GUIDELINES FOR COOPERATION FROM THE UNITED NATIONS IN CASE OF NATURAL DISASTER IN TRANSBOUNDARY HIDROGRAPHY BASINS AUN ISLAND NATIONS

Fátima Moreno Merlo

The cooperation to attempt natural disasters has shown some weaknesses and therefore ineffectiveness due to several factors. Most governments don't have in their development plans actions to become resilient to frequently strong natural events. For this reason when a big magnitude natural event registers, they have needed to ask assistance from the international community.

Introduction

The UN has showed concern about the increasing number of casualties caused by natural disasters worldwide. In its different documents the UN has recommended to governments to include in their national development plans special programs to address the matter on frequently strong natural phenomena.

Which was highlighted at the World Conference on Disaster Reduction held in Japan in 2006, whose second goal was:

> *Identify specific activities aimed at ensuring compliance with the relevant provisions of the Plan of Implementation of the World Summit on Sustainable Development on vulnerability, risk assessment and management of disaster activities.*

The work of the UN in case of natural disasters can be more effective if it identifies vulnerable nations frequently affected with natural phenomena and provides assistance for the development and implementation of required plans, in order to increase resilience to disasters.

This document has taken as references the Guidelines for Natural Disaster Prevention, Preparedness and Disaster Mitigation, presented at the World Conference on Disaster Reduction, 1994, specially these recommendations:

> *K. Enhancing the activities of the organizations and programs of the United Nations, …, related to disaster reduction and cooperation between them, (…).*
>
> *M. Give wider support mechanisms for disaster management and reduction of the Unites Nations system to enhance its capacity to provide advice and practical assistance, as needed, to countries facing natural disasters (…).*

At the same Conference it was formulated the "Strategy for 2000 and Beyond" where it mentioned the need to promote regional cooperation between countries exposed to the same risk through joint activities for disaster reduction, strengthening the capacity of the UN system and thus help reducing the loss of lives.

According to studies by the World Meteorological Organization (WMO), approximately 90 % of the disasters caused by natural events, between 1995 and 2004, were related to climate and water. Places such as island nations are frequently affected by natural events, which was one reason why island nations were part of the 1994 Global Conference on the Sustainable Development of Small Island States in Development, signed the Declaration of Barbados.

The document entitled Mapping WOM and NMHSs' Roles and Mandates on Hyogo Framework for Action 2005 – 2015 Key Activities, prepared by WMO in 2006, highlighted the need to strengthen disaster prevention and early warning systems in the island nations and in transboundery river basins.

Between 1950 and 2005 more than 6 million people died in natural disasters registered in transboundery river basins and island nations, according to the Center for Research on the Epidemiology of Disaster (CRED) database.

Based on the WMO's recommendation and because of the reality exhibited by CRED, it was considered relevant to identify vulnerable areas to disasters caused by natural events, using as a spatial reference frame transboundery river basins and island nations.

In that way, there could be select measures to reduce the incidence of certain events, through management plans for transboundery river basins, and mitigate the effects if it occurs.

According to the 1994 Yokohama World Conference on Disaster Reduction the UN system is called to help developing countries in their special plans for disaster prevention as a part of strategies for the XXI Century through regional promotion cooperation among riparian countries of river basins and island states exposed to the same natural hazards.

In order to make those nations more resilient as Yokohama documents said, UN need to know how to improve its cooperation in a world where natural disasters have no political borders, through joint countries with regional cooperation to advance disaster prevention and mitigation.

I. Objectives

The main objective of these guidelines is to make the UN's work easier, becoming more resilience countries to natural disaster, by performing the following specific objectives:

1.1 Know the differences among human settlements in the transboundery river basins specially those that could require disaster prevention and mitigation planning.

1.2 Attract the attention of governments from countries vulnerable to natural disasters in order to achieve the implementation of Regional Agencies Management Natural Hazards.

1.3 Contribute to the attainment of the strategic objectives of the Second World Conference on Disaster Reduction, based on the creation of institutions dedicated to building resilience to hazards.

