Disaster Summary Sheet
FLOODS

January 2012

Document objective

This disaster summary sheet (DSS) provides a general profile of the potential impact of a flood. The DSS helps understanding what the impact and priority needs after a flooding may be, based on experience and lessons learnt from medium and large scale floods that have occurred in the past.

This document does not intend to provide an in-depth analysis of the specific impact of floods in different settings. It can however be used immediately after you have received a flood alert, as a framework for estimating the impact of the disaster or as a briefing package on "what do we know about the impact of floods on life saving sectors".

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1. What do I need to know?

a. Physical impact

- Floods generally affect a **wider geographical area** than other disasters. (ECLAC 2003)
- **Indirect losses** are often much higher than direct damages. (ECLAC 2003)
- **Crops and livestock** in the affected area are likely to be lost, as well as seeds and tools (WHO, OCHA).
- **Structural damages** after floods are common as they may be swept away by water, become inundated, collapse and be damaged by the impact of floating debris. (ECLAC 2003)
- Floods can **deform the land** on which buildings are built or render them useless (ECLAC 2003)
- Floods can alter course of rivers, thereby disrupting transport, infrastructure and agriculture over a large area.
- Damage is often greater in **valleys** than in open areas (OCHA).
- Blockage of roads, bridges and other infrastructure makes **access** and **communication** difficult. If flood water does not recede quickly, most of the humanitarian assistance may depend on air transport and boats for delivery. Access can remain challenging after flood water recedes, due to damaged infrastructure. (UN 2001)
- Massive amounts of **debris** can be brought about by the flooding which can hamper relief efforts (Flash Appeal Philippines 2009).
- **Electricity** is often interrupted in flood affected areas.
- 15 cm of fast-moving water can knock you off your feet. Water 40 cm deep can carry away most automobiles (NOAA)

- **Flood-related debris** such as sediment, silt, and organic material will affect drainage channels, public roads, public thoroughfares and houses. (WASH Cluster).

- **Landslides** may occur due to saturated soils.
- Flooding can be caused by either **freshwater** or **saltwater**. Each presents specific problems: freshwater carries suspended solids, which leave mud and soil behind when the floodwaters recede, and saltwater can make water sources unsuitable for use, because of the salinity of the floodwaters. There are no simple treatment methods that can be used to remove salinity from salt water (WASH Cluster).
- Containers of **toxic substances** can be carried away and their contents may be released.
- Flooding can **dislodge landmines** that had been under the surface or buried in river banks.

b. Impact on population

- The primary cause of death during floods is **drowning**.
- Examples of common **injuries** after flooding are small lacerations or punctures due to the presence of glass debris and nails, electrical shocks. (WHO).
- Floods can have different effects, depending on whether flooding takes place slowly or quickly.
  - **Slow evolution**: minimal fatalities and injuries,
  - **Flash floods**: many fatalities, few wounded (ECLAC 2003)
- In large-scale flooding, the immediate need is to **evacuate people** from rooftops, trees, and other places where they have sought protection from the rising water (Ferris 2010).
- The most serious consequence of flooding is large-scale **contamination of drinking water** (PAHO)
- At short term, the impact of floods on the **transmission of communicable diseases** is limited. An increased risk for water and vector borne diseases definitely exists. Nonetheless, outbreaks of communicable diseases are rarely observed (WHO).
- Floods are often characterised by **mass population displacements** in a short period (WASH Cluster).
- Floods also destroy productive or **livelihood** assets (ALNAP 2008). Quick and effective recovery from the impact of floods depends significantly on how quickly livelihoods are restored (ALNAP 2008).

2. What is the likely impact of a flood?

a. Aggravating factors

- The **severity of the impact** of a flood is generally related to:
    - The level that water reaches in the flood, the violence and speed of currents, and the geographic area covered;
    - The quality of design of infrastructure;
    - Whether or not precautions have been taken for a certain level of flooding (Early warning, evacuation etc.);
    - The ability of the ground to resist erosion, cave-ins, or landslides brought on by persistent or torrential rain.

The following sections describe aggravating factors that may worsen the humanitarian consequences and impact of flooding:

1. Geography and climate

- **Arid and semi-arid areas:** Areas normally receiving heavy rainfall have evolved dense vegetation that can absorb the impact of falling rain and have developed drainage patters that can handle the expected runoff. Flash flooding in arid and semi-arid regions, where heavy rainfall is rare, can become very severe (Bryant 2005).
- **Deforestation** does have a role in small floods and topsoil erosion by eliminating the buffering and soil-anchoring effects of forests (FAO/CIFOR 2005). Trees prevent sediment runoff and forests hold and use more water than farms or grasslands. Some rainwater stays on the leaves, and it may evaporate directly to the air (the more water used in the watershed, the less remains to run off). Leaves reduce raindrop impact, and gentler rain causes less erosion. Tree roots absorb water from the soil, making the soil drier and able to store more rainwater. Tree roots hold the soil in place, reducing the movement of sediment that can shrink river channels downstream.
- **Areas where floods are not common** - the community will be better prepared in areas where flooding occurs regularly than people living in places where floods are rare.
- **Previous heavy storms**: if the soil is saturated due to earlier storms and heavy rain, it loses its absorbing capacity (2009 Philippines Flash Appeal).
- **Weather:** winter is the worst time to be left exposed to the weather, and those who survive the floods will be at risk of hypothermia, frostbite and illnesses caused by long exposure to dampness and cold. Bad weather also hampers rescue efforts and makes recovery from the disaster much harder (Geography-site).
- **Strong winds**: damage can be more severe when flooding is associated with strong winds as winds can cause already weakened structures to collapse (WASH Cluster)
- **High ground water level** previous to flooding

2. Type of infrastructure and location of the residential area

- **Neglected or inadequately designed dams**.
- **Urban areas** exacerbate flash flooding - much of the ground in urban areas is made impervious by roads and buildings. If drainage channels are fixed in located, the risk of flash flooding is higher than in rural areas with the same amount of rainfall (Bryant, 2005). Given the high spatial concentration of people and values in cities, even small scale floods may lead to considerable damages (WMO).

