

The interaction between disasters and security

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The goal of this study is to present the relationship between disasters and security, and their interdependence. The authors provide an overview of the indicators and components of the disaster vulnerability of countries. The vulnerability of developing countries is shown through the example of Haiti. The authors have studied the interaction between globalisation and disasters and pointed out that the developing countries have only one choice in the protection against disasters: integrating the processes relating to disaster management into the economic developments using international assistance. The task of the international community is to help the less developed countries without traditions of preparation in order to create the fundamentals of development and everyday security. By analyzing the effects of Hurricane Katrina in New Orleans, the authors illustrate the problems of disaster management and were illustrated the requirements towards the institutions of higher education. It was proven that even the developed countries are vulnerable to future challenges and the disasters if public awareness is inadequate, moreover, if there is no upgrade in relation to disaster prevention and their disaster response systems are slow.

Introduction

The world around us is in a permanent change. On one hand, globalization and the technical achievements have made our life easier, on the other hand, we shape, build and destroy our environment and consume its treasures without replacing them, according our interest. The Earth responds to disasters more and more intensively, because it has reached the limits of its “tolerability”. In the line of traditional and new challenges, global climate change has a top place, with its present and future impacts on all actors and components of the environment. Global climate change may induce events that are able to change the normal order of the environment.

There are more and more natural disasters, not only their frequencies but also their nature is changing and their intensity is also increasing, and they occur in places they have never happened before. These disasters are much more powerful and damaging. Natural disasters nowadays take higher tolls, affect more people and cause higher damages to the economy. As the world faces new challenges and the number of factors

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threatening security is increasing, the environmental events affect, in a more and more complex way, the life and security of countries, regions and the international community. To preserve our own security we have to analyze the risks affecting us, we have to identify the factors threatening our security and we have to proceed a step ahead of them when setting up our protection system.

Several countries, in the context of security, have marked terrorism and the proliferation of weapons of mass destruction as a priority; however, they have forgotten about an “ancient friend and foe”: the environment and natural disasters. Hurricane Katrina turned the attention of these countries to disasters. It has been proven that not even the world’s most developed countries, like the United States of America, are not always able to protect their inhabitants and properties from disasters.

Disasters may reduce the economic, political and social security of countries. In the developing countries, whose political, economic and social security problems exhaust their resources, the protection against disasters has become a marginal issue. Combating disasters is crucial for development. The above countries have only one choice as far as their protection against disasters is concerned: to integrate the issues regarding disaster management into their upgrade projects, using international assistance. The international community’s task is to responsibly help the less developed countries without roots of disaster management in order to create the fundamentals of development and everyday security.

In this study, we scrutinize the components of vulnerability of nations, analyzing the context of disasters and security and the fields of security. Since we can only define the factors increasing our disaster vulnerability if we know these components. Without analyzing them, we cannot determine how we can build up a protection system that would mitigate the developing vulnerability.

Security

Defining security is difficult because there are so many and complex factors to be taken into consideration. It could be generally described as an undisturbed state of something free from any threat or harm,¹ or as ‘...a system of objectives, tasks and means by which these threats may be mitigated and/or any type of emergency may be eliminated’.² To identify the relationship between security and natural disasters, we ought to scrutinize the factors influencing security. These security risk factors can be classified in different ways depending on the context we use them.

Among the several possible classifications of the above security factors, we can find some that affect individuals, countries or groups of countries, regions and the international

community. Furthermore, there are traditional factors (e.g. armed conflicts) and modern, new types of factors (e.g. cyber terrorism).³ We may not neglect the factors that appear in the political, military, economic, environmental and social life either.

Moreover, the three main factors that may affect the security perception of individuals are the personal-physical security, the personal intellectual and psychic security and the material security. Several experts have studied, from many aspects, the factors influencing an individual's life and the needs substantiating his security perception. From the aspect of disasters and individuals, one of the best adaptable approach is the Maslow needs approach.