1.4 Encourage Regional Agencies on Natural Hazards Management to establish financial funds to ensure their management.

1.5 Ensure participation of actors of whose action will fall among the Regional Agencies on Natural Hazards Management.

1.6 Encourage the development and implementation of plans to mitigate the impact of natural disasters causing transboundery river basins and island nations, in response to those who are most vulnerable.

II Principles

2.1 The identification of nations vulnerable to natural events, which could cause disasters, is an essential requirement to facilitate the work of United Nations cooperation.

2.2 The management of plans for transboundery river basins are necessary for the identification of measures to mitigate the impact of natural events.

2.3 Popular participation in disaster prevention and mitigations could help achieve greater resilience on human settlements.

2.4 Human beings need to be educated to face natural events they are exposed to, having real–time information to take those necessary decisions.

2.5 The respect and recognition of cultural differences is the essential rule for effective cooperation.

2.6 The preservation of human beings must overcome differences between people interacting in transboundery river basins.

2.7 It's necessary international cooperation to help make places become more resilient to natural disasters, through the performance of multilateral mechanisms.

To improve the economical resource use it was essential to outline and prioritize an order of priorities to make more effective the work of the United Nations at a regional level.

To set these priorities, transboundery river basins and island nations vulnerable to certain natural events causing disasters were identified, according to the frequency in which they occur and the number of victims.

In this article we present a methodology to estimate the level of difficulty that the United Nations will meet, to improve its cooperation in the transboundery river basins and island nations.

III Methodology to measure the difficulty of implementing international cooperation

The degree of difficulty to be faced by the specialized agencies of the UN, was estimated to the transboundery river basin and island nations in order to make arrangements at a political level among governments of the riparian nations of large river basins and island territories, even if the political, religious and cultural rights have traditionally been an obstacle to the implementation of bilateral or multilateral agreements.

In order to estimate the level of difficulty to provide help, it was taken into consideration the number of countries that share each river basin and the island territories as coastal areas of the ocean basins were runoff discharge their end, number of inhabitants, number of majority religious practices, number of languages used by the inhabitants of the basin to communicate, the estimate average political stability of the countries bordering the basin, the average Human Development Index (HDI) of the costal countries of the basin, and the average related Genera Development Index (GDI).

The unit was taken from the watershed as the common numerator in the estimates of the behavior of the selected variables to be analyzed in human groups and those last, as dividers of the said unit, as perceived as a difficulty to provide cooperation in disasters caused by natural events.

To estimate the level of difficulty for cooperation, the variables used as denominator are determined by the sum of different human expressions for each variable associated with rates previously estimated and, for referring to the index, calculated by the average rate given by each country to United Nations Program for Development, in the case of the Human Development Index and the Index of Gender Development, and Marshall and Cole regarding political stability.

3.1 Variables

The variables selected to estimate the level of difficulty for the cooperation of the United Nations using watersheds as special reference field, are described below.

3.1.1 Number of countries sharing the basin

The number of countries with sovereignty in the basin may hinder the achievement of a cooperation agreement. For this reason to estimate how difficult it could be, the number of countries is the quotient of the unit represented by the basin (1 / number of riparian countries of the basin).

3.1.2 Population in the hydrologic unit

The population allows for degrees of priority in the implementation of cooperation, and will be directly proportional to the volume of population living in the river basin or coastal mainland island territory of an ocean basin.

3.1.3 Languages and dialects

The number of languages and dialects is presented as another factor of difficulty to provide cooperation needed to select the language used by the majority of the population in the catchment area and the island nation and to facilitate their participation in the implementation of plans. To estimate this parameter was set as the denominator the number of languages and dialects used by the inhabitants of the basin to communicate, the numerator being the united referred to as in the previous cases the hydrological unit.