- **Construction in flood-prone areas -** there is a worldwide trend that more and more people take up residence in areas vulnerable to floods (ABI; WASH Cluster).
- **Obstruction of drainage channels,** e.g. due to poor garbage disposal (WASH Cluster).
- **Sewage treatment plants, waste dumps** or **dangerous industries** located at very low spots in flood prone areas, increasing the risk of contamination of flood water and other secondary hazards and damages. (WMO).
- **Low-lying areas, coastal regions, and communities on rivers downstream from dams** are the areas which are most at risk for floods (Rosenberg).
- **Low-level housing** - Elevated buildings, for instance buildings on perimeter walls, piers, piles, or fill are less likely to be flooded. The upper levels of multiple storage buildings can provide safety in case of a flood (FEMA 2010).
- **Mud, bamboo and straw-built houses** (WFP 2007).

3. Others

- **Lack of functioning health structures.**
- **Lack of forecasting and early warning information and communication systems.**
- **Unprotected food stocks and standing crops, livestock** (OCHA).

b. Lessons learnt

General

- There is a worldwide trend that more and more people take up residence in areas that are vulnerable to floods (ABI).
- Flooding is increasing in urban areas, causing severe problems for poor people (UNESCAP 2009).
- When comparing fatality rate related to flood events (1985-2003), it appears that deadly floods are worse from June to July in South Asia. Central America has some deadly floods in Sept/Oct and South America in Feb. In Africa, the seasonality seems to be less influent on the number of fatalities (Darthmouth).
- Of all natural disasters, the floods are most frequent (46%) and cause most human suffering and loss (78% of population affected by natural disasters). They occur twice as much and affect about three times as many people as tropical cyclones. While earthquakes kill more people, floods affect more people (20.000 affected per death compared to 150 affected per death for earthquakes) (OFDA/CRED, 2006).
- A study of the United Nations University (2004) shows that floods impact over half a billion people every year worldwide and might impact two billion by 2050, of which a disproportionate number live in Asia (44% of all flood disasters worldwide and 93% of flood-related deaths in the decade 1988-1997).
- People's needs and the flood's impact are not linked solely to the level of water. The conditions of their lives and livelihoods do not necessarily improve when the water recedes. Often, real misery starts when floodwaters recede and displaced people start going home (ALNAP 2008).
- People whose houses are not inundated may be left out of flood response interventions, even though the flood may adversely disrupt their livelihoods (ALNAP 2008).
- Recovery can start as soon as floodwaters recede (WFP, 2000).

- Effective flood responses are those that build on people's existing ways of dealing with floods and complement their coping mechanisms, resources and social capital (ALNAP 2008).

Food security

- When necessary, seeds and tools should be distributed to all the affected population, not only the displaced (many households have homes on higher ground while farming in the valley bottoms) (UN 2001).
- Most urban populations, particularly the poorest, survive by buying and cooking food daily with limited storage for maintaining longer-term food supplies. Given the constraints on urban food systems, any disruption to supply or distribution from a disaster causes immediate consumer shortages (O'Donnell 2009).
- Urban households often rely on a more varied diet.
- Urban households pay more for food in both time and financial costs, particularly the urban poor for whom food is their largest expense.
- Urban households are smaller in average size, but have higher proportions of children to adults and higher proportions of non-family members.
- Urban women's participation is greater in income-generating activities (IRC 2010).
- Even when the flood waters subside, the land may be unfit for agricultural production for a period of time.
- When there is major flooding, livestock and standing crops in the affected area are almost always lost (Ferris 2010).
- Helping people to protect their assets during and after a flood not only makes it easier for them to recover quickly but also reduces future vulnerability and poverty (ALNAP 2008).
- Floods affect not only household livelihoods, but also the local economy, within which household livelihoods operate (ALNAP 2008).
- Vulnerable people should be given various financial and material options, so that they can choose what works best for them. It is important to allow vulnerable people's own choices, concerns and priorities to influence agencies' response strategy. Holistic assessment and participatory planning can facilitate this process (ALNAP 2008).

DIRECT IMPACT	INDIRECT IMPACT
Loss of food stock, crop yields and livestock	Decreased access to food Decreased food access from purchase, due to loss of income Increase of prices for basic foods and commodities
Loss of farm tools, seeds and irrigation channels.	Worsening of the food security situation in the medium and long term Increase of prices for basic foods and commodities
Floods destroy standing crops	Worsening of the food security situation in the medium and long term
Standing flood water limits replanting options	Food security situation deteriorates in the medium to long term Demand for labour in harvesting period decreases, so field workers' income drops.
Damage to markets and supply routes	Decreased food availability
Loss and injury of family members and workforce	Decreased food production

TYPICAL ASSISTANCE NEEDS
• Short term food supply • Market support • Cash for work, Food for work, unconditional cash transfers • Methods for drying and preserving seed stocks • Agriculture tools distribution • Repair of roads and other infrastructure • ....

Health and nutrition:

- Following a flood, conditions may be favourable to the survival and reproduction of vectors, and pathogenic organisms may also be widespread in the environment. Transmission of diseases by vectors is therefore likely to be a serious health risk within affected communities.
- Health risks of most large scale flooding emergencies are both immediate and delayed. Among them, the disruption of public water supplies and waste disposal systems and the contamination of public water supplies can be a major threat to public health; diseases such as cholera, typhoid fever, diarrhoeal diseases, hepatitis and gastroenteritis may increase as a result.
- The most significant diseases are infectious diseases transmitted by the faecal-oral route (such as diarrhoea). Other water and sanitation-related diseases include those carried by vectors associated with solid waste and water (WASH Cluster).
- However, the risk of an epidemic is low unless there is significant population displacement and/or water sources are compromised. Of the 14 major floods which occurred globally between 1970-1994, only one led to a major diarrhoeal disease outbreak - in Sudan, 1980 (WHO).
- Contrary to common belief, there is no evidence that corpses pose a risk of disease epidemics, after natural disasters. Most agents do not survive long in the human body after death (with the exception of HIV – which can be up to 6 days). Human remains only pose health risks in a few special cases requiring specific precautions, such as deaths from cholera or haemorrhagic fevers.
- Tetanus is not common after injury from flooding (WHO).
- Contamination by toxic chemicals during floods is theoretically possible but no verifiable correlation has been observed or measured so far (WHO).

