth and soil strength.
- If you drive, do not block streets and roads so that rescue teams can operate smoothly.
- Do not go through flooded streets, underpasses or subways. Water can be deeper and faster than it looks, and water level could destroy your car as well.

- If flood water surrounds you, leave the vehicle and, if possible, move to higher ground.
- Avoid areas which are known for landslides and rock falls.
- Follow the instructions given by competent institutions. They manage and coordinate emergencies as well as the work of rescue teams.

How to deal after floods?

- Listen to news reports on water supply and whether it is safe to drink water.
- Avoid flood water – it can be contaminated with mud, oil, gas or sewage. The water can also be electrically powered by underground cables.
- Avoid moving water.
- Be careful in areas where flood water has receded as roads may be damaged and dangerous.
- Return to your home only after the competent services have declared it safe.
- Do not use electrical appliances before checking.
- Clean and disinfect all surfaces.
- Stay away from buildings surrounded by flood waters.
- Be careful when entering buildings because of hidden damage which may have occurred.
- Make functional damaged septic tanks and other sewer systems as early as possible – if damaged, they can become a major health risk.
- Clean and disinfect everything that is wet. The mud which remains after flood water can contain sewage waste and chemicals.
- If you notice any dead animals, please inform the competent service at 112 or 123.

REMEMBER: Even when flood water recedes, there is still a danger.

2. MANUAL FOR CITIZENS ON ACTING IN CASE OF LANDSLIDES AND ROCK FALLS

Landslides are movements of soil, stones and other deposits. They are activated and develop rapidly when water is accumulated in the soil as a result of heavy rainfalls, groundwater, snow melting and inadequate land exploitation. They can be a result of poor attitude to land, especially in mountainous areas, canyons or near shores.

In case of landslides, mass of stones and earth falls. Landslides are either small or large, slow or fast, and they are triggered by:

- heavy rainfall,
- earthquake,
- fire,
- severe winter and freezing,
- erosion in case of human terrain modification and
- groundwater.

Rock fall is a result of sudden tearing down and collapse of a rock mass down steep slope. Rock falls occur very often during strong earthquakes or volcanic eruptions. Undermining by natural processes also often leads to rock falling, and it can also be caused by people negligently cutting down rock mass. While moving down a slope, the material goes a long way (depending on the relief). As it rolls down the slope, large blocks break and crush and the material accumulates at the base of the slope.

Please note: There are no houses or walls which can stop the landslide.

If you live in landslide and rock fall-prone areas:

- ✓ Pay attention to strange noises such as breaking of trees and the like, which may be indicative of landslides or rock falls,

- ✓ If you are near a stream or canal, be careful about water flow increasing or decreasing or its turbidity,
- ✓ Consider leaving the endangered site, if you can safely do so,
- ✓ Stay awake and alert – listen to warnings from radio and television about possible heavy rainfall.

If you notice that there is a danger of rock fall:

- ✓ Notify the competent services at 123 or 112;
- ✓ Inform neighbors who may be affected by this danger;
- ✓ Move away from the landslide zone, as this is the best protection;
- ✓ When moving away, always look toward the landslide, paying attention to stones or other material that may bounce and hurt you, move to the side of the landslide – rock fall, and try to reach a higher ground level;
- ✓ Do not stand under bars or poles which may collapse or fall;
- ✓ Do not approach the edges of the landslide, as it is unstable;
- ✓ If you have encountered an active landslide, warn other road users about the danger.

What to do after the landslide?

- ✓ Stay away from landslide and rock fall area.
- ✓ Check if there are injured or trapped people near landslides and rock falls.
- ✓ Assist neighbors who need special help – children, the elderly and people with special needs.
- ✓ Check and report to local authorities if there are broken power lines or damaged roads or tracks.

- ✓ Report damage incurred to house foundations, chimneys and roofs.
- ✓ Listen to radio and television news for the latest information.
- ✓ Pay attention to floods which can occur after landslides and rock falls.
- ✓ Replant the trees, as soon as possible, as erosion can lead to the loss of soil cover and new landslides in the future.

NEED TO KNOW: Driving during heavy rains is dangerous. Be very careful when driving – pay attention to damaged roads, mud, fallen stones or other indicators of landslides and rock falls.

ALBANIAN SECTION

1. MANUAL FOR CITIZENS ON ACTING IN CASE OF FLOODS

The area under the study of this project, Shkoder, Vau I Dejes and Lezha, but specifically Shkodra region, is one of the most flooded areas in Albania.