According to Maslow, it is obvious that our needs can be configured into a pyramidal hierarchy, where, without satisfying our lower level needs, we are unable to satisfy the needs of the higher level.⁴ This has an extremely important role in case of a disaster. The first and most important issue is, after eliminating the imminent danger to life, to help people satisfy their basic needs as soon as possible.

Context of fields of security and disasters

Now it can be seen what security means to the individual, but what does it mean to society, on the level of a nation? Every state is seeking for security and the challenge is to mark its fields in a realistic way. The most important fields of security (on the level of a state) are summarized in Figure 1. Personal, political, economic, social, cultural, military and environmental security cannot be seen independently from one another; there is interdependence among these fields.

Disasters may affect the fields of security respectively, but they may also affect several fields simultaneously.

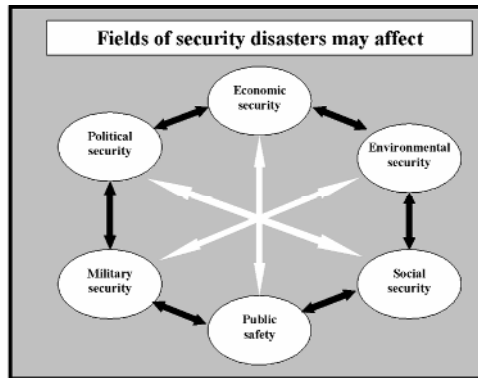


Figure 1. Field of security disasters may affect

Economic security means a stable domestic and international environment, through which a country is able to effectuate its commerce. Social security and the growth of the living standard of the population depend on the economic stability.

Natural disasters, from an economic aspect, can be divided into two groups: climatic or geological disasters, which may affect the economy on a short, mid and long term. Their effect on the economic growth depends on their nature and the size of the country, its institutions, its reconstruction strategy and capacity. The negative impacts of disasters on the economy may be mitigated by a better distribution of the sectors and by avoiding the too strong dependency on one sector.

Disasters affect long-term development through fields like natural resources, the accumulation of physical capital and human resources and technology. While some disasters reduce the productivity of the land (landslides, hurricanes, floods), others (volcanic activities) may increase it. In order to protect the economy from further damages (e.g. in case a major industrial city is destroyed), a rapid recovery is needed, which can only be accomplished by an efficient, not excrement and corruption free institutional system. In case we provide the areas damaged due to a disaster with better and more efficient equipment and technology, a disaster might even do good to the economy.

The same can be applied to human resources. The effect of a disaster can be perceived in the economy if a high percentage of the population dies, is injured, or becomes disabled for work. If children drop out of school, the ratio of skilled employees may deteriorate. Those who remain employable may be seriously affected psychically being victims of a disaster themselves, or losing their beloved ones and properties, which decreases their working capacity. Thus, the security of the economy is closely related to an individual's security.

In New Orleans, half a year after the disaster, only 134,000 persons remained home from the 460,000 residents hit by the hurricane; the number of employees dropped to one-third, education started only in 18 from the 117 schools, while from the 800 restaurants, only 400 reopened.⁵ Staying at this example, economic expenditures, financial shocks, inflation, a decrease in the health care capacity, etc. may be perceived by the entire population, because a disaster's effects are never limited to the area where it physically occurs. In the case of Hurricane Katrina, due to the costs of rescue and recovery operations and the increase of the energy prices, the entire United States of America and even Europe suffered from the disaster.

The establishment of public safety and security, the protection of the population and property is an important task, because it forms the basis of the society's everyday security. Almost after every disaster, we receive news about abuses, violence. If the accommodation of the evacuated population is inappropriate, post-traumatic stress, the

perception of being overcrowded, the pressure to satisfy basic needs and the intention to secure their properties left behind can lead to abnormal behavior. The other reason is that there are always people, during or after a disaster, who exploit others, steal, rob, sabotage, or commit violent actions.

