THE ENVIRONMENT, WATER, SANITATION AND HYGIENE: KEY CONCEPTS AND CONSIDERATIONS IN EMERGENCY RESPONSE

1. INTRODUCTION

This paper provides an overview of key concepts and considerations with regards the environment and water, sanitation and hygiene (WASH) activities undertaken in emergency operations. It has been developed to assist senior emergency managers, trainers and field personnel to understand the critical role which the environment plays in the effective provision of WASH services immediately after a disaster and until normal WASH-related infrastructure and capacities are established or re-established. This note is one of a series of documents produced by the Global WASH Cluster to improve the consideration and more consistent and timely integration of environmental issues in emergency WASH operations, as well as to improve the overall effective delivery of critical assistance to disaster survivors.

There are many occasions during an emergency response when environmental issues need to be identified, understood and addressed. The emergency response to displacement in South Darfur and eastern Chad, for example, involved drilling numerous boreholes to meet immediate water needs in arid areas where no reliable or easily accessible water supplies existed. In many instances, however, the number of boreholes posed eventual problems as groundwater extraction exceeded recharge rates. There were also issues relating to water quality. Such wells also have the potential to create conflict over future ownership and access when the camps eventually close.

WASH-environment linkages are also important where extensive water, sanitation and hygiene infrastructure suffers considerable damage due to a disaster. For instance, an earthquake which severely damages a sewage treatment plant serving 800,000 persons can result in the discharge of partially treated sewage into a river. The inability to use this system after a disaster may pose greater environmental problems than if the same earthquake-affected population used latrines, which could be quickly re-established after the disaster. Where WASH capacity depends on extensive physical infrastructure, the failure of such infrastructure can force disaster survivors to depend on unsustainable or unsafe environmental resources to meet daily basic needs.

2. CORE CONCEPTS

Core concepts behind the WASH-environment linkage are that:

- many resources used to meet WASH demands come from the environment, in most cases directly; and
- many outputs from the provision of WASH services have a potentially negative impact on the environment.

A simple example of these concepts is the provision of water. Water is most often sourced directly from the environment, through wells, from rivers, captured from springs or roofs or extracted from the sea before being treated and delivered to the consumer. If the environment near the consumer cannot provide sufficient water then the water supply effort has to draw from a broader catchment area, at times many kilometres from the consumer. This may require the construction of pipelines or the establishment and maintenance of a tinkering system, each of which will have likely added environmental impacts. If environmental conditions where the water is sourced are poor, then the water will require treatment before it can be used. Over-extracting water, disposing of harmful chemicals collected during the treatment process or allowing extensive wastage in delivery can all result in

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negative environmental impacts if not mitigated properly. The following section explores these WASH-environment linkages in more detail.

3. KEY CONSIDERATIONS

3.1 Water

Short-term over-abstraction is acceptable, if mitigated.

Water needed by disaster survivors comes from various sources in the environment. The manner in which water is extracted can have short- and long-term negative impacts. In some cases, particularly when acute water shortages (e.g. less than 8 litres per person per day) are experienced, short-term over abstraction of water to meet basic humanitarian needs can be justified. Such over abstraction, however, needs to be stopped as quickly as possible, replaced by sustainable sources and the over-abstracted sources allowed to regain their natural equilibrium.

Water may contain hazardous compounds, which need to be safely extracted and disposed of properly.

Water quality needs to be assessed from the outset of a humanitarian operation. Some water sources contain natural compounds such as arsenic which pose a problem for human health. Removing these compounds from potable water usually results in the concentration of hazardous materials, creating a secondary need for safe and environmentally proper disposal.

The social role of water needs to be considered in developing existing or new water supplies.

The role which water plays in society needs to be considered in extraction and distribution plans. Access to water may be governed by customary law or other restrictions. Opening previously restricted supplies of water to wider use may destabilise local resource use structures, or shift demand to new locations, e.g. for livestock watering.

The potential for conflict over new or expanded water sources needs to be assessed and addressed.

Exploiting new water sources, or expanding the production of existing sources, may also lead to conflict. Increased water supplies can make occupation of a location more attractive and thus subject to dispute during or after an emergency operation. An environmental conflict analysis should be developed for the new or expanded use of any water source.

The future use of water sources needs to be planned.

The decommissioning of water sources – or returning sources to their pre-disaster production levels – should be a part of all emergency water assistance plans. Emergency water operations can be used to improve pre-disaster water supplies. However, emergency water supplies should not, after a disaster, lead to over-exploitation of water resources, or the overloading of local environmental resources (e.g. pasture or irrigated farm land) due to the new availability of water.

Water wastage should be prevented.