3.1.4 Political stability, bases on the index of Marshall and Cole

Political stability, based on the results of the Global Report on Conflict of Governance of the year 2008, by Monty G. Marshall and Benjamin R. Cole from the George Mason University, can facilitate the implementation of aid to politically stable nations or limit the possibilities of providing cooperation to those nations with internal

conflicts or with other nations. This index was employed by the estimated average across the values presented by Marshall and Cole, being that the average used as the denominator of the unit, based on the watershed.

3.1.5 Human Development Index (HDI)

According to the differences in levels of development present in every nation, it is necessary to have an estimate, for that reason we worked with the HDI average for a determinant of the level of required cooperation priority. This indicator tells us how much each country meets the basic needs of their citizens (health, knowledge and income), without which limit its interest in the development of plans to deal with natural events causing disaster.

3.1.6 Gender Related Development Index (GRDI)

The GRDI as an indicator of participation of women in all areas of development is of significant interest, considering the limitation of engagement by cultural and religious reason, among others, in some social groups. However, aware of the influence of women in shaping the behavior of human beings, in the first year of life and participation in society, it was considered appropriated to work with GRDI, using the average of this index among the costal countries of the basin.

3.1.7 Religious practices

The incompatibility of the religions practiced by the inhabitants of the watershed may also hinder the implementation of a management plan aimed at reducing the impacts of natural events, given the low participation of women in some cultures attending religious dogmas and specific dietary requirements, dress requirements, among others. That is why we measured the number of religions practiced by the costal countries of the basin.

3.2 Qualification of the difficulty

To estimate the level of difficulty to take cooperation under the criterion of transboundery river basins to riparian countries and island nations in, derived from the differences in the forms of organization of human groups, range from zero to seven. These values allow watershed group in the following categories:

Rate	Qualification	Difficulty
0.00 - 1.75	Little or no chance to implement preventive measures to reduce the impact of natural events of significant magnitude, through a watershed management. Cooperation can only be carried through accompanying measures.	Very high
1.76 - 3.51	Reduced probabilities to implement measures to reduce the impact of natural extreme events.	High
3.52 - 5.27	There is a chance of implementing a watershed management with measures to reduce the impact of natural events with highly intensive.	Moderate
5.28 and more	High probability to implement a management plan for the hydrological unit, with measures to reduce the impact of natural events from catastrophic magnitude to low.	Low

IV Coding areas according to their vulnerability to natural events and degree of difficulty in implementing cooperation mechanisms

The code comprises capital letters to refer to a natural event, followed by a lower case letter, which indicates the degree of vulnerability of that event. Using a vulnerability apostrophe separates the degree of difficulty to implement cooperation identified in Roman numerals, followed by an anagram number, which indicates the variables that cause more difficulty to implement cooperation mechanisms. The identification of acronyms used in this code is described below.

4.1 Natural events and their intensity

Natural events are identified with the following capital letters:

Geophysical events:	Seismic movements -------(SM)
	Tsunami ----------(TS)
	Volcanic eruption ----------(VE)
	Movements of dry mass --(MDM)
Hydro meteorological	Flood ----------(F)
	Storm ----------(S)
	Wet movements mass -----(WMM)
Climate	Drought ----------(D)
	Extreme temperatures ------(ET)

4.2 Vulnerability to natural event

Vulnerability to the natural event is identified with the following letters:

Not vulnerable ---------- o

Low vulnerability ---------- l

Moderate vulnerability ---------- m

High vulnerability ---------- h

Very high vulnerability ---------- vh

4.3 Level of difficulty for the cooperation

The level of difficulty for establishing a cooperation mechanism was coded with the numbers listed below:

Low ---------- I

Moderate ---------- II

High ---------- III

Very high ---------- IV

4.4 Variables as indicator of the level difficulty

The codes to identify the variables of difficulty attributed to cooperation is related to

Number of coastal countries	----------	1
System of Government	----------	2
Number of Languages	----------	3
Religion	----------	4
Political Stability	----------	5
Human Development Index	----------	6
Index of Development Gender Related	----------	7

The application of this coding system facilitates the simultaneous identification of the event, which is vulnerable to a particular geographical area, the degree of difficulty in implementing the required cooperation mechanism and to which human variable should have a greater attention.