The authorities and the police in some countries do not always have enough capacity, so they are not always able to stop the above incidents in time. Organized crime, illicit traffic of drugs and human beings and illegal migration can proliferate. Because of this, after a disaster, it is always a very special and complex task to maintain public safety and security, including the presence of law enforcement bodies, the efficient work of the rescue forces, the supply of the evacuees and the replacement thereof. Without preliminary plans, it is impossible to achieve all this; however, plans on their own do not guarantee successful implementation. New Orleans is a good example. A plan was available to manage a fictitious hurricane named Pam,⁶ based on which they could analyze the necessary steps, but were not able not implement them when Hurricane Katrina hit, as we could see.

Environmental security: Disasters endanger the security of the environment, because destruction caused by them, can cause long-term and enduring damages to nature and the environment, and to important health-related fields (air, water), moreover, they jeopardize industrial establishments and some elements of traffic. A category 4 hurricane that damages coastal oilrigs, capsizes oil tankers may easily lead to an environmental disaster. In this case, structures of an important industrial zone were damaged, affecting the yield, while the hazardous material, flowing into the sea, damages the environment. The same hurricane, heading towards the mainland from the coastal areas, loses its power, but spills hazardous materials into reservoirs, on streets and agricultural areas. Hurricane Katrina induced a very similar phenomenon.

Social security is a nation's security against the effects of minority, ethnic, religious and language-based conflicts.⁷ These kinds of problems may strengthen during a disaster. Hurricane Katrina showed that e.g. the equal treatment of the black population had not been fulfilled.⁸

Political security is the security of the nations' political system in the international community, against conscious or unwanted interventions. On the other hand, an internal stability enables the successful management of crises. In addition to the physical damage of a disaster, the population may get disappointed in the authorities. People may lose their faith in those in power, and all this could lead, in extreme cases, to a civil war.

Military security. During and after disasters, due to the decrease of defense capabilities, such military-like incidents may occur as "food warfare", infiltration of hostile troops and terrorists, and smuggling of weapons. In Somalia, floods after

droughts regularly occur. In the long running conflict, in 2006, Ethiopian forces could easily break through the border and advance, because the country's authorities were busy with the imminent lifesaving operations. However, due to disasters, some armed Islamic groups could also infiltrate into the country and cause armed clashes. However, every year more and more Somali refugees cross the border, fleeing either from the disasters or from the armed conflicts.

The context of disasters and security in the Republic of Hungary

Natural disasters, due to their impact on security, gain field dynamically in the security priorities of nations and international institutions. In our security and defense/protection policy principles, among the most important hazard factors, like the economy, mafia, organized crime, terrorism, etc., one can also find the environmental damages and disasters.⁹

The National Military Strategy of the Republic of Hungary expands the grouping of the security fields in five groups, and defines and summarizes the security fields in more complex way in 12 points.¹⁰ Besides the security fields studied above, the interaction between new fields and disasters is clear. The assessment thereof is a matter of further studies.

Like other countries, Hungary's task is also to fulfil its obligations according to international agreements. The priorities must be determined because of the scarce resources. Regarding natural disasters in particular in the last 10 years, the countries recognized that disaster response exceeds the capacities of the local and even the national military authorities, so there is a need for a more extensive international response.¹¹

The factors affecting security can be ranked, but a "nation's security policy and its institutional system must work in a way to be able to recognize in time the threat factors against the country and to continuously and reliably assess them and be able to make decisions to prevent emergencies and implement the actions needed".¹² The Republic of Hungary also takes its share.

Aggregating all this, a duality can be perceived in Hungary as well: on one hand, the process of globalization requires the international management of global challenges, but some issues must be nationally managed. This fact inspires the Republic of Hungary to cooperate with other countries and institutions in the field of disaster preparedness and planning, rescue, mitigation, recovery, moreover, to institutionalize these cooperations and to integrate this function into some institutional profile. If we look at the previous thoughts, we can see that disasters reached a high position among the factors

threatening security. There are many questions regarding this issue. What influences our vulnerability against disasters? What is the difference between the vulnerability of urban and rural areas? How do developments affect vulnerability? Let us find answers to these questions.