In many emergencies, the immediate objective is to provide water as quickly and in as great a quantity as possible. This approach has clear justifications, not least the role which water can play in assuring human health, enabling good hygiene to be practiced and limiting the spread of disease.

However, many local water sources are *de facto* finite, with overuse resulting in reduced quality or availability of water for other uses. Furthermore, supplying more water than is strictly necessary often results in the unnecessary operation of pumping and other equipment, driving up the overall cost of a relief operation, as well as increasing maintenance requirements. Standing water from overflows may also contribute to the creation of insect breeding sites and poor environmental conditions as less care is taken with controlling or regulating the level of water used. While emergency operations should not intentionally restrict water available below real needs, an excessive supply of water should also be avoided for

economic and environmental reasons. Promoting environmental awareness is therefore also an important measure to consider.

Recognition also needs to be given to the often considerable quantities people use to boil water for cooking and other purposes. While not only a WASH concern efforts should be made between cluster agencies and implementing partners as well as households to encourage and promote the use of improved cooking stoves and energy-efficient cooking practices, both of which when used together can bring about a significant reduction in the amount of fuelwood used to boil water.

In terms of moving towards a more consistent approach for integrating environmental issues in WASH interventions in emergency contexts, consideration should be given to adopting an Integrated Water Resource Management approach, whereby the potential effect of water abstraction, human and domestic waste disposal and physical resource use is both analysed and addressed as a core part of the intervention responses. This must include analysis and addressing of the socio-economic impact of the intervention related to water and resource use, such as the use of water for productive, non-domestic, purposes, water vending, increased and inefficient irrigation of crops and the potential for water re-use and conservation.

3.2 Sanitation

Good sanitation creates good environmental conditions.

The necessary requirements for good sanitation following a disaster include proper management of solid and liquid waste, proper drainage, eliminating or preventing the occurrence of breeding areas for vectors, adequate sewage management and a minimisation of air pollution.

Good solid waste management is more than garbage collection.

An early emphasis in many emergency WASH operations is on garbage collection and site clean-up campaigns, often through labour intensive public works activities. Experience has shown, however, that many solid waste collection campaigns result in garbage being collected from one location and dumped indiscriminately in other locations, often in environmentally fragile areas such as wetlands.

Good solid waste management involves considering and planning for the complete and environmentally sound collection, processing and disposal of waste. Simply moving waste from one location to another without addressing the health and environmental impacts is bad sanitation.

Improper sewage management will lead to environmental and health problems.

Initial emergency WASH efforts tend to focus on the provision of water, with liquid waste management often being a second priority. When the latter is addressed it is often done in an incomplete and haphazard manner. As a result, the availability of latrines, portable toilets or other sewage collection systems are often less than those required by international standards, defecation is uncontrolled, facilities are poorly managed, systems to collect sewage do not meet waste output, and sewage, when collected, is disposed of in an *ad hoc* and environmentally unsound manner. The result is avoidable damage to the environment and increased risks to human health. To avoid these problems, sewage management plans need to be complete and cover all aspects of collection and safe disposal.

Effective vector control requires a clean environment.

Disease vectors, including rats, flies and mosquitoes, often increase following a disaster and pose specific challenges for emergency sanitation efforts. The use of chemicals – insecticides, larvacides or molluscicides – is often the first consideration when responding to the increase in vectors.

This approach, however, has significant negative environmental impacts such as the removal of beneficial species or the disposal of hazardous waste, as well as significant potential health risks.

It is unlikely that the use of chemicals as the main element of vector control efforts will be effective in the long-term. It is also expensive in the short-term. Experience indicates that proactive environmental management, by creating conditions which are not conducive to the development of vector populations, can be largely successful in controlling the threat posed by disease vectors.

Recycling and re-use are key elements of a good waste management programme.
The disruption caused by a disaster often reduces the quantity of both solid and liquid waste, at least temporarily. There are strong economic and environmental justifications for implementing recycling and re-use components in any post-disaster waste management effort. Economically, recycling and re-use can reduce the amount of waste which needs to be transported, processed and disposed, saving funds for other WASH efforts.

From an environmental perspective, recycling and re-use reduce the need for additional extraction of natural resources, e.g. through recycling paper, plastics and metal, and provide inputs to improve or repair environmental damage done by a disaster, e.g. through the generation of compost which can be used to rehabilitate affected areas through soil enrichment. An additional advantage of including recycling and re-use in waste management is that these activities can be labour intensive and as such can be designed to provide needed livelihood support for the disaster-affected. Encouraging active re-use and recycling also significantly reduces the volume of waste that needs to be handled or disposed of in landfill sites.