Map 1 shows the degree of difficulty in the implementation of a mechanism for cooperation within a multilateral and global framework. As well as, priority order to be provided to the UN for its cooperation plan in the supposed disaster, as illustrated in map 2.

4.5 Results of the methodology

The results from the methodology used to establish an order of priorities for implementing cooperation mechanisms of the United Nations to transboundery river basins and islands are summarized in the following table.

CONTINENT	RIVER BASIN / ISLAND NATION (1)	POPULATION (2)	CODE (3)	ORDER OF PRIORITY
Asia	Ganges – Brahmaputra - Meghna	581.000.000	**SMm** Fvh Svh WMMvh ETvh ‘ IV 1234567	1
Asia	Indonesia	242.000.000	SMh TSvh VEvh **Fm** Sl WMMvh ‘ II 3567	2
America	American Coast in the Pacific		SMvh TSh VEl ‘ Fm Svh WMMvh ETl	3
America	Mississippi	70.500.000	Fl Svh WMMvh ETvh ‘ II 4	4
America	Amazon	21.900.000	SMl Fm Sl WMMvh ‘ III 1234567	5
Asia	Sea of China		SMl Fh Svh WMMvh ‘ III 345	6
Asia	Philippines	87.857.000	**SMm VEm** MDMl **Fm** Svh WMMvh ‘ II 5	7
Asia	Japan	127.417.000	SMl **TSm Fm** Svh WMMmavh ‘ I	8

CONTINENT	RIVER BASIN / ISLAND NATION [1]	POPULATION [2]	CODE [3]	ORDER OF PRIORITY
Asia	Indo	219.000.000	SMl MDMl Fmvh WMMl ETvh ‘ III 1234567	9
Asia	Arab Sea		SMh Fh Sh WMMl ETvh ‘ III 34567	10
Asia	Mekong		SMl **TSm** Fh **Sm** WMMvh ‘ III 1234567	11
Europe	Danubio	78.800.000	SMl Fm WMMm ETmvh ‘ II 345	12
Europe	Rin	53.900.000	Fl WMMl ETvh ‘ III 135	13
America	American Coast in the Atlantic		WMMvh	14
Europe	Volga / Mar Caspio	58.900.000	Fl Sl WMMm ‘ III 357	15
Asia	Tigris-Éufrates/Shatt al Arab	43.647.294	SMm WMMh ‘ III 12345	16
Asia	Aral Sea	43.300.000	SMl ‘ III 124567	17
Asia	Taipei	22.894.000	SMl Sh ‘ III	18
Europe	Vistula / Wista	21.900.000	Sl ETh ‘ III 1357	19
Africa	Madagascar Island	18.040.00	Sh Dl ’ II 567	20
Europe	Oder / Odra	17.200.000	Fl ETh ‘ II 35	21
Oceania	Papua New Guinea	5.887.000	SMl WMMh Dl ‘ IV 567	22
Europe	Mediterranean Sea		SMl Fm WMMh	23
America	Continental Coast in the Caribbean Sea		SMl Fm Sm WMMm	24
Africa	Nilo	160.000.000	SMl Fm Dm ’ IV 1234567	25
Africa	Congo/Zaire	63.200.000	VEm Fl WMMm Dl ’ IV 134567	26
America	Parana	22.000.000	Fm ETm ‘ III 35	27
America	Haiti	8.122.000	Fm Sm MHMb ‘ II 567	28
Africa	Dra	1.390.000	SMm Fm ‘ III 367	29
Asia	Amur Daria	63.900.000	**Fm** ‘ III 345	30
Africa	Zambezi	18.040.000	Fm Sl WMMl Dl ’ IV 13567	31
Africa	Awash	1.920.000	VEl Fl Sm ’ III 3567	32
Europe	European Coast in the Atlantic		SMl Sl WMMm	33
Africa	Juba-Shibeli	11.800.000	SMl TSl Fl Dl ’ 34567	34
Asia	Bei Jiang/Hai	83.400.000	MDMl Fl Sl ‘ III 345	35
Africa	Turkana Lake	15.200.000	Fl Sl Dl ’ IV 34567	36
America	Orinoco	10.200.000	SMl Fl Sl ‘ III 5	37
America	Titicacas Lake – Poopo System	2.180.000	Fl Sl WMMl ‘ II 567	38
Africa	Chad Lake	37.300.000	Fl ETl ’ IV 1234567	39
Europe	Elbe	22.400.000	Sl ETl ‘ II 3	40
Oceania	Australia	20.090.000	Fl Sl Dl ‘ II	41
Europe	Po	17.700.000	Fl ETl ‘ II 35	42
Africa	Basin of Orange River	13.100.000	Fl Sl ’ III 3567	43
Europe	Tagua / Tejo	9.440.000	Fl ETl ‘ I 3	44
America	Dominican Republic	8.950.000	Fl Sl ‘ II 567	45
America	Colorado	8.270.000	Fl Sl ‘ III 4	46
Oceania	New Zeland	4.028.000	VEl Sl ‘ III	47
Africa	Ruvuma	3.220.000	Fl Dl ‘ III 3567	48
America	San Juan	2.750.000	SMl Fl ‘ II 567	49