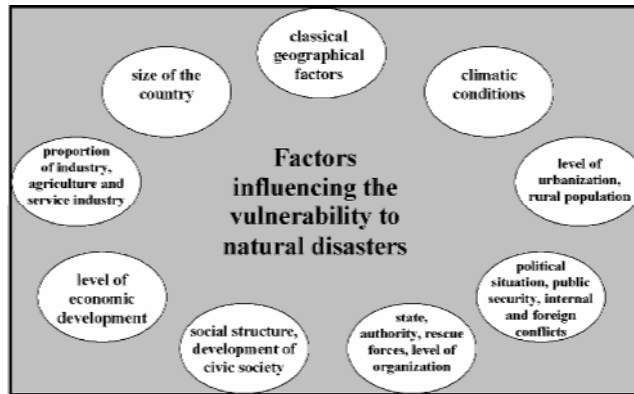


Figure 2. Disasters and globalization

Due to the social and economic changes, the effects of disasters have significantly changed. World population growth, merging into societies, evolving and transforming countries, urbanization, industrial-social lifestyle, the development of transportation, the essential technical progress made in the last 100 years, globalization and climate change were the causes for disasters creating irreparable harm both to the economy and human beings.

Globalization, also known as global connection between economies and societies, also results in that a disaster may (potentially) affect people living in other places. Globalization creates possibilities for better living conditions and protection against disasters for those benefiting from investments and developments. Others have no opportunities to do so. The world may be divided into two parts also from the aspect of protection and preparation against disasters. Without development, hazards cannot be mitigated, so vulnerability against disasters and other impacts cannot be reduced. International organizations recognized this context and decided on programs, uniting the Millennium Development Goals with the programs helping reduce disaster vulnerability.¹³

Vulnerability factors of nations

Each country should implement preparations for avoiding disasters in its own way. Plenty of “donor countries” finance regional, international and national projects as natural disasters affect the states’ security – they cost many lives, entail sizable financial losses and prevent development. Risks cannot be decreased without developments. Most of these theories can be found in a book titled “Reducing Disaster Risk: A challenge for development”. An exact description is to be found in the “*Millenium Development Goals*”, of the connection of initiatives that aim to decrease vulnerability to natural disasters.

Components of vulnerability of a country

While endeavouring to maintain our security, it is vital to scrutinize our vulnerability, our threats – in other words the characteristics of natural disasters, their tendencies and the factors of our vulnerability. As it has already been mentioned, the vulnerability of countries has several components. The most important ones are summarized in Figure 2. Each country should take its own special factors into consideration and draw consequences from them. Let us see what components are there to analyze while examining our vulnerability. If a country wants to evaluate its vulnerability, experts should take into consideration the following factors.

A. The classic factors that make us potentially vulnerable to disasters derive, on one hand, from geographical and climatic conditions, e.g. geographical position, height above sea level, distance from sea, and other natural parameters. The size of a country also belongs here, since smaller countries are in a worse situation in case of a disaster. In these countries, even more minute problems exceed the capacity of authorities and rescue forces (especially in case of small island states). Their capacity is not only weaker in responding to disasters but also in recovery. However, in larger countries, where a disaster only affects a smaller part of the country, rescue forces from other regions of the country are available.

B. The division of industrial, agricultural and service sectors: In several cases, the repartition of these sectors might coincide with the development of a country, however, it is not always decisive. Technologies applied in certain branches of industry have a vital role in inducing disaster risks. For instance, using inappropriate agricultural technologies or creating industrial zones that are not harmonized with environmental aspects may cause further risks.

C. We must distinguish between *developed and developing countries, regions or districts*. Examining how disasters can affect development, from the developed

countries' security aspect, it can be said that many developed countries think (thought) that they are less vulnerable due to their level of development. Economic development may decrease risks, if countries do not underestimate nature and its forces. On the other hand, individuals living in rich regions or countries may develop a false sense of safety and security that can seriously affect the evaluation of hazards. This could seriously affect their response to threats.

D. The social system and traditions of countries can also have influence to the preparation and response to disasters. Where non-governmental associations have no traditional roots, inhabitants cannot be involved in prevention, rescue and recovery.