The entire catchment area is surrounding by rivers Buna, Drin, Kir and from Shkodra Lake to the Adriatic Sea. In the last few kilometers, before joining the Sea, the Buna River flows partly near the border between Montenegro and Albania. The Drin-Buna Rivers represents a very complex water system where rivers, lakes, hydro power lakes, valleys and ground water interact. Due to the above factors, the Region is affected by heavy floods, which have occurred regularly in recent years and may increase and increase due to climate change in the region.

The most recent floods in January 2010, December 2010 and March 2013 on the territory of Shkodra, Vau I dejes and Lezha Region caused significant economic and environmental losses, and if measures are not continuously taken to adequately adapt to increased flood risk it is likely that socio-economic and health damages increase.

The municipalities of Shkodra, Vau Dejes, and Lezha have a well-developed hydrographic network, consisting of rivers, streams and some springs that feed on atmospheric rains that fall and flows from mountainous areas to these rives and then on the sea.

The entire Drin and Buna and Kir rivers catchment area is mainly characterized by a Mediterranean climate with up to 3000 mm of average annual rainfall in the mountainous part of the area. The rains traditionally fall, mainly in the period from November to March and there is a wide variety of total amount and spatial distribution of rain in different parts of the catchment area.

Possible scenario of flooding in lowland regions are in between periods from November-to March and the duration of emergency timing have been up to 30 days, with a uninterrupted rainfall in some cases 20 days. Also, this is indicated and makes it more difficult because of the

snowfall and temperatures from -3 to -20o / c in the north-eastern mountain part of these regions.

The time frame of flood development varies from case to case. Floods in the flat regions develop slowly, over several days, unlike torrential floods which develop rapidly, sometimes without visible signs. Such floods form a dangerous and destructive flood wave, which carries mud, stones, branches and waste.

Flooding also occurs when the water level in rivers rises so high that groundwater emerges or there is an overflow over the embankment or, due to water pressure, the embankment breaks. Flooding can also be caused by damages and overflows of the dam due to excessive water inflow – causing a flood which is similar to a torrential flood, but to a much wider and catastrophic extent.

Floods can happen anywhere. Even very small streams, rivers, drainage channels or rain channels, which seem harmless, can cause large scale flooding.

Floods are usually not preventable, but there are certain activities which a person can take to prevent or reduce consequences of this natural disaster.

Flood prevention and mitigation activities – preventive measures

- Get acquainted with the history of flood events in your area.
- Design your plan to protect yourself, your family and property in case of a flood.
- During periods when there are no floods, act responsibly and do not throw waste into rivers, streams and canals.
- If the waste is already in the troughs and canals, report it to the competent municipal service and take part in actions of cleaning the watercourses.
- In cities with heavy rainfall and increased water drainage, do not dispose of waste and cover manholes which drain atmospheric water.
- Do not block watercourses to accumulate water during summer.

- Prepare the most basic reserves of food, water and medicine.
- Raise electrical appliances to a safe location.
- If possible, prepare sandbags which, in case of a flood, you can put at the entrance and close all places on the house through which water can enter.
- Find out evacuation routes and safe evacuation points.
- If you live downstream the dam, be informed about the danger signal, time it will take you to the shelter and the safe limit to take shelter in the event of its collapse.
- Plan how to inform other occupants of the building (neighboring houses) about flood hazard, preventative measures and rescue and protection procedures.
- Monitor the situation and warnings of possible floods through media.

How to act during floods and evacuations?

- Follow information via radio, television and Internet for adequate information.
- If there is a risk of torrential floods, immediately move to the higher floors of the house. Do not wait for instructions to do this.
- Be cooperative and collaborate with rescue teams.
- Wear waterproof clothing and shoes.
- Strengthen personal hygiene measures to preserve your health and prevent epidemics.
- Do not drink tap water until you are sure it is safe to be used, as drinking water may be contaminated in flooded areas. Until then, use only bottled, boiled and disinfected water.
- Do not touch electrical equipment when wet or standing in water.
- Do not use phone unless it is really necessary, as this will help to relieve the telephone network and lines required for rescue and evacuation.

- If you are unable to leave your house, go to the top floor of the house and wait for rescue teams to arrive.

If you need to evacuate – leave your home:

- Turn off all electrical appliances, turn off gas, and unplug the main switch even if there is no electricity in your house.
- Lock the object/apartment you are leaving.
- Bring the favorite toy/picture book of your child.
- Evacuate pets and, if this is not possible, release them from the premises where they are located.
- Take the necessary things you prepared. Remember to bring your IDs and medicines, as it may be that you will be away for a longer period from your house.
- Bring bottled drinking water.
- Inform the competent evacuation authorities if you wish to evacuate using your own vehicle.
- Notify the competent evacuation authorities if you have a sick family member who needs special procedures and health care.
- Do not cross the bridge for any reason or go past rivers, torrents, slopes, etc. Do not cross rapids and streams. A flood wave can drag you along.
- Keep a close eye on roadmaps and any other information published by competent institutions. This way you will avoid going to dangerous areas.
- Do not walk through moving water, as 15 cm deep water may cause a fall. If you have to go through water – walk where the water does not move. Use a stick to check the water depth and soil strength.
- If you drive, do not block streets and roads so that rescue teams can operate smoothly.