DIRECT IMPACT	INDIRECT IMPACT
• Drowning • Water inhalation and ingestion • Lacerations, broken limbs etc • Electric shocks	• Increased incidence of chest infections • Increased incidence of skin infections, e.g. dermatitis • Exacerbation of existing medical conditions, e.g. diabetes, asthma, angina • Exposure including hypothermia and sunburn • Dehydration • Snake and insect bites • Falls on slippery surface

Disruption of water availability & consumption of unsafe drinking water	Water-borne diseases, such as diarrhoeal diseases, acute respiratory infections (ARI) and skin infections, are common among flood-affected individuals, especially children.
Interruption in basic health care services due to power cuts disrupting the cold chain and flood water which damages health facilities structure, equipment and medicine.	• Lack of access to basic healthcare • Overcrowded health structures • Deterioration of nutritional status, famine and illness may occur if victims do not have access to health care
Human and animal corpses in water	Contamination of water sources and distress caused to survivors of the event.
Overcrowding due to displacement	Increased risk of transmission communicable diseases such as measles and meningitis (WHO).
Destruction of and damage to shelters	People sleep on wet, cold floors which can lead to acute respiratory infections (OXFAM).
Stress	Breastfeeding can be seriously compromised, which can result in an increase in diarrhoea and pneumonia episodes.

RISKS

Floods can potentially increase the transmission of the following communicable diseases:

- Water-borne diseases
- Vector-borne disease

Water-borne diseases:

- E.g. typhoid fever, cholera, leptosirosis and hepatitis A.
- There is an increased risk of infection of non-epidemic water-borne diseases contracted through direct contact with polluted waters, such as wound infections, dermatitis, conjunctivitis, and ear, nose and throat infections (WHO).
- The only epidemic-prone infection which can be transmitted directly from contaminated water is leptospirosi, a zoonotic bacterial disease (WHO).

Vector-borne diseases:

- E.g. malaria, dengue and dengue haemorrhagic fever, yellow fever, and West Nile Fever. through the expansion in the number and range of vector habitats (WHO).
- Malaria epidemics in the wake of flooding are a well-known phenomenon in malaria-endemic areas world-wide (WHO).

TYPICAL ASSISTANCE NEEDS

- Basic emergency rehabilitation of health facilities
- Epidemiological surveillance and disease control
- Medical diagnosis and treatment
- Vector control measures
- reducing the individual risk of being exposed to water-borne and vector-borne diseases in the short term
- Raising awareness on the risk associated with cleanup activities (WHO).
- Vaccination against hepatitis A
- Malaria prevention
- Health education
- ....

WASH:

- Shallow wells are more prone to contamination from flooding than deep boreholes (WASH Cluster).
- The rise of water levels in sewer outfalls can cause waste water to flood the interiors of homes, lower levels of buildings, and public throughways. In homes this occurs through toilets and washbasins; in streets it occurs through manholes and rainwater sinks.
- Groundwater is an important source of water for many rural communities in developing countries. (WASH Cluster). However, if the water table is within 1.5m of the bottom of a pit latrine it is almost certainly contaminated. Therefore, ensure people do not use water from wells in the vicinity of excreta disposal facilities (WASH CLUSTER).
- Conventional pit latrines – that use traditional infiltration techniques – are never flood proof; other technology options (e.g. those that involve raising latrine pits) should be explored and used in flood prone areas (WASH Cluster).

WASH		
WATER SUPPLY	**DIRECT IMPACT**	**INDIRECT IMPACT**
	People may be stranded on roofs and trees, and don't have access to safe water.	
	Standing water may hamper access to existing water sources	
Urban	**Disruption of water distribution systems due to** • Power cuts • Flooding of water treatment plants • Sedimentation, resulting in silting up of components of water treatment plants. **Contamination of drinking water sources by** • Human and animal corpses • Turbidity, organic or saline • Leaking of polluted water into the water supply system. • Overflowing of sewage systems • Overflowing of industrial drainage systems • Fuel flooding into water supply systems	• Consumption of contaminated water: potential risks of water-borne diseases • Insufficient quantity of water available per person and per day • Increased distance to functional water source
Rural	**Disruption of water distribution systems due to:** • Inundation of shallow (protected or unprotected) wells.	• Consumption of contaminated water: potential risks of water-borne diseases • Insufficient quantity of water

	• Loss of intake points due to changes in the course of rivers • Damage to pumping equipment • Sedimentation, resulting in silting up of components of water treatment plants. **Contamination of drinking water sources by** • Human and animal corpses • Turbidity, organic or saline • Leaking of polluted water into the water supply system. • Overflowing of sewage systems • Fuel flooding into water supply systems	available per person and per day • Increased distance to functional water source
SANITATION	**DIRECT IMPACT**	**INDIRECT IMPACT**
	Irrigation, drainage and storage facilities are heavily affected	
	Overflowing of pit latrines.	• Contamination of the environment • Lack of latrines can lead to open defecation • Lack of available and functional latrines can force women to wait after dark to be able to use an (open air) latrine in private. This can cause constipation.
	Displacement leading to overcrowding	Existing latrines/toilets are filled quickly and rapidly overflow. Open defecation becomes commonplace
	High ground water table	Restricted excreta and waste disposal options
WASTE	**DIRECT IMPACT**	**INDIRECT IMPACT**
	Restricted options for solid waste and waste-water disposal	• Increased presence of vectors • Accidental releases to ground water • Altered drainage patterns. Existing drainage channels, canals may be clogged with waste or mud
HYGIENE	**DIRECT IMPACT**	**INDIRECT IMPACT**
	Loss of basic hygiene items for personal and domestic uses	Non-availability of safe drinking water and damage to sanitation infrastructure can cause skin problems and infections, especially among women and children.
TYPICAL ASSISTANCE NEEDS		