The establishment of non-governmental organizations is in progress in numerous parts of the world due to international initiatives, and it is a common purpose to lay down the cornerstones in the foundation of civil society. In Germany, where a network of volunteers efficiently functions, hundred thousands of people are active members in different associations and people feel responsible for helping others and themselves in case of need.¹⁴ Rescue forces of countries that lack these associations have to sort out the problems on their own and in addition to that, residents are unable to organize their own rescue in a fast and efficient way. This is also known in Hungary.

E. Another important factor is the organizational level of the state, authorities, rescue forces and the confidence in them.

F. Urbanization is a global challenge for all the aspects of life of states, including disaster management. Population decrease of regions of the West, ageing society and the concentration in cities are huge problems, while in Asia, Africa, Latin-America and the Caribbean, population increase and urbanization cause serious problems. More than the half of the inhabitants lived in cities in 2007¹⁵ – this population should be satisfied and developments must be achieved. However, it increases hazards. The other factor that increases hazards in cities is the migration of the poor population into the cities, whose economic and social network is weak. Individuals with low social status are “extruded” from the society, they lack basic supplies, which may lead to the increase of their vulnerability. The third essential risk factor is that the developing countries change, reconstruct or destroy their environment. For instance, the capital of Uruguay, Montevideo is potentially threatened by disasters.¹⁶ The planning process that only recently began in many places is influenced by the fact whether a city has evolved on a hazardous location (e.g. beyond sea level). There are plenty of questions to ask: Does the city of the future exist? Can claims of the future generations be estimated? Can urbanization be stopped? Can “future disasters” be predicted? These questions are still to be answered. The article “The special case of Mega-cities”¹⁷ looks for answers to these questions. According to this article, the greatest challenge of the 21st century is

urbanization. This is why urban planning and introducing urban security standards have become vital (life or death) issues. Though, there are differences between overcrowded countries. In poor, less developed countries the capacity for urban planning is smaller (they often build cities on hillsides sensitive to landslide), the level of infrastructure is lower and adapting construction regulations is a further problem.¹⁷ The experts' responsibility is to change this vicious circle.

*G. 70% of the world's poverty is to be found among people living in the countryside.*¹⁸ One of the main problems of rural areas is that more and more areas are cultivated. Accelerating environmental degradation increases disaster risks. From the aspect of disaster management, the rural population demands a different way of preparation and risk analysis than the urban population because it is more dependent than the urban population. The sensibility of people who live in these areas is determined by the absence of the local infrastructure and of the preparedness of the local authorities (financial scarcity, and deficit in preparing the population for disasters). Furthermore, a weak national and local government, a lack of local non-governmental organizations and financial resources are typical.

Natural disasters, conflicts and wars often lead to humanitarian disasters. 1.4 million people suffered from the most horrible floods of the last 10 years in Somalia, while 0.4 million inhabitants were forced to leave their homes due to Ethiopia's intervention and the political crisis.¹⁹ All these problems are summarised.

The indexes of vulnerability

Let us review the indexes of vulnerability of a developing nation through the example of Haiti.

It was chosen because it represents all the security, defence/protection and emergency management problems that may occur anywhere in the world. Some of them will be analysed below.

1. Disasters

In the last 10 years, more than 20 internationally recognized disasters happened that struck the entire population (8 million) causing more than 4,200 deaths. The worst year for this small country was 2004, when two strong disasters hit the area. A flood and a mudslide occurred on 23 and 24 May 2004, in the areas of Belle-Anse and Fond Verettes, affecting 30,000 people and killing more than 2,000.

The second flood happened on 17 and 18 September and affected the North-Western part of the country, especially Gonniaves and Port-de-Paix. 1,514 people died, 2,600

injured and almost 1,000 were missing. Overall, 298,926 people were affected. Ten thousands were left without food, water and work, the already weak commerce almost totally collapsed.²⁰

2. Degradation of the natural environment

Due to the irrelevant agricultural production methods, the quality of the land became worse and erosion gained speed. The water flooding this area often brought loamy topsoil (together with houses, animals and inhabitants). The stocked land and the land waiting to be harvested disappeared in huge areas and took the crop and their livelihood with it. The tainted water infected thousands of starving people. The ever-changing map made the work of the relief organizations and the recovery very difficult.