CONTINENT	RIVER BASIN / ISLAND NATION [1]	POPULATION [2]	CODE [3]	ORDER OF PRIORITY
America	Jamaica	2.732.000	Fl Sl ‘ II 4567	50
Europe	Drin	1.830.000	Sl WMMl ‘ II 67	51
Africa	River Basin of Senegal	442.000	SMl Sl ’ III 3567	52
Oceania	Vanuatu	206	TSl Sl ‘ IV 567	53
America	San Lawrence	45.700.000	Sl ‘ II 4	54
Asia	Ob	25.800.000	Fl ‘ III 345	55
Africa	River Basin of Volta	20.100.000	Fl ’ III 3567	56
Europe	Seine	16.300.000	ETl ‘ II 3	57
America	Cuba	11.347.000	Sl ‘ II 5	58
Europe	Ron	9.860.000	WMMl II 35	59
Europe	Schekle	7.820.000	ETl ‘ II 3	60
Asia	Helmand/Sistan Lake	7.800.000	Fl ‘ III 34567	61
Europe	Schekle	7.820.000	ETl ‘ II 3	62
Asia	Helmand/Lago Sistan	7.800.000	Fl ‘ III 34567	63
Africa	River Basin ofthe Oueme	5.110.111	Fl ’III 3567	64
Europe	Garonne	3.520.000	Sl ‘ II 35	65
Europe	Ebro	2.760.000	Fl ‘ II 3	66
Africa	River Basinof Merdjerda	2.440.000	Fl ’ III 3567	67
Africa	Maputo	1.830.000	Sl ’ IV 34567	68
Africa	Natron Lake	1.350.000	Dl ’ III 34567	69
Africa	River Basin of Little Scarcie	869.000	Sl ’ III 3567	70
Africa	Comoras Island	671.200	Sl ’ II 567	71
America	Barbados	279.300	Sl ‘ II 4	72
Africa	Limpopo	218.000	Fl ’ III 34567	73
Africa	St.Tome & Prince	187.000	VEl ’ II 567	74
Oceania	Samoa	178.000	Sl ‘ III 567	75
America	ST. Kitts & the Grenadines	117.500	Sl ‘ II 6	76
America	Yukon	96.200	SMl ‘ II 4	77
Africa	River Basin of Gambia	68.695	Fl ’ III 3567	78
Europe	Dneiper		MDMl ‘ I 345	79