- Distribution of safe water and means to store and use.
- Rapid cleaning and disinfecting programme for affected water sources
- Improving access for hygiene and sanitation services
- Raising tube-wells and boreholes above flood water level to prevent contamination (ALNAP 2008).
- Innovative approaches to sanitation in flooded areas, such as raised latrines, pit liners or rings, sealed pits or tanks, or contained leach fields (WEDC, 2007)
- Provision of adequate excreta disposal facilities and promotion of good excreta disposal practices **(**WASH Cluster**)**
- Decontaminating water from community ponds or essential water bodies used for washing and cleaning utensils.
- Distribution of household water treatment materials and related instruction.
- Repairs to existing sanitation facilities and water works
- ....

Shelter and NFI

- The impact of floods in infrastructure/building is caused by different factors: a) Flood depth, b) Flood duration, 3) Uplift due to soil saturation and 4) Horizontal force created by flood waves or currents.
- Floodwater can submerge buildings and cause various degrees of damage from staining of walls to structural collapse depending on flood depth and/ or duration and type of building (ADPC 2005).
- Land/property issues and related disputes typically emerge in the aftermath of a disaster, particularly in urban areas where there is high demand for housing.
- Land ownership after floods can pose problems as land markers can be washed away by floods (Ferris 2010).
- Debris and mud displaced by the floods must be removed before rebuilding can take place (Brookings Institute 2010).
- The distribution of hygiene or health related NFI's should always be accompanied by information on why it is included in the distribution and on optimal use whether this is in relation to water purification tablets, water filters, mosquito nets, sanitary towels or soap for hand washing (WASH Cluster).
- Provision of mosquito nets is important, especially in malaria-endemic areas.
- When floodwater recedes, displaced people can return to their former place of residence. House cleaning kits need to be distributed to support reconstruction of damaged houses (Ferris 2010).
- Quick provision of temporary shelter reduces exposure, can help to limit the outbreak of disease (ALNAP 2008).
- Reconstructing permanent housing in large-scale disasters may take a long time. In such cases, temporary or transitional shelter should have adequate facilities (for water and sanitation and cooking) (ALNAP 2008).
- If a housing strategy is to be successful, materials should be chosen with care to ensure that they have multiple uses, can protect people from climatic conditions and do not adversely affect the local environment (ALNAP 2008).
- Basic service provision is equally important for resettlement (ALNAP 2008).

Protection

- Disasters cause more damage to vulnerable geographic areas, which are more likely to be inhabited by poor people (PAHO).

- Natural disasters do not only seriously disrupt the functioning of a community by causing widespread human, material, economic or environmental losses, but also the mechanisms established, formally or informally, to protect the lives, security and basic rights of the population.
- A breakdown of law and order can occur following a disaster. Emergency situations tend to exacerbate existing inequalities among the population, or other human rights/protection concerns (Haiti Flash Appeal 2010).

Gender

- Women are especially vulnerable to disasters (e.g. floods) for the following reasons:
  - Changing role of women (from care giver to head of household) and less access to resources, social networks and decision-making. Lack of safety nets
  - Informal and agricultural sectors are usually the most impacted by disasters. In different societies, these sectors are the main income source for women. As floods have a large impact in the agricultural sector, women become over represented among the unemployed.
  - Women have less freedom and mobility to look for alternative sources of income.
  - Less access to relief and information in specific cultures
  - Low visibility in society and sometimes limited understanding of women's needs in post disaster situation (i.e. reproductive health). Identification and attention to their needs is most often inadequate.
  - Reproductive and sexual health care are often neglected in an emergency.
- In many communities, household cleaning is traditionally the role of women/girls, while men will go out and seek immediate livelihood opportunities. Being left behind to undertake household cleaning will make them more vulnerable to diseases brought about by the extra burden of coping with household level crisis and unsanitary conditions (Flash Appeal Philippines 2009)
- Although targeting women for relief distribution can have numerous advantages in certain contexts, there is a need to address women's safety after departure from distribution sites, as well as the physical effort required by women to transport distributed relief (Haiti Revised Appeal 2010).

c. Coping mechanisms

The following table contains a list of coping mechanisms generally adopted by affected population to cope with the impact of a flood.

REVERSIBLE STRATEGY	IRREVERSIBLE STRATEGY	RISK SURVIVAL STRATEGY
Changes in food intake (e.g. less meals, cheaper foods)	Taking out loans which cannot be paid back	Decrease food intake
Drawing on food stores	Sale/mortgaging of productive assets (tools, and seeds)	Theft
Increased (sustainable) sale/slaughter of livestock	Mortgaging of farm land	Travel to insecure areas to work or to gather food or fuel
Collection of firewood, charcoal, building poles	Intensification of self-employment activities	Over-use of natural resources, such as excessive fishing and collection of firewood
Harvesting of reserve crops	Increased social support/gifts	Reduced expenditure on productive inputs (fertilizer, livestock drugs)
Migration for work		Child labour
Intensification of local labour activities		Reduction in expenditure on school fees and health care
Selling non-productive assets		Sale of household assets

Taking out loans or calling in debts	Prostitution and external relationships
Changes in livestock migration patterns	Engaging in illegal economy e.g. drug trafficking
Separation of families and mothers from children	
Short-term/seasonal labour migration	

3. Quick impact analysis

a) Before to start...