- Do not go through flooded streets, underpasses or subways. Water can be deeper and faster than it looks, and water level could destroy your car as well.
- If flood water surrounds you, leave the vehicle and, if possible, move to higher ground.
- Avoid areas which are known for landslides and rock falls.
- Follow the instructions given by competent institutions. They manage and coordinate emergencies as well as the work of rescue teams.

How to deal after floods?

- Listen to news reports on water supply and whether it is safe to drink water.
- Avoid flood water – it can be contaminated with mud, oil, gas or sewage. The water can also be electrically powered by underground cables.
- Avoid moving water.
- Be careful in areas where flood water has receded as roads may be damaged and dangerous.
- Return to your home only after the competent services have declared it safe.
- Do not use electrical appliances before checking.
- Clean and disinfect all surfaces.
- Stay away from buildings surrounded by flood waters.
- Be careful when entering buildings because of hidden damage which may have occurred.
- Make functional damaged septic tanks and other sewer systems as early as possible – if damaged, they can become a major health risk.

- Clean and disinfect everything that is wet. The mud which remains after flood water can contain sewage waste and chemicals.
- If you notice any dead animals, please inform the competent service at 112 or 123.

REMEMBER: Even when flood water recedes, there is still a danger.

2. MANUAL FOR CITIZENS ON ACTING IN CASE OF LANDSLIDES AND ROCK FALLS

Landslides are movements of soil, stones and other deposits. They are activated and develop rapidly when water is accumulated in the soil as a result of heavy rainfalls, groundwater, snow melting and inadequate land exploitation. They can be a result of poor attitude to land, especially in mountainous areas, canyons or near shores.

In case of landslides, mass of stones and earth falls. Landslides are small or large, slow or fast, and they are triggered by:

- heavy rainfall,
- earthquake,
- fire,
- severe winter and freezing,
- erosion in case of human terrain modification and
- groundwater.

Rock fall is a result of sudden tearing down and collapse of a rock mass down steep slope. Rock falls occur very often during strong earthquakes or volcanic eruptions. Undermining by natural processes also often leads to rock falling, and it can also be caused by people negligently cutting down rock mass. While moving down a slope, the material goes a long way (depending on the relief). As it rolls down the slope, large blocks break and crush and the material accumulates at the base of the slope.

Please note: There are no houses or walls which can stop the landslide.

If you live in landslide and rock fall-prone areas:

- ✓ Pay attention to strange noises such as breaking of trees and the like, which may be indicative of landslides or rock falls,

- ✓ If you are near a stream or canal, be careful about water flow increasing or decreasing or its turbidity,
- ✓ Consider leaving the endangered site, if you can safely do so,
- ✓ Stay awake and alert – listen to warnings from radio and television about possible heavy rainfall.

If you notice that there is a danger of rock fall:

- ✓ Notify the competent services at 123 or 112;
- ✓ Inform neighbors who may be affected by this danger;
- ✓ Move away from the landslide zone, as this is the best protection;
- ✓ When moving away, always look toward the landslide, paying attention to stones or other material that may bounce and hurt you, move to the side of the landslide – rock fall, and try to reach a higher ground level;
- ✓ Do not stand under bars or poles which may collapse or fall;
- ✓ Do not approach the edges of the landslide, as it is unstable;
- ✓ If you have encountered an active landslide, warn other road users about the danger.

What to do after the landslide?

- ✓ Stay away from landslide and rock fall area.
- ✓ Check if there are injured or trapped people near landslides and rock falls.
- ✓ Assist neighbors who need special help – children, the elderly and people with special needs.
- ✓ Check and report to local authorities if there are broken power lines or damaged roads or tracks.

- ✓ Report damage incurred to house foundations, chimneys and roofs.
- ✓ Listen to radio and television news for the latest information.
- ✓ Pay attention to floods which can occur after landslides and rock falls.
- ✓ Replant the trees, as soon as possible, as erosion can lead to the loss of soil cover and new landslides in the future.

NEED TO KNOW: Driving during heavy rains is dangerous. Be very careful when driving – pay attention to damaged roads, mud, fallen stones or other indicators of landslides and rock falls.