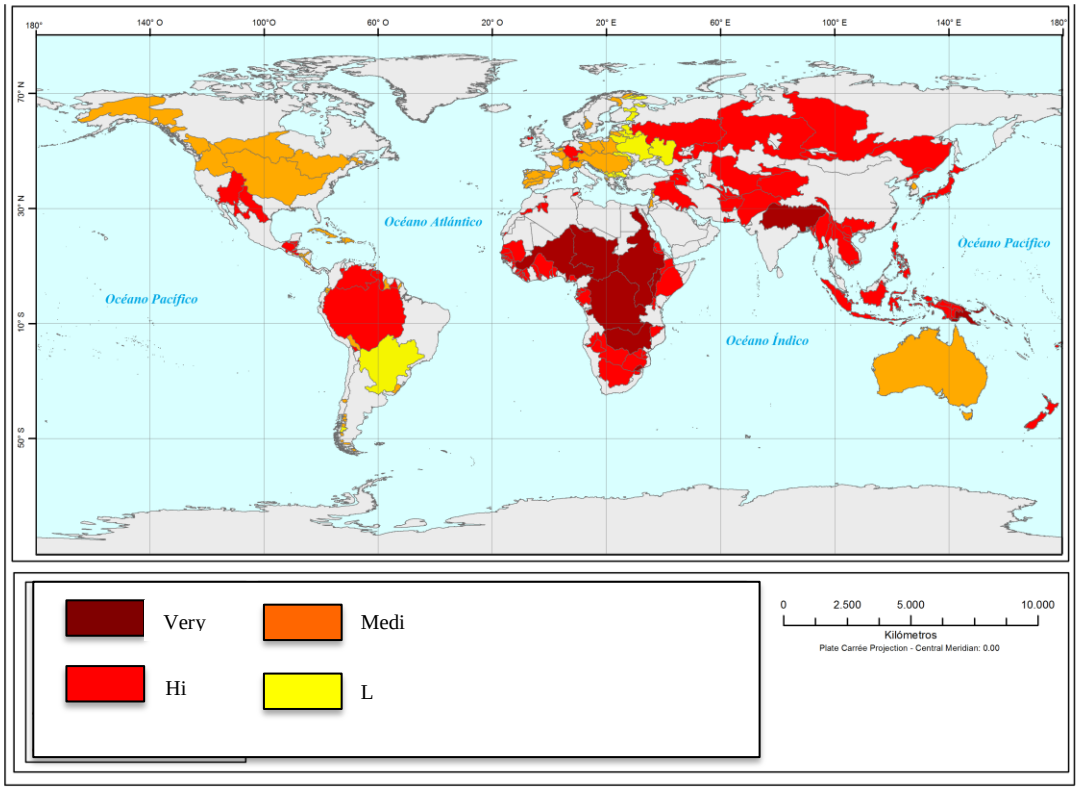
Source: own elaboration

(1) According to the web site http://www.transboundarywater.orst.edu

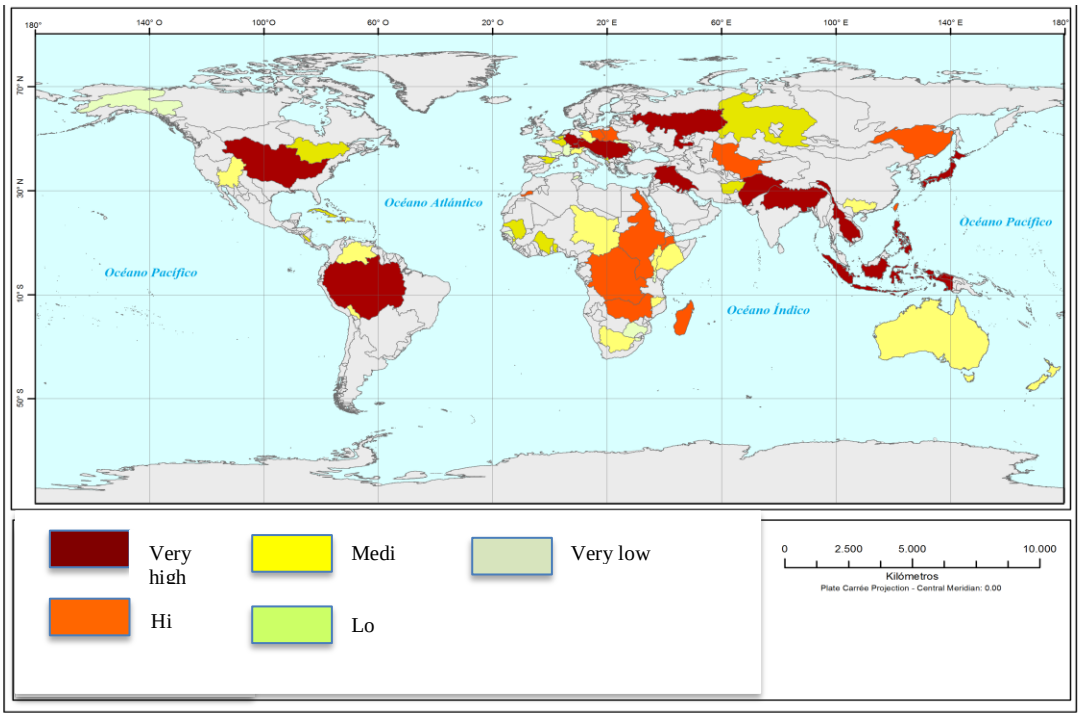
(2) Data from the web site http://waterwiki.net

(3) Taken from the site http://saber.ucv.ve/jspui/bitstream/123456789/9427/1/T026800010858-0-Tesis_de_Fatma_Moreno-000.pdf, pages 432 - 435

Map 1 Difficulty for cooperation of the United Nations to attempt the natural disasters occurred by natural events in the hydrographic transboundery river basin and insular nations of the world



Map 2 Order of priorities to implement cooperation mechanisms of the United Nations to attempt the natural disasters occurred by natural events in the hydrographic transboundery river basin and insular nations of the world



V Action Plan

The United Nations, in order to make cooperation work in the topic of natural disasters more proactive, seek the development and implementation of plans according to the following guidelines:

- Technical cooperation by nations of large technological development in the study of natural events, equipment and methods of prevention and early warning systems.
- Nor refundable grant aid aimed at implementation in regions of high and very high vulnerability to natural events, development of meteorological facilities centers in strategic locations to capture and send information at regional level.
- Environmental management plans for transboundery river basins and island nations. It should be taken into consideration the development of infrastructure for flood control, as for the storage water resources in those areas regularly affected by flood and drought.
- Humanitarian aid and emergency must be scheduled in advance for those regions with greater vulnerability.
- Food aid must meet the traditional diet of the group people affected.