- **Flood monitoring**: Through Darthmouth's 'River Watch', floods can be monitored worldwide. The Global Flood Detection System from GDACS is also an excellent resource.
- **Locate floods:** Make sure that you have the last version of Google Earth (GE). The Google Earth Pro version could be useful for satellite imagery analysis as it integrates measuring tools that enable to measure distance, area, and radius a well as modules to import, style and view GIS data without installing additional and costly GIS software in your computer. The Floods lives KML provided by GDACS is a key resource for locating floods
- **Weather forecast:** The *real-time rainfall accumulation KML* of TRMM.
- **Locate past floods**: Use the *Global Active Archive of Large Flood Events of the Darthmouth Observatory to identify and locate past flood events as well as to have access to satellite imagery and details on loss and damages.*

b) Identify the aggravating factors:

Look for...	
Determination of the affected area	GDACS, Google Earth, Dartmouth Flood Observatory, UNOSAT

- Low-lying areas, coastal regions, and communities on rivers downstream from dams are the areas which are most at risk for floods (Rosenberg).

➢ *There are two ways to estimate the affected area, depending on the type of flood.*

- *Floods caused by rain or storms can be measured by making a plan and establishing key points according to the information obtained (the triangulation method) or by examining the contours and the elevation of the land, on the assumption that the lowest areas will be the most prone to flooding.*
- *In the case of flooding caused by swollen rivers or tsunamis, the river's normal course or the beach line are taken as the base line. From there, parallel lines may be drawn, as reports arrive of affected areas (see figure 2).*
- *This information should be complemented with information about the sector's geographical characteristics such as contour lines, slopes, hills. ECLAC 2003*

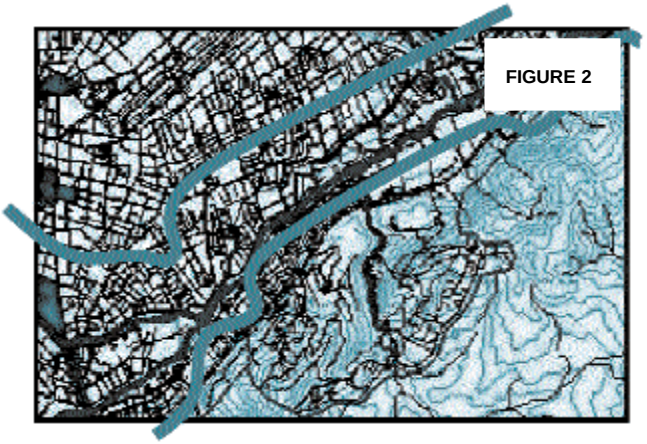

FIGURE 2

Type of floods and their consequences

- Floods can have different effects, depending on whether flooding takes place slowly or quickly.
    - Slow evolution: minimal fatalities and injuries,
    - Flash floods: many fatalities, few wounded (ECLAC 2003)

- Flooding can be caused by either freshwater or saltwater.
    - Freshwater carries suspended solids, which leave mud and soil behind when the floodwaters recede.
    - Saltwater can make water sources unsuitable for use, because of the salinity of the floodwaters. There are no simple treatment methods that can be used to remove salinity from salt water (WASH Cluster**).**

- ***Review what caused the flood. Excessive local rainfall or rain in neighbouring catchments combined with poor drainage and/or high tides?***
- ***Identify whether it is a rapid on-set (flash-flood), a slow (river overflowing) onset flood or if there has been a tidal surge (Tsunami***
- ***Check whether there are early warning systems in place for this specific flood.***
- ***In case of flooding due to heavy rain; check recent precipitation amounts (because soil moisture affects how much rain will soak in and how much will run off), and how much more precipitation forecasters expect.***

Geography, soil type — Google Earth

- Areas normally receiving heavy rainfall have evolved dense vegetation that can absorb the impact of falling rain and have developed drainage patters that can handle the expected runoff. Flash flooding in arid and semi-arid regions, where heavy rainfall is rare, can become very severe (Bryant, 2005).
- Urban areas exacerbate flash flooding; much of the ground in urban areas is made impervious by roads and buildings. If drainage channels are fixed in located, the risk of flash flooding is higher than in rural areas with the same amount of rainfall (Bryant, 2005). Given the high spatial concentration of people and values in cities, even small scale floods may lead to considerable damages (WMO).

- *Consider the type of soil affected*
- *Differentiate between urban and rural areas***.**

Time of the day — GDACS, media

- In case of flash floods and Tsunami's, the time of day of the impact can influence the impact of the floods on the population – e.g. during the night early warning systems may not be as effective and people can be overwhelmed by floods in their sleep.

- *Consider the time of the day and the main activities of the population in the considered area.*
- *Estimates where the following categories of people are supposed to be at the local time of the earthquake (women, men, elderly, children).*
- *Differentiate between rural and urban areas.*

Population density — GDACS, Google Earth, Population explorer, EMOPS

- More people often mean a greater chance of impact on livelihood, habitat, injury, death as well as loss of assets and capital. The closer people are from the floods, the greater the humanitarian impact should be.

- *Within the considered affected area[1], look at high density areas and key human settlements (cities, villages).*
- *List the five to ten most important cities within the considered area and figure out how many*

[1] Use GE

inhabitants are potentially affected[2].

Type of building and infrastructure	Google Earth

- Elevated buildings, for instance buildings on perimeter walls, piers, piles, or fill are less likely to be flooded. The upper levels of multiple storage buildings can provide safety in case of a flood (FEMA 2010).
- Mud-built houses are especially vulnerable to floods.

➢ *Look for photos of habitat. Identify common construction methods in the affected area.*

Weather, temperature and altitude	GDACS, Google Earth, Dartmouth Flood Observatory

- Winter is the worst time to be left exposed to the weather, and those who survive the floods will be at risk of hypothermia, frostbite and illnesses caused by long exposure to dampness and cold. People living in mountainous areas and affected by earthquakes are also a risk of low temperature (Pakistan 2005).
- Bad weather and rainy seasons can also hampers rescue efforts and makes recovery from the disaster much harder.
- Floods that strike in warm dry weather also have specific problems, but these are more associated with hygiene. In addition, high temperatures make it harder for trapped people to survive, for instances on rooftops, due to a lack of water (Geography-site).
- Strong winds: damage can be more severe when flooding is associated with strong winds as winds can cause already weakened structures to collapse (WASH Cluster)

➢ *Identify within the affected areas the variations of altitude and temperature, particularly temperature at night (min and max)[3]. Provide estimates of population at risk of extreme temperature. Identify when the winter will come.*
➢ *Isolate key upcoming climatic events, such as strong winds, or situations that can aggravate the situation or hampered humanitarian access to affected population.*

Impact previous floods	Dartmouth Flood Observatory Global Active Archive of Large Flood Events, EM-DAT Database, Humanitarian Flash Appeals

➢ *Identify whether the affected area is an area that is affected by flooding on a regular basis or people have been surprised by the flooding(ECLAC 2003).*
➢ *Identify what was the impact of previous floods in the same area (fatalities, injuries, destruction etc.)*

Disaster management capacity	Preventionweb, evaluation report of past floods in the same area.