3. Poverty as the strongest risk-inducing factor

Haiti has one of the highest poverty rate in the world. This issue has already been discussed in the previous part, so we are aware of the risk induction effect of poverty.

4. The lack or the weakness of adequate institutions

In disaster management and in the prevention thereof, the main solution would be the strengthening of the role of the institutions, but these institutions are missing in Haiti. After Hurricane Georges in 1998, the Haitians started to strengthen their disaster management. They established the “Direction de la Protection Civile”, coordinating the tasks relating to disasters and the prevention on national level, based on the National Plan for Disaster and Risk Management, established on a US pattern. More than 100 local disaster committees were established, but by the time the institutions started working, new natural disasters destroyed their equipment.²⁰ No time remained to prepare the population.

5. Political crises and the shortfall of security

The country has often been a target for attacks by paramilitary groups from both political sides. The order is not yet restored, people still do not know whom to trust. People still do not know whom to be scared of: those who are on power or those who fight for power. The continuous political instability weakens the state. The flood in 2004 highlighted again the bad public law and order. In the period of disasters violence, murder and rape became more frequent. International recovery organizations provide relief regularly. People (mostly women) have to wait 8 to 10 hours to receive the aid, but they do not always arrive home alive with it.

6. Social problems

There is a huge gap between the standard of living of the French speaking Mulattos and the Creole language speaking black population. Children in their teenage years are targets of armed gangs and drug smugglers. The role of public awareness and recovery programs is to engage young people when they are the most responsive to join the gangs. During educational programs and recovery work, they gain useful knowledge and experience of belonging to a supporting community.

Relief organizations learnt that after a disaster, when they start distributing food and medicine, people get “addicted” to receive aid. It is difficult to inspire them to participate in the recovery work, therefore they introduced a new practice: first they give the survival aid ‘for free’, only for a short period of time, sometimes later, they give it for work.

The USA pays an increased attention to Haiti. The financial aid granted is shown in the following table:

Budget	FY 2003 Actual	FY 2004 Actual	FY 2005 Actual	FY 2006 Actual
Total Program Funds (In Thousands of dollars)	\$71,665	\$143,496	\$192,871	\$156,552

Source: <http://www.usaid.gov/ht/>

The USA supports two important programs in disaster management:

1. The enhancement of disaster preparedness: the main goal is to help the Haitian government to prevent and prepare for disasters.
2. Helping to recover from the situation caused by tropical storms. The USA donated, after Storm Jeanne, in 2004, 11.8 million, later 34 million dollars to the Tropical Storm Recovery Program.

We saw which factors affect the vulnerability indexes of nations. Let us examine some of the consequences of mismanaging disasters, through an example of the USA.

The significance of the appropriate methods of emergency management

The experience in disaster response in countries obviously more prepared than Hungary proves that many countries must reconsider and adjust both risk analysis and the system and methodology of prevention and emergency management to the new hazard factors. In connection with Hurricane Katrina and the situation evolved in the USA, let us look

at what significance the correct or incorrect selection of the methods of emergency management has.

Hurricane Katrina

On 25 August 2005, Katrina arrived at the western part of Florida, where it reached category 5 (280 km/h). By the time it reached Louisiana, Mississippi and Alabama, it had decreased to category 3. It hit the parts of New Orleans that laied under sea level the most. 80% of the city was inundated by 7.6 meters of water. One of the reasons for this is that the drainage and dyke structures were inappropriate; there had not been adequate maintenance, because the budget of the US Army Corps of Engineers responsible for the maintenance had been cut by 50% and had been allocated to the costs of the war in Iraq. The disaster struck the population of the city in a devastating way.