- The UN through the Office of the Humanitarian Affairs Coordinator carrying out the task of coordination between its bodies (regional economic commissions, Food and Agriculture Organization, World Meteorological Organization, United Nations Program for Development, United Nations Environment Program, United Nations Found for Children, World Food Program, World Health Program, United Nations Educational, Scientific and Cultural Organization, United Nations University and Environmental Convention Secretariats), trying to bond with aid groups and local civil defense organizations.

To meet the objectives of this action plan it is recommended to:

- Subscribe agreements between the riparian countries of transboundery river basin, led to development of management plans for the reduction of natural disasters.
- Engage the States Parties of the UN to adjust their national development plans according to management plans of transboundery watersheds, aimed at reducing the effects of natural disasters.
- Ensure the participation of the actors responsible for decision-making and community leaders living in the area.
- Include in the management plans of transboundery watersheds programs aimed at reducing the effects of natural disasters, scientific and technical basis in order to avoid possible difficulties due to political differences of government systems.
- Ensure the participation of women in the development and implementation management plans.
- Engage the most vulnerable states to establish their participation in the programs that will provide them with education on disaster prevention and mitigation, with real-time access to information.
- Plans for prevention of natural disaster must be published in the official language of the riparian countries of the basin river transboundery, and

signatory States are obliged to disseminate to their communities in their own language and dialects.

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