The following parameters can mitigate the impact of an floods:

- Functioning early warning systems in the case of a tsunami.
- Existence of emergency stockpiles (shelter, NFI, food, Water, medicines)
- Functioning health structures for primary health care
- Functioning emergency services (including civil protection, military)
- Existence of effective planning and regulatory frameworks capable of factoring disaster risk reduction considerations into urban development

➢ *Collect few key indicators about the affected country (health, HDI, WASH, GNA, ...)*
➢ *Estimate the capacity of the affected country to cope with the situation compared to the estimated scope and extent of the flood impact[4].*
➢ *Look at the main present INGO in country. Consider if they are involved in relief operations or development programme. Look at regional capacities.*

[2] Use GDACS population estimates and/or PopulationExplorer.
[3] Use GDACS Alert report
[4] Use your estimation of affected population and the scope of the disaster to judge the in-country capacity to address needs.

c) Building a disaster snapshot report:

Disaster snapshot Reliefweb Alertnet GDACS, VOSSOC, media

The report needs to be concise and clear, no more than four pages (including one page of reference map). Use bullet points.

- **Country profile and key indicators**
  - Key indicators
  - Past hazards
  - Disaster management capacity

- **Disaster characteristics**
  - Magnitude, location, depth, etc.
  - Time and date, weather

- **Affected area profile**
  - Map of affected area
  - Name and number of potentially affected districts/areas
  - Characteristics of the affected areas (livelihood, geographical characteristics, density, rural, urban, housing, etc...)
  - Total number of inhabitant living within the affected area

- **Affected population**
  - Estimation of affected population number: potentially affected, injured, death and missing people
  - Number of affected and fatalities/casualties reported after similar past earthquake
  - Pre-disaster vulnerabilities
  - Desegregation per sex and age

- **Estimation of impact on life saving sectors**
  - Main sectors likely affected by the disaster and priority needs
  - Potential secondary effects
  - Lessons learnt and experience from past floods in the same area

- **Estimation of physical damage (hospital, houses, roads, bridges destroyed, etc.)**
  - Critical infrastructure potentially affected within the affected area

Constraints
- Access and communication

- **Key concerns**
  - Secondary effects (landslides, avalanches)
  - Temperature, weather, altitude
  - Key upcoming events (rainy season, winter)

- **Key messages**
  - Likely scope and scale of the disaster
  - Priority sector for assistance / recommendations for intervention
  - External assistance required

Information gaps and needs

Template

Double click on the following icon to see a Disaster Snapshot Report template:

110214 Disaster Snapshot report temp

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ANNEX I: General characteristics

Floods are natural phenomena which maintain soil fertility by depositing fresh layers of alluvium and flushing salt out of soils. At the same time, floods are the most widespread hazards in scope and severity. On the global level, between 2000 and 2009, of 2 billion people affected by disasters; 44% were affected by floods (against 30% by drought and only 4% by earthquakes) (Ferris 2010). The pattern of floods across all continents has been changing. Floods have become more frequent, intense and unpredictable for local communities, particularly as the number of people living in areas vulnerable to flooding increase due to poverty and development issues. WASH Cluster

Floods can be local, affecting a neighbourhood or community, or very large, affecting entire regions (Save the Children, 2010). Floods can be predicted to a reasonable extent, with the exception of flash floods, whose scale and nature are often less certain (ALNAP, 2005).

Modification of the overall landscape during a single flood event is minor in most vegetated landscapes. However, in arid-semi-arid, cultivated (where a high portion of the land is fallow) or urban areas, such events can be a major cause of erosion and damage. Steep drainage basins are also particularly prone to modification by flash floods because of their potential to generate the highest maximum probably rainfalls (Bryant).

a. Causes

Obviously "heavy rain" is the main cause of large floods. The second main cause is "brief torrential rain" which generates flash floods. These causes might be combined (or generated) to one of the other causes. Among this other flood causes, tropical cyclones and monsoonal rain are quite important.

PREVIOUS FLOODS

China

- May 2010
- Sustained heavy rains over a period of time which causes rivers to gradually swell and overflow their banks
- more than 134 million people affected and over 600,000 homes destroyed