Consequences

- a. The Mississippi River, flowing through the city, and Lake Pontchartrain lying in the north meant hazards themselves. There are several plants processing hazardous materials, oil refineries and oil-rigs, whose damage led to an environmental disaster.
- b. Most of the residents were poor, black, manual workers, who underestimated the hazards, because their previous knowledge was inadequate.
- c. The delay of the evacuation (only a day before Katrina's landfall) already forecasted that the disaster would cause more damages to human lives and resources than many people would have thought. Many were taken by the flood wave and drowned, or died due to the lack of food and water before help arrived. One million people became homeless.
- d. 400.000 people lost their jobs. At the end of the month of August, people did not have enough money to leave their homes and public transport was not free (not even on 24 and 25 August), and they had no money for even bus tickets.
- e. Due to the collapse of the bank system, later, following the disaster it was impossible to get hold of their money and buy basic foodstuffs.
- f. In the USA, FEMA^a controlled the rescue operations, its supporters were the voluntary rescue organisations, the National Guard and the Armed Forces. The independence of the professional disaster management institutions had diminished when they were subordinated to the Ministry of Homeland Security and most of the financial support was allocated to the prevention against terrorism (since the 9/11

^a Federal Emergency Management Agency (its leader was Mr. Michael Brown who used to be the leader of a horse breeder association, so his competent has been questioned by many people)

incidents). Therefore, the prevention of and the preparation for natural disasters were neglected.

- g. The Army and the National Guard arrived too late, as the National Guard had not been allowed to operate in another state until the decision makers declared emergency. Because of the war in Iraq, the budget of the units of the Army stationed on home bases was downsized and long time was needed to mobilize larger forces.
- h. At the designated reception settlements, at the designated assembly points and at the Congress Center, used as a spontaneous reception center, life support was disorganized. No one bore in mind the necessity of an adequate law enforcement (shooting was a daily event). The accumulated trash caught fire several times. People were trapped in the stadium; the helicopter rescue had to be suspended for some time because more and more people were shooting at the rescue forces.
- i. The deficiency of public awareness. In the United States of America, public awareness exists and drills are regularly held. They were also held in New Orleans often enough, but the methods of training for the low qualified inhabitants were not chosen properly. They did not pay enough attention to the self rescue from water, to the stockpile of reserves and to the pre-packaged "emergency kits". They ran out of food and water reserves quickly, a reason why several people lost their lives. The pharmacies were looted; it was not possible to acquire primary lifesaving medicine.

The population did not receive any information on important topics such as panic, violence, lack of information, the changes in the behaviour of animals and the collapse of the critical infrastructure. The lack of psychological preparation was one of the strongest components of panic for both the population and the rescue forces. The actions of people accelerated due to fear, they flustered or, on the contrary, "froze" and were unable to save themselves or others. The residents did not take into account the extent of the risk and were stuck in the city. Mass rescue was drilled in vain, it was impossible to efficiently rescue in a "live" situation in such a short time.

The disturbances in emergency management

Studying the disturbances of emergency management in case of a disaster may reveal important correlations of the protection system. What kind of problems may occur? Let us examine it through the example of the rescue operations during a hurricane.

- a. The principle of "internal rescue" failed due to the large area and the large number of residents, so the local response forces (ambulance, firefighters, the police) proved to be insufficient. "External rescue" forces arrived late and the authorities underestimated the size of the necessary forces.

- b. The involvement of the media in the process of the public information failed. Local television and radio stations were not prepared to carry out one of the most important tasks in a disaster.
- c. Many were damaged, hazardous materials were spilled into the water, the soil and the air, and, in addition, they started pumping back the contaminated water into the Mississippi without purifying it. The area of Venice where the Mississippi was fully covered with oil and other chemical substances was called as the 'street of cancer' by the locals.
- d. Due to the damage of crude oil and fuel producing plants disturbances were caused in the energy sector of the USA that affected world prices. We could also feel this effect in Europe.²¹
- e. Material damages, considering the agricultural, environmental and ecological losses, amounted to 600 billion dollars. President Bush allocated 10.5 billion dollars as imminent aid to the city, but the distribution of the money needed a longer time.
- f. The authorities did not assess the events in time and adequately. Many countries offered relief deliveries, rescue forces, expert groups, but their coordination and distribution was disorganised. They could only concentrate the rescue forces to a specific area with delay, because the policy makers were not prepared for such devastation. The unpreparedness, the disorganized state and the hopeless situation induced irreversible process.