Good environmental conditions mean adequate drainage, which is necessary for good sanitation and hygiene.
A good environment means the absence of stagnant water or erosive areas caused by improper drainage systems. The drainage problems faced by disaster-affected areas and emergency settlements can come from debris-choked drainage channels, for sites which are on flat land with poor natural drainage (e.g. a sports field) or on marginal land which has poor natural drainage. Unless these drainage challenges are addressed, disaster survivors face the threat of increased disease vectors and unhygienic conditions from standing water, poor shelter (poor drainage can lead to the flooding of emergency shelter) and generally unsanitary conditions.

Attention is also needed to drainage with respect to water points, wash areas and near toilets and drainage needs to be designed into the establishment of these facilities. For example, toilets on one camp in Albania had water connections for washing, but the faucets did not shut-off automatically. As a result, the latrines quickly flooded, with the waste water slowly spreading through the camp. The design of toilets, water points, and wash areas needs to needs to consider drainage, if only for the basic human right of a safe environment.

3.3 Hygiene

Good hygiene is not possible in poor environmental conditions.
Poor environmental conditions, whether from an abundance of uncollected garbage, poor drainage or improperly managed toilets, make good hygiene difficult if not impossible. On the other hand, where sanitation and environmental management are good, good hygiene is not only possible but likely given the public awareness of environmental and sanitation conditions which result when these conditions are good.

Hygiene facilities need to consider environmental impacts.
It makes no sense to build hygiene facilities – bathing and washing areas, toilets or hand-washing stations – which do not consider and address resulting environmental impacts. Waste water from washing areas should not create unsanitary or muddy areas or provide vector breeding areas. Toilet areas should be

properly sited and maintained and not become the site for garbage disposal. The planning for, and operation of, hygiene facilities should be an integral part of the environmental management plan for WASH activities in a disaster-affected site.

4. THE PROVISION OF ASSISTANCE

The environmental impacts of WASH activities extend beyond the direct provision of water, sanitation support and hygiene assistance to the way that these commodities and services are procured and delivered. Key considerations include transport, packaging and energy.

4.1 Transport

The most effective means of transport should be used to deliver WASH supplies. Where commodities are time-sensitive – where disaster survivors are at immediate risk of death, injury or deteriorating health conditions – air transport should be used. However, air transport should not be used for items which are not time sensitive if and when other means of transport, such as ships, rail or roads, are available.

4.2 Packaging

Packing of WASH supplies should be adequate to address safe transport requirements, but should not be excessive. To the extent possible, shrink wrapping should be avoided and items should be shipped in bulk packaging. Hazardous items such as chlorine should be clearly labelled and properly packaged for the appropriate transport conditions.

4.3 Energy Efficiency

Opportunities to deliver water, sanitation and hygiene in the most energy efficient manner should be integral to operations planning and execution. The use of solar water heaters, biogas (as an energy output and source of energy for heating water, pumping or cooking), electricity from solar or wind sources, and insulation should be used to reduce demand for non-renewable energy sources, or from local renewable resources when these are overexploited. Where possible, gravity should be used to deliver water and water tanks used to store water during off-peak times to avoid having to run pumps on a constant basis. All vehicles used in WASH activities should be properly maintained, and properly sized to needs to use as little petroleum-based fuel as possible.

5. WASH, SPHERE STANDARDS AND THE ENVIRONMENT

The Sphere Standards for WASH focus specific attention on environmental considerations in the following five areas:

- Water
  - The sourcing of water considers the short- and long-term risk of over-exploitation.
  - A Water Safety Plan is developed for each water provision operation.

- Excreta disposal
  - The environment is free from faecal contamination.
  - Toilets should not result in environmental contamination.
  - All sewage is disposed of in a way to limit future environmental problems.

- Vectors
  - Shelter sites are not be located in environments at risk of disease vectors.
  - Environmental modification is used when practical to reduce the threat from vectors.
  - Proper procedures are used to protect applicators, bystanders and the environment when chemical control methods are used to control vectors.

- Solid waste
    - Clean-up campaigns are used to minimise the environmental – and sanitation and hygiene – impacts of garbage and other waste.
    - All waste – including market and slaughter waste – is disposed of in a way which avoids future environmental problems.
- Drainage
    - The environment and the people living in it are not threatened by erosion, storm water or the health, sanitation and hygiene hazards associated with standing and stagnant water.

At the same time, the Sphere Standards for water, sanitation and hygiene contain an underlying theme that an "ugly" environment (in the words of the Sphere Standards) makes good sanitation and hygiene problematic.

Otherwise put, a good environment, one which is sanitary, hygienic, well drained with a sustainable water supply, is an environment which meets the concepts and details set out on WASH in the Sphere Standards.