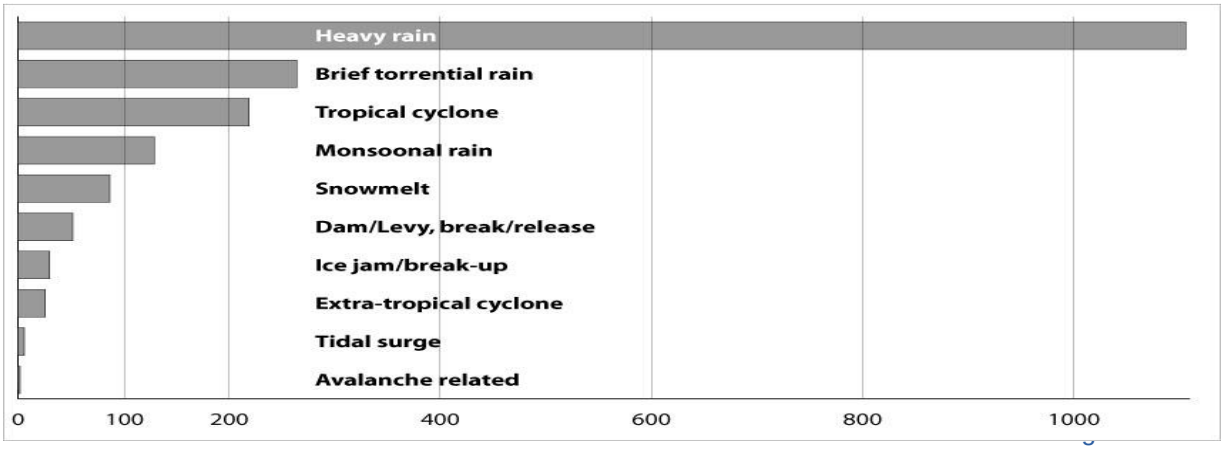
Pakistan

- Flash floods - 28/07/2010
- Heavy rainfall, flash floods and riverine floods, landslides have devastated large parts of Pakistan since the arrival of seasonal monsoon rains on 22 July
- 1,985 killed, more than 18 million people – one-tenth of Pakistan's population
- 1.7 million homes have been damaged or destroyed
- Agriculture most affected sector with estimated $5 billion in losses, especially in crops but also widespread loss of livestock;

More facts on previous floods can be found at EM-DAT

Natural processes, such as hurricanes, weather systems, and snowmelt, can cause floods. Failure of levees and dams and inadequate drainage in urban areas can also result in flooding (USGS).

Main causes of floods *(Darthmouth Flood Observatory, 2004)*:



b. Types of floods (ALNAP 2008, WASH Cluster)

Types of floods			
Type	**Duration**	**Characteristic Impacts**	**Examples**
Predictable, regular flooding	Up to 3 months	Blocks access. Damage and displacement of population often relatively low depending on levels of protection.	Seasonal flooding in Kenya is caused by 'long' rains (March to May).
Increased size of regular flooding	Up to 6 months	Blocks access too many areas. Greater potential for infrastructure damage, livelihoods impacts, and large displacement of population.	River floods affecting low lying areas, with increased frequency and intensity as a result of increased climate phenomena such as El Nino. E.g. floods in Tana River Delta, Kenya.
Flash flooding	A few days to weeks	Rapid cresting often with little warning. High velocity flood flows can destroy infrastructure. Population displacement often localized.	Yemen, 24 Oct 2008. Flash floods caused by tropical rainstorm lasting 36 hours.
Coastal flooding	A few days	Often combined with wind damage from storms. Damage and displacement along coastline with extent depending on storm size.	Maldives, 15 May 2007. Southern atolls affected by waves surging as far inland as 600 metres.
Slow-onset from sustained rainfalls	3-6 months	Blocks access. Depending on season, damage to crops may be significant. Population displacement limited and may be dependent on food security.	River floods that seasonally affect areas along major rivers e.g. western part of Kenya.

c. Related disasters:

Floods can trigger:

- **Landslides/mudslides**: Flooding, because of heavy rains, is often paralleled by mudslides (Ferris 2010). In a land- or mudslide, masses of rock, earth, or debris move down a slope.
- **Displacement:** Floods can force the affected populations to leave their homes. The nature and duration of the displacement depend on the duration of inundation (ALNAP 2008)

d. Severity classification

Unlike earthquakes and hurricanes, floods do not have a standardized rating system that meteorologists can use to measure their intensity. However, there are three factors that scientists can use to determine the magnitude of a flood: stage, which is the depth of the water; discharge, which is the volume of water that passes through a given area in a certain period; and area covered by the water (Dweck).

The size of floods is measured on a "recurrence interval" system. After studying a waterway, scientists can estimate the probability that a flood of a certain size will occur. For instance, if research shows that there is a ten percent chance of a flood occurring on an annual basis, this flood would then be classified as a "10-year flood." If there is only a one percent chance of a flood occurring, this would be classified as a "100-year flood." Under this system, the larger the interval, the bigger the flood (ESA 1998)

The Dartmouth Flood Observatory divides floods into three classes.

- Class 1: large flood events: significant damage to structures or agriculture; fatalities; and/or 1-2 decades-long reported interval since the last similar event.
- Class 1.5: very large events: with a greater than 2 decades but less than 100 year estimated recurrence interval, and/or a local recurrence interval of at 1-2 decades and affecting a large geographic region (> 5000 sq. km).
- Class 2: Extreme events: with an estimated recurrence interval greater than 100 years.

e. Terminology

Coastal floods: High tides and storm surges caused by tropical depressions and cyclones

Flash floods: A flash flood is a flood that rises and falls quite rapidly with little or no advance warning, usually the result of intense rainfall over a relatively small area (AMS 2000). Typically, flash floods occur primarily at night and when there is an abundance of atmospheric moisture; in addition, there is usually little, if any, vertical wind shear present (Weather Explained).
Flash floods occur as a result of the rapid accumulation and release of runoff waters from upstream mountainous areas, which can be caused by very heavy rainfall, cloud bursts, landslides, the sudden break-up of an ice jam or failure of flood control works. Flash floods are particularly common in mountainous areas and desert regions but are a potential threat in any area where the terrain is steep, surface runoff rates are high, streams flow in narrow canyons and severe thunderstorms prevail (WHO).

Flood: the temporary covering by water of land not normally covered by water

Local floods: Very high rainfall intensity and duration during the rainy season sometimes caused by seasonal storms and depressions and exacerbated by saturated or impervious soil.

River basin: the area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta. (Directive 2000/60/EC)

River Floods: River floods are triggered by heavy rainfall or snow melt in upstream areas, or tidal influence from the downstream. Ground conditions such as soil, vegetation cover, and land use have a direct

Tributaries: Then trace on the streams, brooks and smaller rivers that feed into your main river.

Annex II: Safety recommendations

a. What to do during a flood

Most flood-related deaths and injuries occur as a result of people attempting to walk or drive through rising flood water. When flooding starts you should take the following precautions;

If you are on foot:

- Move to higher ground and stay there. Do not walk through flood water, as even shallow water can sweep you of your feet and there may be hidden dangers such as open drains, damaged road surfaces or submerged debris.
- If you must walk in the water, try to walk where the water is not moving and use a stick to check the firmness of the ground in front of you.