The recovery

The recovery of the consequences is still going on. 11.000 Guardsmen, 7.200 soldiers arrived in the city for the recovery; the United States Coast Guard concentrated its helicopters, reservists. Only the Navy's rescue boat was able to dock at the damaged beaches or harbours. The amateur radio transceiver owners joined their efforts and made their sets available to the city. All rescue forces of the nation linked up for the recovery. Europe also offered its assistance. Even in one of the most developed countries, in the United States of America, it was necessary to review the process and the system of preparation, rescue and recovery. Even there where proper conditions exist, it was not sure that the society was responsive enough to disasters and could correctly assess the risks. In less developed countries the situation is even worse. In order to improve public awareness, more and more countries are restructuring their public awareness system, in whose framework they put the emphasis on the most efficiently reachable layer, i.e. the youth. This tendency also is observable in Hungary.

Future requirements towards higher education

Several European countries recognized that teaching disaster management must receive a greater role in higher education. The content of education should suit the vulnerability of a given area and should contain the process of emergency management and the knowledge of self-rescue and rescuing others. Moreover, such knowledge should be built in the education of professionals, by which the students are able to meet the new professional challenges, practical tasks and the expectations from and the requirements towards the leaders. The prospective outcomes may be as follows:

- If the students combine their expertise with disaster management knowledge, it is an advantage on the labour market.
- If the leaders of society, the intelligence of the future participate in this kind of education, it might be a good model for others.
- Having this knowledge, their security perception will be stronger. These students will get on better in case they experience a disaster, either as a leader or as a victim.
- As a result of the positive shaping of conscience during training, these experts while becoming leaders may concentrate more energy also to this field in the long run may change the priorities so that man-made disasters may reduce in numbers and the management of natural disasters will be more efficient.
- Protection experts will be able to develop and efficiently run a protection system that adjusts to the actual threat factors.

The institutes of higher education that defer to introduce this knowledge into education will lag behind because they will not prepare their students for one of the greatest challenges in the world, for disasters.

Having all things considered, plenty of components should be analyzed when talking about a state's security. These components cannot be strictly dissociated from each other. In our globalized world, natural disasters affect the security of individuals, states and the international community as they influence economic, political, military, public and environmental security. States have always been aiming at establishing security, so they can attempt to reduce risks to the lowest possible level. However, due to the lack of resources, they had to determine priorities. More and more countries focus on the protection against natural disasters caused by climate change, in their national security strategy. While fighting against disasters, countries must examine plenty of factors from geographical position to economic situation and the capacity of institutional systems. Level of organization of non-governmental associations and the social activity of inhabitants, their willingness to participate in disaster management, are

essential points. In our globalized world, the vulnerability of countries is even stronger, as it is not only the internal situation that they are influenced by.

Poor countries (low level of industry, low GDP, etc.) that have a small territory, that lie in an hazardous geographical area, that are close to seas, insular countries, that lie in earthquake-prone areas or in hurricane zones, that have many rivers and lakes and scarcely any forests are increasingly vulnerable to disasters. Besides, regions that are dependent on one branch of industry (e.g. Monserrat has all its income from tourism,²² areas where urbanization is extent or where there are too many rural zones, the proportion of people living from agriculture is high, there are many monocultural economies and where there are many (illegal) immigrants. Moreover, underdevelopment of the infrastructure (health care, transportation), low level of education (high illiteracy). Regarding institutes and states with weak central and local organizations and which are lack of non-governmental organizations are highly endangered. But mostly countries where the inhabitants are not prepared well enough and there is no disaster management oriented development are the most endangered ones.

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