If you are in a vehicle:

- Do not drive into flood areas. If you come across flood water do not attempt to drive through it, as the water could be much deeper than it appears and you could become stranded or trapped. Turn around and take a different route.
- If you must drive through flood water, drive slowly to prevent the engine from getting wet or the tyres losing grip.
- Drive with the windows open in case a quick escape is necessary.
- If your vehicle loses control or stalls, abandon it and move to higher ground.

If you are in a building:

- If you are in a (solid) multi-storey building, move to one of the higher floors.
- Switch of the electricity at the main power switch and close the gas valve, but do not touch electrical equipment if you are wet or standing in water.
- Fill bathtubs, sinks and jugs with clean water in case water becomes contaminated.

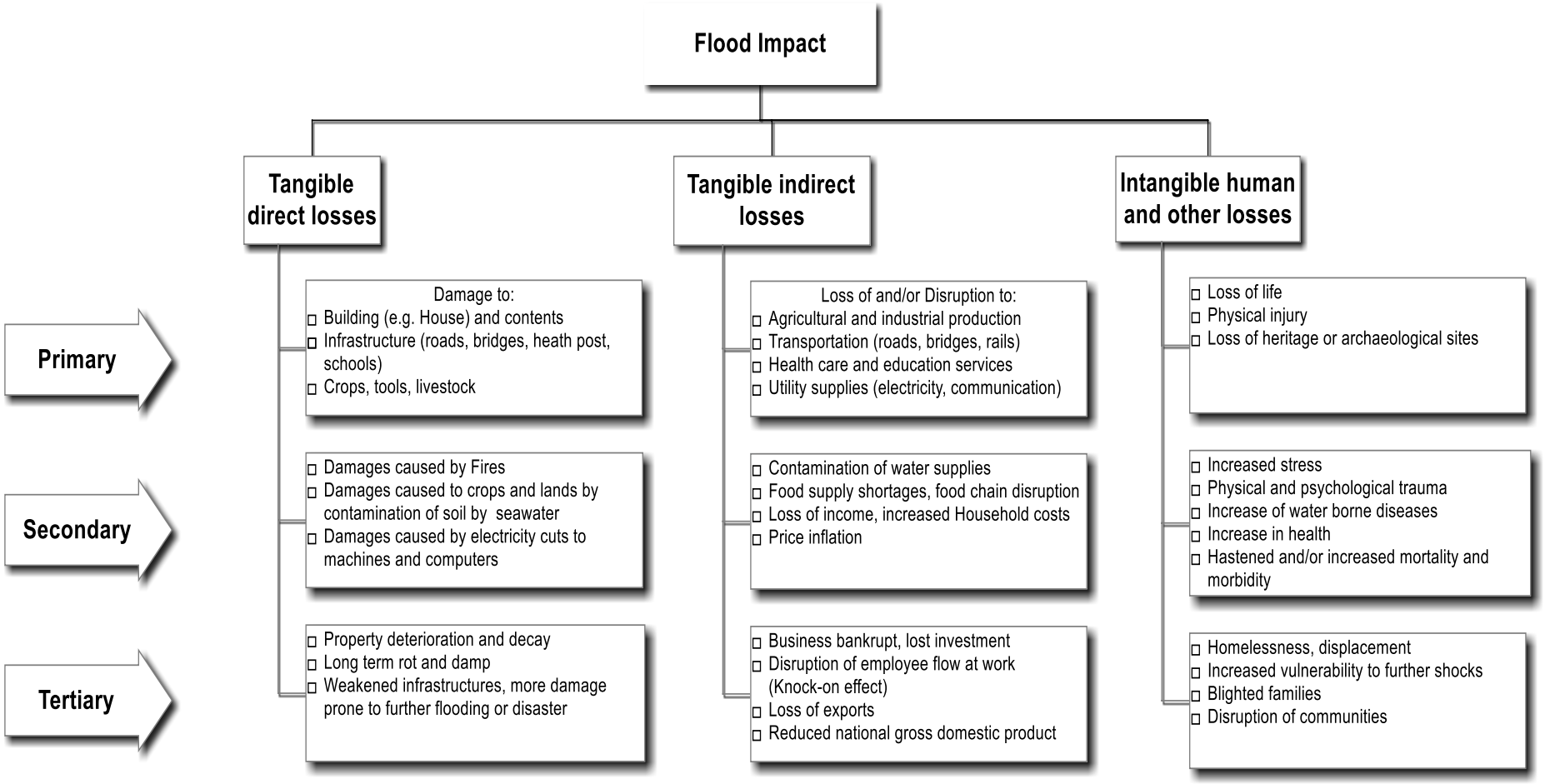
b. What to do after a flood:

The dangers associated with floods do not end when the water level recedes; new dangers arise in the aftermath of a flood. Particular care should be taken when re-entering flooded buildings to assess damage or to clean up debris, or while travelling in areas following flooding. It is important to consider the following basic guidance:

- Be aware that additional flooding, flash floods or landslides may occur.
- Stay out of buildings that look badly damaged or if floodwaters remain around the building. Always use extreme caution when entering buildings as there may be structural damage, gas leaks and risks of electrocution from damaged wiring. Animals, especially snakes, may be hidden inside, so use a stick to poke through any debris.
- Open doors and windows at least 30 minutes before starting cleaning activities.
- If landmines and unexploded ordnance (UXOs) are present in the area, be aware that these may have been moved by the flood water.
- Disinfect cuts and wounds which have been into contact with floodwater.
- Wash and disinfect clothes worn for clean up campaigns. Clothes salvaged from the flooded home should also be washed and disinfected.
- Ensuring the house is fully dried before resettling.

Source: Save the Children 2010 and WASH Cluster

Annex III: Categorisation of flood losses



Source: WMO, 2008. Urban Flood Risk Management.